



5. konferenca z mednarodno udeležbo –
Konferenca VIVUS s področja kmetijstva, naravovarstva,
hortikulture in floristike ter živilstva in prehrane

5th Conference with International Participation
Conference VIVUS Conference on Agriculture, Environmentalism,
Horticulture, Floristics, Food Production and Processing and Nutrition



Konferenca VIVUS

kmetijstvo, naravovarstvo,
hortikultura in floristika ter živilstvo in prehrana

Agriculture, Environmentalism, Horticulture,
Floristics, Food Production and Processing and Nutrition

*»Družbeno odgovorna uporaba novih znanj
in naprednih tehnologij«*



*»Socially Accountable Use of New Knowledge
and Advanced Technologies«*



Zbornik izvlečkov

Collection of Abstracts

26. oktober 2018
Biotehniški center Naklo
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26th October 2018
Biotechnical Centre Naklo
Higher Vocational College
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Conference VIVUS: SOCIALLY ACCOUNTABLE USE OF NEW KNOWLEDGE AND ADVANCED TECHNOLOGIES m

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Strahinj, 26. oktober 2018 / 26th October 2018

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Biotechnical Centre Naklo Higher Vocational College, Research Unit, Strahinj 99, Naklo, Slovenia

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Pozdravni nagovor

Spoštovani udeleženci,

dobrodošli na konferenci VIVUS. Letos je že peta konferenca. Peta obletnica je dokaz za pravilno odločitev Biotehniškega centra, da poveže širši krog strokovnjakov v skupno delovno društvo in izmenjavo svojih spoznanj. Odpiram plenarni del konference VIVUS 2018.

Skupaj s sodelavci že 10 let gradimo sodoben dinamičen center znanja – center odličnosti, ki sloni na povezovanju, ki se ne zaustavi na mejah države. Naše poslanstvo je, da razvijamo potenciale, raziskovanje spodbujamo že pri srednješolcih, na Gorenjskem vodimo program »Gibanje znanost mladini«. Izpopolnjevanje raziskovalne žilice omogočamo na višji šoli v Raziskovalni enoti, kjer povezujemo raziskovalce, študente in različne institucije. Praktične raziskovalne izsledke lahko tudi udejanimo v Medpodjetniškem izobraževalnem centru, v prihodnje tudi v »Zelenega inkubatorju«.

Na letošnji konferenci bo predstavljenih več kot 70 referatov s področja kmetijstva, hortikulture, naravovarstva in okoljevarstva, živilstva in prehrane ter podpornih dejavnosti.

Ne glede na uspešnost preteklih konferenc, sem prepričan, da bo peta boljša in še bolj odmevna v našem prostoru. Vesel bom, če bodo naši deležniki (predvsem tudi dijaki in študenti) prepoznali nove priložnosti.

Zahvaljujem se avtorjem, udeležencem in organizatorjem, brez vas ne bi bilo konference. Predvsem pa želim prijetno počutje in dobro sodelovanje tudi vnaprej.

dr. Franc Vidic,
v. d. ravnatelja Višje strokovne šole Biotehniškega centra Naklo

Welcome speech

Dear participants,

Welcome to the VIVUS conference. This is the fifth conference this year. The fifth anniversary is the proof for the right decision of the Biotechnical Centre to connect a wider circle of experts into a joint working meeting in order to share new knowledge. The plenary part of the VIVUS 2018 conference is declared open.

Together with the colleagues we have been building a modern dynamic knowledge centre - the centre of excellence, which is based on integration and does not end at the borders of the country. Our mission is to develop potentials, so research activities at secondary school have been encouraged, and speaking of broader region of the Gorenjska area a programme "Moving Science to Youth" has been run. Our research centre at the College in the Research Unit has been upgrading, as we connect researchers, students and various institutions. Practical research findings can also be seen in the Business Education Centre, and in the future it is expected to be developed within the framework of a Green Incubator.

At this year's conference, more than 70 papers on agriculture, horticulture, nature protection and environmental protection, food and nutrition, and support activities will be presented.

I am convinced that the 5th Conference will be even more successful than the previous ones. I will be really glad if our participants (especially High School and Higher Vocational College students) will recognize new opportunities.

I would like to thank the authors, participants and organizers. Without you, there would be no conference. Above all, I do hope you feel well and welcome in our school and I'm looking forward to further cooperation.

dr. Franc Vidic,
The acting Principal of the Higher Vocational College in Biotechnical Centre Naklo

Plenarni del: Vabljeno predavanje 1

Plenary session: Invited lecture 1

Zeleno podjetništvo

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Izvleček

Podjetja v mnogih panogah se vse bolj soočajo z okoljskimi in socialnimi izzivi. Podjetja naj se ne bi osredotočala le na kratkoročne dobičke, ampak naj bi izpolnila vrednote trajnostnega razvoja: ekonomske, okoljske in socialne vrednote. Zelene ekonomije ne moremo enostavno postaviti »od zgoraj«, ampak je lahko le rezultat podjetniške iniciative, ki se odraža kot inovacije na področju upravljanja in novih tehnologij.

Naložbe zasebnega sektorja v zelene inovacije ne ustvarjajo le zasebnih dobičkov, ampak (ustvarijo) velike pozitivne zunanje učinke za družbo in okolje kot celoto, zlasti če ne prispevajo le k ustvarjanju in zapolnjevanju majhnih tržnih niš, temveč imajo potencial da se dosežejo trajnostno preoblikovanje celotne industrije.

Na predstavitvi bomo prikazali pobudo za spodbujanje, izobraževanje in podporo novim generacijam študentov, ki so sposobni prepoznati in izkoristiti prednosti zelenega podjetništva z inovativnimi rešitvami za jutrišnji trg.

Ključne besede: podjetništvo, izobraževanje, zelena ekonomija

Green Entrepreneurship

Abstract

Businesses in many industries are increasingly confronted with environmental and social challenges. Rather than just focusing on short-term profits, stakeholders expect firms to meet a sustainable values economic, environmental and social value . It is argued that a Green Economy cannot be mandated from above but needs to be driven by entrepreneurs that respond through innovation in management and technology.

These private sector investments in green innovation do not just generate private profits but also (create) large positive externalities for society and the environment as a whole, especially when they do not contribute only to the creation of a small niche market, but have the potential to be scaled up to reach the sustainable transformation of a entire industry.

In this presentation, we will address the pressing need to promote, educate and support new generations of entrepreneurs who are able to identify and take advantage of green entrepreneurship with innovative solutions for tomorrow's markets.

Keywords: entrepreneurship, education. green economy

Plenarni del: Vabljeno predavanje 2 *Plenary session: Invited lecture 2*

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Izvleček

V prispevku obravnavamo problematiko znanosti in kulture in njunih učinkov v luči družbene odgovornosti. Pri tem se osredotočamo na pomen posameznih znanstvenih področij in ugotavljamo razmerja med njimi. Iščemo povezave in razlike med naravoslovjem, družboslovjem in humanistiko in pri tem ugotavljamo, kaj se dogaja s publiciranjem znanstvenih del v današnjem času. Opozorimo na vlogo znanstvenih založb in njihovega vpliva na obliko raziskovanja in publiciranja. Razčlenjujemo različne vidike družbene odgovornosti, ki ima v znanstveno-kulturni sferi še prav poseben pomen zaradi potrebe po preseganju tržnih mehanizmov kot virov financiranja omenjenih dejavnosti. Ob tem je treba izpostaviti tudi vlogo kulture in besedne umetnosti, ki lahko s svojo duhovno razsežnostjo predstavljata ne le pomemben, ampak morda celo ključni kamenček v mozaiku človekovih teženj po napredku, razvoju in preseganju eksistencialne omejenosti.

Ključne besede: družbena odgovornost, znanost, naravoslovje, družboslovje, kultura, humanistika, umetnost

Between Science and Literature

Abstract

The paper focuses on science as well as culture and their influence in the light of social responsibility. The meaning and relationship between research domains, such as natural sciences, social sciences and humanities are presented. Common areas and differences between these domains are looked into with the analysis of the publicizing of contemporary scientific works. The role of scientific publishing houses and their influence on the forms of scientific research and publishing have been touched upon. Various perspectives of social responsibility with a special meaning in the spheres of science and culture with their financial dependence on market mechanisms being transcended are dealt with. The role of culture and literature should also be stressed out as their spiritual dimension presents not only an important but crucial piece in the overall jigsaw of human aspiration for progress, development and the transcendence of existential limitations.

Keywords: social responsibility, science, natural science, social science, culture, arts and humanities

Plenarni del: **Vabljeno predavanje 3** *Plenary session: Invited lecture 3*

Soil multifunctionality and its significance for food security and climate change mitigation and adaption

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Soils are our natural capital, which are the means to produce food, fodder, fuel and fiber (4Fs). Soils can be source or sink for greenhouse gases depending on whether the soils are managed sustainably. Hence, it is necessary to manage our soils responsibly to meet the human and animal needs and to address the adverse impacts of climate change. Soil-based ecosystem services are the outcomes of soil properties, environment, land use and their interactions and soil functions can be grouped into five key soil functions a) primary productivity, b) water retention and storage c) carbon sequestration d) biodiversity habitat and e) nutrient retention and availability. These five soil functions contribute to agronomic productivity and provision of regulating and supporting ecosystem services. Hence, soil management is a key driver that will determine whether soils are capable of supplying these multiple functions, which underscores the significance of soil custodianship. Optimization of one function can have trade-offs with other soil functions. The objective of soil management should be optimized supply of soil functions, depending on the local demands for the soil function (e.g clean drinking water) or national or regional demands (e.g national carbon sequestration targets). Due to the competing demands for different soil functions, there is a need for an integrated, holistic assessment, of the five soil functions in order to mitigate trade-offs and to optimize supply in contrasts to conventional approach to optimize individual soil functions.

Keywords: soil multifunctionality, food security, climate change, soil management

1. sekcija: KMETIJSTVO
Ist session: AGRICULTURE



Časovna in prostorska spremenljivost termalnega časa v obdobju 1950-2017 v Sloveniji

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Izvleček

Razvojne faze rastlin zahtevajo določeno količino akumulirane toplote, ki jo v agrometeorologiji izražamo kot termalni čas. Časovna in prostorska spremenljivost termalnega časa za sedem krajev v Sloveniji (Bilje, Celje, Črnomelj, Ljubljana, Maribor, Murska Sobota in Rateče) je bila analizirana za obdobje 1950-2017. Uporabili smo povprečne dnevne temperature zraka za rastno dobo (1. 4. do 30. 9.), podatki so iz arhiva Agencije Republike Slovenije za okolje. Termalni čas smo izračunali za temperaturna praga 5 °C (TP5) in 10 °C (TP10). Povprečne vrednosti termalnega časa nad TP5, ki se pogosto uporablja pri definiciji rastne dobe, so bile najvišje v Biljah (2404 °C) z omiljenim sredozemskim podnebjem, najnižje pa v Ratečah (1408 °C) z omiljenim gorskim podnebjem. Med ostalimi kraji, ki ležijo na podobni nadmorski višini v celinskem podnebjem, so bile razlike v termalnem času bistveno manjše. Za časovno analizo smo obravnavano obdobje razdelili na obdobji P1 (1950-1990) in P2 (1991-2017). Primerjava termalnega časa med obdobjema je pokazala, da se termalni čas v obdobju P2 povečuje, vsi trendi so statistično značilno pozitivni in znašajo za TP5 od 49 °C/10 let do 75 °C/10 let. Izrazitejši trend v obdobju P2 že ima posledice za kmetijsko pridelavo, rezultati naše raziskave pa lahko pomagajo pri načrtovanju prilagajanja kmetijstva na spremenjeno podnebje.

Gljučne besede: termalni čas, temperatura zraka, kmetijstvo, podnebne spremembe, Slovenija

Temporal and spatial variability of thermal time for the period 1950-2017 in Slovenia

Abstract

The development phases of plants require a certain amount of accumulated heat, in agrometeorology expressed as thermal time. The space-time variability of thermal time for seven places in Slovenia (Bilje, Celje, Črnomelj, Ljubljana, Maribor, Murska Sobota and Rateče) was analyzed for the period 1950-2017. We used the average daily air temperatures for the growing season (1. 4. to 30. 9.), data were gained from the archive of the Slovenian Environment Agency. The thermal time was calculated for the temperature threshold of 5 °C (TP5) and 10 °C (TP10). The average values of thermal time above TP5, often used in definitions of the growing period, were the highest in Bilje (2404 °C) with the Submediterranean climate, and the lowest in Rateče (1408 °C) with the Subalpine climate. Among other places, located at similar altitudes in the Subcontinental climate, the differences in thermal time were significantly lower. For the time series analysis, the period considered was divided into P1 (1950-1990) and P2 (1991-2017). The comparison of the thermal time between the periods showed that the thermal time in the period P2 is increasing; all trends are statistically significant and range from 49 °C/10 years to 75 °C/10 years. A more pronounced trend in the period P2 already has implications for agricultural production, where the results of our research can help in climate change adaptation planning.

Keywords: thermal time, air temperature, agriculture, climate change, Slovenia

Vloga kmetijskih svetovalcev pri vedno večji izpostavljenosti delavcev v kmetijstvu vročinskemu stresu

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Izvleček

Vročinski stres se zaradi globalnega segrevanja nedvomno povečuje, projekcije podnebnih sprememb kažejo nadaljnje stopnjevanje v tej smeri. V kmetijstvu vročina ni pomembna le z vidika vplivov na rastline in živali, temveč delavcem v kmetijstvu povzroča slabše počutje, zdravstvene težave, več možnosti delovnih nesreč in manjšo storilnost. Meteorološka analiza kaže velika povečanja temperaturnih vsot v vročinskih valovih v zadnjem obdobju. Raziskava med kmetijskimi svetovalci (N = 86) je pokazala, da zadnje čase prepoznajo večji negativni vpliv vročinskega stresa na delavce zaradi podnebnih sprememb (73,3 %) in vročinski stres kot težavo pri kmetijskem delu (94,2 %). Vpliv vročinskega stresa se svetovalcem v kmetijstvu zdi večji kot v drugih gospodarskih sektorjih. Kljub temu jih skoraj tretjina (29,1 %) delavcev ni seznanila z možnimi negativnimi vplivi vročinskih valov, saj večina (86,2 %) pravi, da navodil za ukrepe ni ali pa jih ne poznajo. V okviru 5-letnega evropskega projekta Heat-Shield razvijamo opozorilni sistem pred vročinskimi valovi in pripravljamo portal z navodili za ustrezne ukrepe v kmetijstvu, industriji, turizmu, gradbeništvu in prevozništvu.

Ključne besede: kmetijski svetovalci, delavci v kmetijstvu, vročinski stres, vročinski val, podnebne spremembe, opozorilni sistem

The role of agricultural advisers in aggravated heat stress exposure of workers in agriculture

Abstract

Heat stress is increasing due to global warming and climate change projections show a further escalation in the same direction. Heat in agriculture is not only the problem of plant and animal production, it impairs the well-being of workers in agriculture, causes them health problems, increases the likelihood of work accidents and reduces their productivity. The meteorological analysis shows a high increase in temperature sums in heat waves in the recent period. A survey among agricultural advisers (N = 86) showed their recognition of a lately greater negative impact of heat stress on farmers due to climate change (73.3%) and heat stress as a problem in agricultural work (94.2%). In the opinion of agricultural advisers, the impact of heat stress appears to be greater in agriculture than in other economic sectors. Nevertheless, almost a third (29.1%) of advisers did not explain the possible negative impacts of heat waves to farmers, as the vast majority (86.2%) claims that the instructions for the measures do not exist or they do not know about them. Within the framework of the 5-year European Heat-Shield project, we are developing a warning system against heat waves and preparing a portal with instructions for appropriate measures in agriculture, industry, tourism, construction, and transport.

Keywords: agricultural advisers, workers in agriculture, heat stress, heat wave, climate change, warning system

Pridobivanje podjetniških izkušenj med šolanjem

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Izvleček

Tema referata je predstavitev možnosti pridobivanja podjetniških izkušenj dijakov v obdobju njihovega šolanja. Ker dijaki nekaterih šolskih programov, kot sta naravovarstveni in živilski tehnik, po končanem šolanju težje najdejo zaposlitev, jih učitelji v zaključnem letniku izobraževanja spodbujajo k samozaposlovanju. S tem namenom pri predmetih podjetništvo in trženje v programih srednjega strokovnega izobraževanja (SSI) in osnove podjetništva in prodaje v programih srednjega poklicnega izobraževanja (SPI) lahko dijaki z uporabo orodja Moje podjetje razvijajo podjetnost in inovativnost.

Dijaki se za sodelovanje v tem programu odločijo prostovoljno. Ob začetku šolskega leta ustanovijo dijaška podjetja v obliki delniških družb. Preizkusijo se v vseh stopnjah poslovanja podjetja, od iskanja idej do njihovih uresničitvev. Izdelajo poslovno poročilo in se po zaprtju podjetja udeležijo zaključnega sejma, ki je hkrati državno tekmovanje med dijaškimi podjetji različnih slovenskih srednjih šol.

V referatu so podrobneje predstavljena dijaška podjetja, ki so bila ustanovljena v šolskem letu 2017/18 in so tudi na tekmovanju dosegla dobre rezultate. V zaključku referata so navedena še mnenja nekaterih dijakov, ki so bili v preteklem šolskem letu člani dijaških podjetij.

Ključne besede: podjetnost, inovativnost, samozaposlovanje, dijaško podjetje, Moje podjetje

Gaining entrepreneurial experience during schooling

Abstract

The report refers to the presentation of the possibilities of gaining business experience for the pupils during their education. The pupils of some programs, especially nature protection technicians and food processing and nutrition technicians find jobs harder after they finish school. That is the reason why we encourage them in the final year to become self-employed. For that purpose we support their ambition and inventiveness with the use of the tool »My business« during lectures of the subject Entrepreneurship and marketing in programs of Technical upper-secondary education and during lectures of the subject The basics of entrepreneurship and sales in programs of Vocational upper-secondary education.

The pupils participate voluntarily. At the beginning of the school year they found their companies in the form of joint stock companies. They go through all phases of the company's conduct, from seeking for the ideas to the realization. They also produce a business report and take part in the work of a concluding fair and simultaneously in the national competition between schools.

In this report I will present in detail pupils' companies founded in the school year 2017/18 which have achieved good results at the competition as well. At the end of the report I will also mention some members' opinions from the last school year.

Keywords: ambition, inventiveness, self-employment, pupil's company, »My business«

Doseganje digitalnih kompetenc zaposlenih v Biotehniškem centru Naklo

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Izvleček

Namen raziskave je bil ugotoviti doseganje digitalnih kompetenc zaposlenih v Biotehniškem centru Naklo (BC Naklo). Podatki ankete so bili obdelani v programu Microsoft Excel.

Pokazalo se je, da večina anketiranih zaposlenih v BC Naklo zna brskati po spletu in se zaveda, da vse informacije na spletu niso vredne zaupanja. Večina zna tudi naložiti in shraniti datoteke; uporabljati e-pošto, družabna omrežja, elektronske storitve javne uprave, spletno banko, spletno nakupovanje ter osnovne funkcije v programu Microsoft Excel. Shranjevanje v oblakih pa zna uporabljati le slaba polovica anketiranih.

Večina anketiranih zna v programu Microsoft Word narediti avtomatsko kazalo vsebine, slik in tabel; različno oštevilčiti strani dokumenta (v istem dokumentu uporabiti arabske in tudi rimske številke) ter spojiti dva dokumenta. Več kot polovica anketiranih zaposlenih se tudi zaveda, kako uporabljati digitalno tehnologijo, da se izogne zdravstvenim težavam. Večina anketiranih ima utemeljeno stališče o vplivu tehnologij na vsakodnevno življenje, spletno uporabo in okolje.

Ključne besede: digitalne kompetence, zaposleni, Biotehniški center Naklo

Employees' digital competences attainment in Biotechnical Centre Naklo

Abstract

The purpose of the research was to clarify the level of employees' digital competencies attainment in Biotechnical Centre Naklo. The data was processed in Microsoft Excel. The research indicated that most of our employees can browse the internet without any problems. At the same time they are aware of the fact that data found on the web might not always be trustworthy. Most of them can download and save files, use e-mail, social network services, public administration e-service, online banking, online shopping and basic functions in Microsoft Excel. As far as cloud file storage is concerned only less than a half of the employees know how to do it.

Most employees know how to use Microsoft Word and its tables of contents, complex pagination (using Arabic and Roman numerals in the same document) and merge multiple Word documents. More than a half of the employees are aware of how to use digital technology and avoid health risks. Most of them have realized that digital technologies impact our daily life and the environment.

Keywords: digital competencies, employees, Biotechnical Centre Naklo

Digitalizacija v kmetijstvu

Digitalisation in Agriculture

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Izveček

Po podatkih FAO organizacije bomo zaradi globalne rasti prebivalstva morali do leta 2050 proizvesti 70% več hrane kot leta 2006. Ta cilj bomo lahko dosegli samo z uporabo novih tehnologij. Pametne tehnologije v kmetijstvu (ang. Smart farming) predstavljajo povsem nov koncept kmetovanja, ki temelji na uporabi sodobnih informacijskih in komunikacijskih tehnologij (IKT), s katerimi zajemamo in obdelujemo velike količine raznovrstnih podatkov, ki posredno prinašajo številne ekonomske in okoljske prednosti. V prispevku je predstavljen osnovni koncept naprednega kmetijstva in tehnološka področja na katerih sloni, to so merjenje, zbiranje in zajemanje podatkov, obdelava in njihovo shranjevanje ter na koncu njihova aplikacija in uporaba v tehnoloških procesih in sistemih upravljanja, ki so lahko specifični agrotehnični postopki (gnojenje, namakanje, škropljenje) ali kompleksni odločitveni modeli, ki služijo kot podpora odločanju in upravljanju posameznih proizvodnih sistemov na kmetiji ali celotnih kmetij.

Ključne besede: pametne tehnologije, masovni podatki, internet stvari, napredno kmetijstvo, poslovna priložnost, gospodarjenje na kmetiji

Abstract

According to FAO's data, due to global population growth, we will have to produce 70% food more by the year 2050 comparing with 2006. This goal could be achieved only by using new technologies. Smart farming represents an entirely new concept of farming based on the use of modern information and communication technologies (ICT), which capture and process large amounts of diverse data that indirectly bring a number of economic and environmental benefits. The paper presents the basic concept of advanced agriculture and the technological fields on which it is based: measuring, collecting and capturing data, processing and storage. It shows their use and application in technological processes and management systems for specific agro-technical processes (fertilization, irrigation, spraying) or complex decision making models that serve as support for the decision-making and management of individual production systems of the farm or managing entire farms.

Keywords: smart technologies, big data, internet of things, advanced agriculture, business opportunity, farm management

Vpliv različnega deleža biooglja v prsti na zadrževanje vlage in rast rastlin

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Izvleček

Učinkovita raba naravnih virov ni le okoljski izziv, temveč postaja osnovni pogoj za kvalitetno življenje na našem planetu. Vse bolj se kaže nujna potreba po zmanjšanju pritiska na ključne naravne vire (voda, minerali, nafta, prst...), zato jih je potrebno uporabiti manj in hkrati bolj učinkovito, ter povečati njihovo produktivnost.

Cilj zastavljenega projekta je bil koristno uporabiti odpadno biomaso iz šolskega posestva z izdelavo biooglja, ter ugotoviti, kolikšen delež dodanega biooglja k prsti še pozitivno vpliva na povečanje pridelka.

V dveh ponovitvah smo v sadilne lončke, ki smo jih napolnili z mešanico zemlje in različnega deleža biooglja, posadili grah, fižol in česen. Spremljali smo rast rastlin in s sondo preko vmesnika Vernier merili vlago zemlje v lončkih. Dobljeni rezultati so pokazali, da ima na rast rastlin najbolj ugoden vpliv zemlja z 20 – 30% dodanega biooglja.

V želji po čim bolj učinkoviti rabi naravnih virov smo na ravni strehi strojne lope, prvotno zastavljen cilj, nadgradili z izdelavo treh visokih gred. Na srednji gredi je sloju vrtno zemlje primešanih 20% biooglja., kar se pozitivno kaže na prilagoditev in vitalnost posajenih rastlin.

S pomočjo tehnologije 4.0.bomo spremljali parametre potrebne za rast rastlin in ugotavljali vpliv dodanega biooglja glede na kontrolni gredi.

Gljučne besede: naravni viri, učinkovita raba, bioogljje, visoke grede, zelene strehe, tehnologija 4.0

The influence of different proportion of biochar in soil on retention of moisture and plant growth

Abstract

Efficient use of natural resources is not only an environmental challenge, becoming a basic condition for the quality of life on our planet. All the more shows the need to reduce pressure on key natural resources (water, minerals, oil, soil...) We need to use them less and more efficient, as well as to increase their productivity. Use biochar in agriculture is not something revolutionary but it shows the increasing importance of its use, because the deficit of organic matter in the soil, improving the structure and fertility of the soil, due to the energy use of waste plant biomass and permanent binding of carbon dioxide.

For the project we decided to make good use of waste biomass from the school herb garden and to find out what proportion of added biochar to the soil still have a positive impact on the increase of the crop. In planting pots with mix of soil and different percentage of biochar it was planted green peas, garlic and beans. We made two iterations. We determined plant growth and with the Vernier probe measured the moisture of the soil in the planting pots. The results showed that has the best influence on the growth of the plants mix of soil and 20 – 30% biochar, what has a positive effect on adjustment and growth of plants.

We wanted the most efficient use of natural resources, in this fact we made three raised beds. In one raised bed will be on the top layer of garden soil added biochar.

With the help of technology 4.0.we will monitor the parameters necessary for plant growth and investigated the impact of added biochar depending on the control raised beds.

Keywords: natural resources, efficient use, biochar, raised beds, green roofs, technology 4.0

Podeželska naselja nekoč in danes

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Izvleček

V prispevku je prikazano večletno raziskovalno delo učencev geografskega krožka, s katerim smo raziskali naselja, ki sodijo v naš šolski okoliš. Vsa proučevana naselja so prvotno podeželska naselja na desnem bregu Tržiške Bistrice jugozahodno od mesta Tržič. Zanimal nas je razvoj izbranih naselij; dejavniki, ki so vplivali na širitev in močno preoblikovanje nekaterih naselij; geografske značilnosti naselij danes in kakovost življenja v njih. Zbirali smo stare fotografije, karte, zgodbe med domačini ter popisovali hišna in krajevna ledinska imena. Oblikovali smo preglednico hišnih imen po vaseh, primerjali sedanje stanje s stanjem v Franciscejskem katastru in v župnijskih knjigah in ugotavljali razvoj naselij skozi obdobje dobrih 150 let. Predvsem zanimive so bile stare fotografije, ki smo jih primerjali s sedanjim stanjem naselij. Na terenu smo proučili izbrana naselja, opažanja zapisovali, fotografirali in kartirali dejavnosti in izgled različnih elementov v pokrajini. Veliko smo izvedeli tudi z anketiranjem domačega prebivalstva. Zbrana dejstva smo nadgradili s SWOT analizo, to je prikazom prednosti in slabosti ter priložnosti in pasti v razvoju izbranih naselij.

Ključne besede: geografija naselij, podeželje, podeželska naselja, urbanizacija podeželja, raziskovalno delo

Rural Settlements in the Past and Today

Abstract

In the article, showing a multi-annual research work of pupils of the geographical circle, with whom we studied settlements, which include in our school district. All examined settlements were originally rural settlements on the right bank of the river Tržiška Bistrica southwest of the town of Tržič. Of interest to us is the development of the selected settlements; the factors which influenced the expansion and significant transformation of some settlements; the geographical features of the settlements today and the quality of life in them. We collected old photos, maps, stories among the locals and made the inventory of houses and local fallow names. We have created a spreadsheet of house names separately for the villages; we compared the current situation with the situation in the Franciscan cadastre and in the parish books. This was the basis for identifying the development of the settlements throughout the period of over 150 years. The old photos were especially interesting, which we compare with the current status of the settlements. We researched the selected settlements on the ground, wrote down observations, photographed and mapped activities and appearance of different elements in the landscape. We learned a lot also by interviewing local people. Upgrading of the research activities is the SWOT analysis which shows strengths and weaknesses, the opportunities and threats in the development of the selected settlements.

Keywords: geography of settlements, rural areas, rural settlements, urbanisation of rural areas, research work

Krompirjeva dežela

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Izveček

Razvoj turizma v občini Šenčur bomo zgradili na povezovanju ponudbe širšega lokalnega področja. Konkurenčno prednost bomo gradili tudi na unikatnem ambientu in stacionarnih ter dnevno izletniških gostih.

Naš razvojni fokus Krompirjeve dežele bomo usmerili v razvoj posebnih vsebin, doživetij, zgodb, oblikovanje zaokroženih destinacijskih produktov, povezovanje različnih ponudnikov, razlikovanje, implementacijo aktivnosti za trajnostni razvoj turizma in uvajanje inovacij za bolj razlikovalne turistične produkte.

Izzivov v projektu izgradnje Krompirjeve dežele je veliko, cilji so ambiciozni – in menimo, da je prav, da smo si zastavili visoke cilje, saj imamo na voljo resnično strateško lego z velikim pretokom števila gostov. Uspešni bomo, če bomo stopili skupaj z ožjimi in širšimi lokalnimi deležniki ali delali kot partnerji. Projekt bo veliko prispeval k jasnemu pozicioniranju lokalnega področja in povečanju ekonomske vrednosti turizma na našem območju.

Gljučne besede: krompir, Šenčur, doživetje, avantura, podeželje, Marija Terezija, lokalna skupnost, podjetništvo, turizem, trajnostni razvoj

Potatoland

Abstract

We will build the development of tourism in the municipality of Šenčur on connecting the offer of a wider local area. Another basis of our competitive advantage will be unique atmosphere as well as stationary and daily excursion guests.

The development focus of Potatoland will be on developing unique content, experiences, and stories, creating comprehensive destination products, connecting different providers, differentiating, implementing activities for sustainable development of tourism, and introducing innovations for more distinguished tourist products.

There are many challenges in the project of building Potatoland, our goals are ambitious – and we think it is good that we set ourselves high goals because we have a real strategic location with a high number of guests. We will succeed if we work together with local and wider local stakeholders or work as partners. The project will greatly contribute to clear positioning of the local area and increase the economic value of tourism in our area.

Keywords: potato, Šenčur, experience, adventure, countryside, local community, entrepreneurship, tourism, sustainable development

Vpliv prostočasnih aktivnosti na podjetniško namero med mladimi

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Izvleček

Prihodnost temelji na mladih. Pomembni so posamezniki, prepričani v svoje sposobnosti, ki bodo razvijali svoje podjeme, nasledili kmetije, se ukvarjali z dopolnilno dejavnostjo. V članku so rezultati raziskave o podjetniški nameri generacije, ki prihaja. Rezultati raziskave so potrdili, da inovativnost, zanimanje za tehniko, ročne spretnosti, oziroma umetniško izražanje kažejo na večjo stopnjo podjetniške namere. Prav tako se je izkazalo kot pomembno sobivanje v okolju z več pozitivnimi zgledi.

Ključne besede: mladi, podjetniška namera, prostočasne aktivnosti

The impact of leisure activities on entrepreneurial intention among young people

Abstract

Future depends on young people. Individuals are important, they are convinced of their abilities; they will develop their businesses, succeed on their farms, and work on supplementary activities.

In the article are the results of the survey on the entrepreneurial intention of the coming generation. The results of the survey confirmed that innovation, interest in technology, handcraft skills, or artistic expression indicate a higher level of entrepreneurial intent. It has also proved to be an important coexistence in an environment with several positive examples

Keywords: young people, entrepreneurial intention, leisure activities

Priložnosti vključevanja osebja visokošolskih institucij v mobilnosti programa Erasmus+

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Izvleček

Mobilnost osebja v visokošolskih izobraževalnih institucijah je zelo pomembna zaradi pozitivnega vpliva na posameznike in tudi na institucijo. Zaposleni se iz tujine vrnejo obogateni z novimi izkušnjami, strokovnimi znanji, idejami in samozavestjo. Mobilnost ima velik vpliv na osebni ter strokovni razvoj posameznika. Pomembni sta tako mednarodna kot tudi domača mobilnost.

Mobilnost učiteljskega osebja lahko pozitivno vpliva tako na posameznika kot na organizacijo. Kakovost mobilnosti osebja vključuje več dejavnikov: izboljšano znanje; nove pedagoške prakse; močnejša transnacionalna partnerstva in vzpostavitev skupnih projektov. Mobilnost daje priložnost za ogled primerov dobrih praks v tujini, kako šole, delodajalci in politika sodelujejo pri zagotavljanju zaposljivosti, kako povečajo sodelovanje oblikovalcev politike in nosilcev odločanja, kako spodbujajo sodelovanje med okolji izobraževanja, usposabljanja in dela.

Ključne besede: Erasmus+, mobilnost, internacionalizacija, gostujoča predavanja

Opportunities of involving staff of higher education institutions in the mobility of the Erasmus+ programme

Abstract

Mobility of staff in tertiary educational institutions is very important because of the positive impact on individuals and also on the institution. Professionals return enriched with new experiences, expertise, ideas and confidence from abroad. Mobility has a significant impact on the personal and professional development of the individual. Both kinds of mobilities are important: international as local mobility as well.

The mobility of teaching staff can have positive impacts for both the individual and their organisation. Quality in staff mobility including more factors: enhanced knowledge; new pedagogical practices; stronger transnational partnerships and the establishment of joint projects. Mobility gives a chance to experience the examples of good practice abroad – of cooperation between schools, employers and policy working together in order to achieve higher rates of employability, forms of intensified cooperation between the creators of policies and decision takers and encouraging collaboration between educational, qualifying and working fields.

Keywords: Erasmus+, mobility, internationalization, guest lectures

Projekt MUNERA 3 kot podpora zaposlenim za razvoj kompetenc v sodobni družbi

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Izvleček

Tehnološki napredek ustvarja nove poslovne priložnosti in priložnosti za zaposlitev. Nekatera delovna mesta, ki jih poznamo danes, bodo v prihodnjih letih skoraj povsem izginila, delovna mesta, ki danes sploh ne obstajajo, pa bodo čez nekaj let nekaj povsem običajnega. Da bomo sledili napredku, bodo zaposleni morali razvijati kompetence (znanje, veščine in sposobnosti), ki jim bodo pomagale slediti razvoju in novim zahtevam trga dela. Najpomembnejše tri kompetence prihodnosti v očeh delodajalcev so reševanje problemov, kritično razmišljanje in ustvarjalnost. Kompetence lahko razvijamo samo s stalnim izobraževanjem in usposabljanjem, zato morajo tudi izobraževalne institucije temu ustrezno prilagoditi svoje izobraževalne programe, da bodo sledile razvoju, ki ga je prinesla 4. industrijska revolucija, predvsem na področju robotike, umetne inteligence, nanotehnologije, biotehnologije, internetom stvari (IoT), idr. Projekt MUNERA 3 bo delodajalcem in zaposlenim nudil priložnost in podporno okolje za razvoj potrebnih kompetenc za zmanjšanje neskladij med usposobljenostjo in potrebami trga dela. V okviru projekta bodo izobraževalne institucije v sodelovanju s podjetji izvajale kakovostne in aktualne neformalne in formalne programe usposabljanj s poudarkom na kompetencah, ki jih trg dela potrebuje.

Ključne besede: kompetence, zaposleni, industrija 4.0, napredek, izobraževanje, projekt MUNERA 3

MUNERA 3 project as support to employees in competence development in a modern society

Abstract

Technological progress creates new business and employment opportunities. Some of the jobs we know today will almost disappear in the coming years, and jobs that do not even exist today will be quite normal in a few years. In order to follow the progress, employees will need to develop competencies (knowledge, skills and abilities) that will help them to follow the development and new demands of the labour market. The most important three competences of the future in the eyes of employers are problem solving, critical thinking and creativity. Competence can only be developed through continuous education and training; therefore, educational institutions must also tailor their educational programs accordingly to follow the development brought by the 4th Industrial Revolution, in particular in the fields of robotics, artificial intelligence, nanotechnology, biotechnology, the Internet of Things (IoT), etc. The MUNERA 3 project will provide employers and employees with an opportunity and support environment to develop the necessary competencies to reduce discrepancies between qualifications and labour market needs. Within the framework of the project, educational institutions, in cooperation with companies, will provide quality and up-to-date informal and formal training programs, focusing on the knowledge needed by the labour market.

Keywords: competencies, skills, employees, industry 4.0, progress, education, MUNERA 3 project

Kmetovanje kot zaposlitvena priložnost za osebe z lažjo motnjo v duševnem razvoju

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Izvleček

Eden izmed načinov soočanja z izzivi kmetijstva v Evropi je uveljavljanje inovativnih praks, ena izmed njih je tudi socialno kmetijstvo, ki med drugim omogoča zaposlovanje oseb z lažjo motnjo v duševnem razvoju na kmetijah. Lažja motnja v duševnem razvoju (LMDR) se kaže kot nižja raven splošne inteligentnosti, ki zajema kognitivne, govorne, motorične in socialne sposobnosti. Odrasle osebe z LMDR so sicer sposobne delati ter ohranjati dobre socialne odnose, vendar so pogosto na trgu dela ranljivejše, tudi zaradi nižje stopnje dosežene izobrazbe. S projektom FARMID želimo spodbuditi zaposlovanje teh oseb na kmetijah, saj ima pozitivne učinke tako na osebe z LMDR kot tudi na kmete, njihove družine in lokalno okolje. V partnerskih državah projekta smo raziskali, kakšne so možnosti zaposlovanja oseb z LMDR na kmetijah, pri čemer smo pregledali predvsem zaposlitvene možnosti s subvencijo ali drugimi oblikami podpore, ter ugotovili, da ima vsaka država svoje načine podpore. Izvedli smo tudi dvanajst študij primerov dobrih praks zaposlovanja oseb z LMDR, ki so nam med drugim služile pri opredeljevanju potrebnih znanj za trajnostno zaposlovanje teh oseb, saj s projektom želimo pripraviti zanimiv in uporaben e-izobraževalni program za vse kmete, ki jih zanimajo socialne storitve v kmetijstvu.

Ključne besede: socialno kmetijstvo, zaposlovanje na kmetijah, osebe z lažjo motnjo v duševnem razvoju, socialna vključenost

Farming as an employment opportunity for people with mild intellectual disability

Abstract

One of the challenges of European agriculture is implementing innovative practices, for example social or care farming, which amongst others enables employment of people with mild intellectual disability (MID). Mild intellectual disability is shown as lower overall level of intelligence, i.e. cognitive, language, motor, and social abilities. However, many adults with MID are able to work and maintain good social relationships and contribute to society, but are more likely to be vulnerable on the job market, often due to obtained lower level of education. The FARMID projects aims to encourage employment of people with MID on farms, as it was shown that such employment has positive effects on people with MID, farmers and their families as well as local environment. In project partners countries we investigated, what are the options of employment of people with MID on farms and discovered, every country has its own ways of supporting such employments. We have developed twelve case studies of best practices of employment of people with MID on farms, which, amongst others served us in determining educational needs of farmers to ensure sustainable employment of people with MID on farms as one of the project objective is to develop interesting and useful online educational programme for all the farmers interested in social farming.

Keywords: social farming, care farming, employment on farms, people with mild intellectual disability, social integration

Ocenjevanje osebnosti konj z uporabo testov obnašanja

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Izveček

Ocenjevanje osebnosti konj je pomembno področje raziskovanja v konjeniškem svetu. Poznavanje osebnosti konja lahko pomaga pri izbiri ustrezne metode treninga konj ter tako izboljša dobro počutje živali. Cilj pilotne študije je bil preveriti različne odzive konj na plašnost in učljivost ter razviti teste, ki bi jih uporabili v prihodnje. Testiranih je bilo 35 slovenskih konj pasme lipicanec, starih vsaj pet let, ujahanih in zdravih. Konje smo izpostavili trem testom obnašanja - test z dežnikom (UT), kjer dva dežnika tvorita prehod, skozi katerega vodnik vodi konja, test z vrečko (BT), kjer je konj postavljen 5 m od asistenta, ki drži bič s pritrjeno plastično vrečko, s katero maha 20 sekund. Pri testu dotika tarče je bilo pričakovano, da se konj šest-krat dotakne rumene žogice. Rezultati so pokazali dve statistično značilni razliki na plašnost pri dveh opazovanih skupinah konj (C1 in C2). Skupina C1 je pri BT več časa stala na mestu in/ali se premikala nazaj ($P < 0.001$) ter bila bolj nezaupljiva in podrejena ($P < 0.001$). Skupina C2 je pri BT več časa skakala, bila v kasu, galopirala in/ali se nervozno premikala ($P < 0.001$). Skupina C2 je bila pri UT bolj pozorna in/ali radovedna ($P < 0.001$). Naši rezultati so pokazali, da se konji na strah odzovejo bodisi z izmikajočim ali radovednim odzivom. Prav tako smo mnenja, da bi testa plašnosti v prihodnje lahko bila uporabljena v praksi.

Ključne besede: konji, ocenjevanje osebnosti, testi obnašanja, plašnost

Personality assessment of horses with the use of behavioural tests

Abstract

Personality assessment is an important topic of research in equestrian world and can be of use in choosing appropriate training method and improve horse welfare. The aim of the preliminary work was to look at the responses of fear and investigate learning abilities in horses and develop behavioural tests that can be used in the future. A total of 35 Lipizzan horses were tested that were at least five years old, ridden and healthy. Three behavioural tests were used - the umbrella test (UT), two umbrellas formed a passage through which the handler led an individual horse; the bag test (BT), the horse was positioned 5 m from an assistant who held a whip with an attached plastic bag and waved with it for 20 seconds, the target training test (TT), horses were expected to touch a yellow ball six times. Results showed two significant differences in the fear responses between the two observed groups of horses (C1 and C2), but no differences in the learning ability. In the BT, horses from the C1 group spent more time standing still and/or moving backwards ($P < 0.001$) and were more submissive and/or distrustful ($P < 0.001$) while horses from the C2 group spent more time jumping, trotting, running and/or balking ($P < 0.001$). Horses from the C2 group were more attentive and/or curious ($P < 0.001$) in the UT. Our results showed that Lipizzaner horses respond to fear situations with an evasive behaviour on one hand or curious on the other. We also believe that fearfulness tests can be used in the practice.

Keywords: horses, personality assessment, behavioural tests, fearfulness

Nabiranje in vrednotenje izbranih zelišč

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Izvleček

Zelišča, dišavnice in začimbnice so tiste rastline, brez katerih si življenja ne moremo predstavljati in so bile prisotne že pred pričetkom prvih civilizacij. Na Biotehniškem centru Naklo smo spremljali v zeliščnem vrtu izbrani zelišči, in sicer poprovo meto (*Mentha x piperita*) in meliso (*Mellisa officinalis* L.) v treh zaporednih letih, od leta 2016 do leta 2018. V nasadu smo zasadili leta 2016 180 sadik tako mete kot tudi melise na 22 m². Pred zasaditvijo smo gnojili površino z organsko snovjo, kasneje pa z gnojilom Stellatico v manjšem obsegu. Zelišča smo pobirali glede na razpoložljivost šolske sušilnice in glede na vremenske razmere. Pridobljene podatke pridelkov mete in melise smo preračunali na hektar. Pridobili smo pridelke mete in melise, ki so v istem obsegu s pridelki v literaturi. Pridobljene rezultate pridelkov bi bilo v bodoče potrebno potrditi z več letnim poskusom in z več ponovitvami.

Gljučne besede: meta, melisa, pridelek, zelišča, začimbe, dišavnice

Harvesting and evaluating selected herbs

Abstract

We cannot imagine our lives without herbs, aromatic plants and spices which existed before the beginning of first civilizations. At the Biotechnical Centre Naklo we monitored selected herbs in our garden, namely peppermint (*Mentha x piperita*) and balm (*Mellisa officinalis* L.) for three years, from 2016 to 2018. In 2016 we planted 180 plants of peppermint and 180 plants of balm on the area of 22 m². The area was manured with organic substance and later with the fertilizer Stellatico to a lesser extent. We harvested herbs regarding availability of the school drying room and the weather. We calculated the obtained data of peppermint and balm for the hectare. Our crops of peppermint and balm were at the same extent as the crops in the literature. The obtained results should be verified in the future with repeated multiannual experiments.

Keywords: peppermint, balm, crop, herbs, spices, aromatic plants

Uporaba orodja za podporo skupinskemu odločanju pri pripravi regionalnega razvojnega programa za razvoj podeželja

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V prispevku predstavljamo uporabo orodja za podporo skupinskemu odločanju pri pripravi Regionalnega razvojnega programa Gorenjske 2014-2020 za področje Razvoj podeželja. Opisana je metodologija zbiranja in ocenjevanja idej s strani ekspertne skupine. Analizirana je učinkovitost zbiranja in ocenjevanja idej kakor tudi dinamika dela v skupini. Predstavljene so najpomembnejše kategorije in ideje, ki opredeljujejo zastavljene strateške cilje. Ugotovljeno je bilo, da se najvišje rangirane ideje nanašajo na oskrbovanje javnih ustanov z lokalno pridelano hrano. Udeleženci so pozitivno ocenili orodje Teamworks, kakor tudi učinkovitost izvedenega sestanka, hkrati pa izrazili mnenje, da se tovrstni pristop sicer premalo uporablja. Na izvedenem sestanku je bilo identificiranih 75% projektov, ki so bili nato opredeljeni v končnem dokumentu Regionalnega razvojnega programa Gorenjske 2014-2020.

Ključne besede: razvoj podeželja, orodje za podporo skupinskemu odločanju, viharjenje možganov, elektronsko glasovanje

Application of Group Decision Support System for Determination of Regional Development Plan in the Field of Agriculture

Abstract

The paper presents an application of a group decision support system at the determination of Gorenjska Regional development plan 2014-2020 for the area "Countryside development". The methodology of collecting and evaluating ideas by the expert group is described. The efficiency and dynamics of idea collection process has been analysed as well as the idea evaluation process. Most important categories and ideas, which determine strategic goals, are presented. The top ranked ideas belong to the area of local food self-supply of public institutions. Responses from participants were positive regarding the Teamworks tool as well as the efficiency of the conducted meeting. The participants stated, that such tools should be used more often. At the conducted expert group meeting, 75% of the projects, which were stated in the final document "Gorenjska regional development plan 2014-2020" were identified.

Keywords: Regional development, Group Decision Support System, Brainstorming, Electronic Voting

Application of artificial neural networks to predict phosphate in rivers

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Abstract

Environmental pollution is one of the key problems that modern society faces. Faced with increasing water pollution, significant legislative measures are being taken globally to reduce concentrations of various pollutants both in surface and groundwaters. Continuous monitoring, as well as the application of new technologies for predicting pollutants, provides a comprehensive approach for achieving the given objectives in terms of water quality. In this paper, in order to estimate the concentration of phosphate in river water at the national level, the artificial neural networks (ANN), standard three-layer network is used. Sustainable development indicators were used as input parameters for ANN model development, in total six. The model was trained and tested with annual average values data of the phosphate concentration, obtained from river monitoring stations for 16 European countries. The obtained results showed a very good agreement between the measured values of the phosphate concentration and the values predicted with the ANN model.

Keywords: ANN, river water, phosphate concentration, sustainable development indicators

Trajnost kitajskega kmetijstva

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Izvleček

V tem prispevku bom opisala opažanja glede kitajskega kmetijstva, v katerega sem dobila vpogled med študijsko izmenjavo v juniju 2018, preko projekta med Evropsko unijo in Kitajsko. Med 14-dnevno izmenjavo smo si ogledali več kot 20 kmetij, podjetij in raziskovalnih centrov v štirih različnih regijah na Kitajskem. Cilji projekta so bili povezovanje EU in Kitajske v kmetijskem sektorju in izmenjava dobrih praks v trajnostnem kmetijstvu.

Ugotovili smo, da bi bile izmenjave znanja lahko koristne za obe strani. Kitajska že zdaj uporablja veliko evropske tehnologije vendar v veliko večjem obsegu, kot to delamo pri nas. Čeprav Kitajska potrebuje veliko več poudarka na trajnosti kmetijstva in dobrih ekoloških praksah, bi se EU lahko od Kitajske veliko naučila o podjetnosti, učinkovitosti in visokotehnoški razvitosti kmetijstva ter uporabi spletnih in mobilnih aplikacij pri prodaji, oglaševanju in naročanju izdelkov.

Prav tako smo med ekskurzijo videli pridelavo izdelkov z različno stopnjo certificiranja: ekološka hrana, zelena hrana, hrana brez škodljivih snovi in navadna hrana. Opazili smo negativne posledice intenzivnega kmetovanja (onesnaženi vodni viri, ostanki plastike na poljih) in veliko primerov dobrih praks na področju trajnostnega kmetovanja in kmetijskega podjetništva.

Ključne besede: Kitajska, kmetijstvo, trajnost, onesnaževanje, hrana

Sustainability of Chinese farming

Abstract

The purpose of this paper is to outline and explain the findings about Chinese agriculture which I have gained during a two-week study tour in China in June 2018. The tour consisted of more than 20 field visits of farms, companies and research centres in four different regions in China. The project objectives were to reinforce cooperation in agriculture and exchange of good practices in sustainable farming between the European Union and China.

Exchange of knowledge could be beneficial for both parties as China already uses European agricultural technology but on a much bigger scale. They could gain vital information about sustainability and organic production. The EU could gain new knowledge about agricultural entrepreneurs, high-tech farming and the use of mobile applications for buying, selling and advertising agricultural products.

During the study tour we visited various producers who produce products with different level of certification: organic food, green food, hazard-free food, and ordinary food. We noticed a lot of negative effects of intensive farming (contaminated water sources, plastic waste on arable land) and also a lot of good practices of sustainable farming and agricultural entrepreneurship.

Keywords: China, agriculture, sustainability, pollution, food

Namakanje s prečiščeno odpadno vodo v kmetijstvu

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Izvleček

Uporaba prečiščenih odpadnih voda je privlačna alternativa za zadostitev vedno večjih potreb po namakanju v kmetijskem sektorju, tudi v Sloveniji. Z namakanjem s prečiščeno odpadno vodo se poveča količina organske snovi v tleh, v prečiščeni odpadni vodi je vir dodatnih hranil. Prečiščene odpadne vode še vedno lahko vsebujejo takšne količine oziroma koncentracije soli in drugih snovi, da lahko pusti posledice v okolju ter tleh. Pri namakanju s prečiščeno odpadno vodo je potreben dodaten monitoring – spremljanje kakovosti vode za parametre, kot so vsebnost natrija ali prisotnost kovin. Možna je tudi uporaba dodatnih prečiščevanj na območju čistilnih naprav, kot so zelene tehnologije (npr. rastlinske čistilne naprave, algna), ki vsebnosti nezaželenih snovi zniža na nivo, ki nima negativnih učinkov v ekosistemu.

Ključne besede: namakanje, prečiščena odpadna voda, kakovost tal, slanost tal

Irrigation with treated waste water in agriculture

Abstract

Use of treated wastewater as alternative water source for irrigation is an attractive option, also in Slovenia. With the use of treated waste water, organic content in the soil increases, as well as nutrient input. There are possible negative consequences due to increased salt content and other substances, for soil quality. Use of treated wastewater necessitates additional monitoring of water quality parameters such as sodium content or presence of heavy metals. The use of additional purification systems such as constructed wetlands and algae treatments would further decrease the content of unwanted substances on an acceptable level.

Keywords: irrigation, treated waste water, soil quality, soil salinity

Izzivi pri deficitnem pristopu namakanja v Sloveniji pri zelenjadnicah

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Izvleček

Potreba po namakanju v kmetijskem sektorju v Sloveniji skladno s svetovnimi trendi vztrajno narašča. Napovedane klimatske spremembe, višje temperature in spremenljiv vzorec padavin v zadnjih dekadah vplivajo in bodo še močnejše vplivali na vodno bilanco tal tudi na območjih v Sloveniji, ki do zdaj namakanja niso potrebovala. Z vodo v pridelavi zelenjave varčujemo z uporabo ustreznih tehnik namakanj, kot so kapljični sistem ali mikrorazpršilci. Priporočeno je zbiranje vode – deževnice – in zadrževanje vode v manjših akumulacijah iz zimskih pretokov površinskih voda. Deficitno namakanje je alternativna rešitev za pridelovalce poljščin in nekaterih vrst zelenjadnic v primeru pomanjkanja vode v času suše bodisi omejenih količin vode, zaradi tehničnih težav ali administrativnih prepovedi. Za uspešen prenos principa deficitnega namakanja v prakso je potrebno poznati tudi kritične fenofaze namakanih kulturnih rastlin in dostop do opreme, ki bo omogočala nadzor deficita.

Ključne besede: vodna bilanca, namakanje, deficitno namakanje, zelenjadarstvo, pridelava solate

Challenges for deficit irrigation in vegetable production in Slovenia

Abstract

Similar to global trends, irrigation demand of agricultural sector in Slovenia is increasing. Forecast climate change, increased temperatures and changed precipitation pattern negatively affect soil water balance in the areas of Slovenia that have previously not experienced water shortages and irrigation has not been necessary. In vegetable production, water can be saved with the use of efficient irrigation techniques, such as drip irrigation systems or micro sprinklers. Rainwater harvesting and retention of winter discharge of surface streams should also be considered. Deficit irrigation is alternative solution for crop growers and growers of certain vegetables in case of water shortages during drought period, either because of administrative restriction or technical difficulties. For the successful transfer of deficit irrigation to practice, knowledge of critical growth stages of irrigated crops is necessary, as well as suitable technical equipment and knowledge for deficit monitoring.

Keywords: water balance, irrigation, deficit irrigation, vegetable production, lettuce growing

Vpliv ekoloških gnojil na pridelek sladkega krompirja (*Ipomoea batatas* (L.) lam.) pridelanega na Gorenjskem

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Izvleček

Zaradi koristnih snovi, ki jih vsebuje, je sladki krompir v zadnjem času v Sloveniji vse bolj poznana kultura. Za poskus smo izbrali 4 sorte sladkega krompirja, in sicer 'Janja', 'Martina', 'Purple specklet' in 'Lučka'. Gnojili smo ga z različnimi ekološkimi gnojili, s Stallaticom, Dungom in Bio-ZEL-om. Kot kontrolo smo vzporedno vzgajali negnojene rastline istih sort. S poskusom smo želeli ugotoviti, katera sorta v kombinaciji s posameznim gnojilom najbolj uspeva na Gorenjskem. Ugotovili smo, da najboljše maso gomoljev, listno maso in število gomoljev naredi sorta 'Martina', gnojena z Dungom, širino gomoljev najboljše naredi sorta 'Martina' gnojena s Stallaticom, dolžino gomoljev pa sorta 'Purple specklet', gnojena s Stallaticom. V času poskusa smo imeli zadovoljivo temperaturo in količino padavin, kar je zelo dobro vplivalo na rast sladkega krompirja. Ekološka gnojila so naravna in ne škodujejo okolju in ljudem, kljub temu pa smo z gnojili poskrbeli za rodovitnost tal in zadostno količino hranilnih snovi, ki jih sladki krompir potrebuje za rast in razvoj.

Ključne besede: Sladki krompir, ekološka gnojila

Effect of organic fertilizer on the yield of sweet potato (*Ipomoea batatas* (L.) Lam.) produced in Gorenjska

Abstract

Recently, sweet potatoes became increasingly recognizable agronomic culture in Slovenia because of its useful substances. For our experiment we selected four different types of sweet potatoes 'Janja', 'Martina', 'Purple specklet' and 'Lučka'. We fertilized it with various organic fertilizers like Stallaticom, Dungom and Bio-zelom. At the same time for purpose of control we raised the same types of plants without fertilizers. With our experiment we tried to find out which combination of plants and fertilizers would work best for Gorenjska region. We found out that the best mass of potato tuber, leaf and number of tuber is given by sweet potatoes type Martina which was fertilized with Dungo fertilizer. The best width of tubers are given from type Martina which was fertilized with Stallaticom, and the best length of tubers are given by type Purple specklet which was also fertilized with Stallaticom. At the time of our experiment we had satisfactory temperature and amount of rainfall. This had a very good effect on sweet potatoes growth. Organic fertilizers are natural and they don't harm the environment and people. By using them we took care for soil fertility and sufficient amount of nutrients for effective growth of sweet potatoes.

Keywords: Sweet potatoes, organic fertilizers

Pričakovanja mladih pri izobraževanju v kmetijstvu

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Izvleček

Slovensko kmetijstvo se prepočasi prilagaja novim ekonomskim razmeram na mednarodnih trgih. Primerjanje ekonomskih računov v razvitih evropskih državah kaže na težave v panogi. Faktorski dohodek, najboljši pokazatelj ekonomskega stanja, se je v zadnjih dveh letih celo zmanjšal. Poleg tega beležimo nizko samooskrbo, pri vrtninah je že desetletja pod 40 %. Vzrokov za zaostajanje na področju konkurenčnosti slovenskega kmetijstva je seveda več, od majhnih površin z različnimi proizvodnimi omejitvami do težav pri povezovanju v proizvodnji, predelavi in prodaji kmetijskih proizvodov. Tudi zaradi omenjenih vzrokov dosegamo v nekaterih panogah nizke donose s sorazmerno nizko dodano vrednostjo. Ena od večjih omejitev hitrejšega razvoja kmetijstva je tudi prepočasna menjava generacije, saj je povprečna starost gospodarjev kmetij narasla na 57 let. Statistični podatki kažejo, da se v slovenskem prostoru izobražuje dovolj mladih na srednjih, višjih in visokih šolah, ki lahko v prihodnosti prevzamejo delo od svojih staršev. K izboljšanju tega stanja lahko v določeni meri prispevata izobraževanje in usposabljanje mladih, ki bodo delali na kmetijah. V ta namen bo treba uvesti več individualnega dela z mladimi, zlasti na področju njihove kariere. Mladi prevzemniki kmetij naj bi imeli tudi izražena managerska sidra. Z raziskavo smo med študenti preverjali njihova pričakovanja v zvezi z izobraževanjem na Višji strokovni šoli BC Naklo in njihove načrte za nadaljnji študij oz. zaposlitev. Večji delež vprašanih študentov, ki izhajajo s kmetije ali imajo doma podjetje, bi kot prvo zaposlitev izbralo delo na domači kmetiji oz. v domačem podjetju. Pri študentih naravovarstva, ki večinoma ne izhajajo iz podjetniškega okolja, je zaznati nizko motivacijo za podjetništvo. Iz anket lahko razberemo, da podjetniško naravnano okolje pomembno vpliva na njihove odločitve.

Ključne besede: kmetijstvo, naravovarstvo, študenti, pričakovanja

Young people's expectations in agricultural education

Abstract

Slovene agriculture's adaptations to new economic circumstances in the international markets are too slow. The comparison of economic calculations in developed countries indicate problems in the sector. Factor income, the best indicator of economic situation actually decreased in the last two years. Besides, the level of self-supply seems to be low; in vegetable gardening less than 40% in last decades. Naturally, there are many reasons for Slovene's farming lagging behind; from small surfaces with various production limitations to troubles with connectivity of production, processing and sales of agricultural products. These are also causes for low yields and the value added in certain sectors. Furthermore, the slow change of generations is also one of the most appalling limitations for better development of agriculture; the average age of farmers has grown to 57 years. Statistical data indicate there are enough students in the secondary and tertiary degree of education, which means that later on they can take over the farms of their parents. In order to improve this situation young people should be educated and qualified to work on farms. That is why more individual work with the young should be done, especially in the field of their careers. Young successors of the farms should have shaped their managerial anchors. A research was conducted in order to verify the expectations of the students in relation to their education at the Higher Vocational College and their plans for further studies and employment. The majority of participants coming from farms or having their own companies would prefer staying on their farms or in the companies. Students of nature protection mostly do not come from entrepreneurial environment. Consequently, they do not seem to be interested in entrepreneurship. The questionnaire indicates that business oriented environment does have a strong impact on their decisions.

Keywords: agriculture, nature protection, students, expectations

Ugotavljanje prilagodljivosti ponudbe turističnih kmetij za nemško govoreče goste

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Izvleček

V raziskavi smo ugotavljali prilagodljivost ponudbe turističnih kmetij Zgornje Savinjske doline za nemško govoreče goste in uporabo nemškega jezika zaposlenih pri komunikaciji z nemško govorečimi gosti. Raziskava temelji na 23 anketah nosilcev turističnih kmetij Zgornje Savinjske doline. Ugotovili smo, da je ponudba turističnih kmetij za nemško govoreče goste dokaj zadovoljiva. Izobrazba nosilcev turističnih kmetij je delno ustrezna (znaten delež srednje nižje in poklicne izobrazbe). Komunikacija zaposlenih z gosti v nemščini je delno zadovoljiva: komuniciranje ne poteka v celoti v nemščini oz. poteka v nemščini v manjši meri, čeprav skoraj vsi anketiranci ocenjujejo poznavanje nemškega jezika kot pomembno poklicno kompetenco. Večina anketirancev se z nemško govorečimi gosti pogovarja tudi o strokovnih temah. Večina anketirancev izboljšuje znanje nemškega jezika preko jezikovnih tečajev; največ dopolnjevanja je potrebnega pri jeziku stroke. Ponudba turističnih kmetij je ustrezno prilagojena nemško govorečim gostom: zlasti z jeditnikom, prospekti, hišnim redom in evakuacijskim načrtom v nemščini, z domačo in lokalno hrano, z dobrimi kolesarskimi potmi in pešpotmi, z možnostjo ogleda naravnih znamenitosti. V prihodnosti turistične kmetije ne načrtujejo večjih sprememb pri svojem delu.

Ključne besede: turistične kmetije, nemško govoreči gostje, ustreznost turistične ponudbe, nemški jezik

The assessment of the adaptability of the offer of tourist farms for German-speaking guests

Abstract

The research assesses the adaptability of the offer of tourist farms of the Upper Savinja valley for German-speaking guests and use of German in communication with guests. The research is based on 23 surveys of the holders of tourist farms of the Upper Savinja valley. We found out that the offer of tourist farms for German-speaking guests was rather satisfactory. The education of the holders of the tourist farms is partly satisfactory (the significant percentage of the secondary lower and professional education). The communication of employees with the guests in German is partially adequate: it does not take place entirely in German or takes place in German to a lesser extent although almost all respondents assess the knowledge of German as an important professional competence. Most of the respondents talk with German-speaking guests also about professional issues. The majority of the respondents improve the knowledge of the German language through language courses; most improvement is required in the field of professional foreign language. The offer of tourist farms is appropriately adapted for German-speaking guests: with menus, prospects, house regulations and evacuation plan in German, with good cycling paths and walkways, with the possibility of seeing natural sights. The farms do not plan major changes in the mode of work in the future.

Keywords: tourist farms, German-speaking guests, the adequacy of the tourist offer, German language

2. sekcija: NARAVOVARSTVO
2nd session: ENVIRONMENTALISM



Improvement of water and nutrient retention and use efficiency in arable farming systems from field to catchment scale in Europe and North Africa (WaterFARMING)

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Abstract

The sustainable management of water resources is one of the greatest global challenges, particularly in agriculture, which consumes about 70% of the planet's accessible fresh water. Concerns about depletion of water bodies and the necessity for water resource protection, has led to transnational and national resolutions such as the Water Framework Directive (WFD) in Europe and the Water Code in Tunisia to ensure the sustainable use of water resources. In the EU, ~50% of the water resources do not meet WFD targets due to pollution from agriculture and industry and increasing demand on declining water resources. Agriculture accounts for 25-80% of total water use in the EU and North (N.) Africa and huge regional differences exist in the extent and gravity of water related challenges in agriculture. Problems of low and fluctuating water supply are most serious in South Europe and N. Africa where climate change is predicted to result in 30% reductions and increased uncertainty in rainfall by 2050. Overexploitation of ground water for irrigation has caused salinization leading to soil degradation and loss of fertility, particularly in N. Africa, while extreme rain events have resulted in severe erosion, landslides and flooding. Excessive and inappropriate timing of fertilizers and manure application in agriculture are causing considerable nutrient flows into the ground water or in the surrounding water bodies, thus affecting water quality. The magnitude, diversity and complexity of water and soil issues calls for a coordinated and versatile strategy, to retain the available water at source and optimize water and nutrient use across agricultural sectors and regions in Europe and N. Africa.

Keywords: water retention, nutrient use efficiency, production systems, decision support tool

Nove agrometeorološke aplikacije za spremljanje potreb rastlin po vodi – od satelitov do terenskih opazovanj

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Izvleček

Spremenjeni podnebni vzorci in njihovi vplivi se odražajo po celotni Evropi. Hkratno naraščanje temperature zraka in neugodna razporeditev padavin med drugim pripomoreta k zmanjšanju razpoložljivosti vode in k povečanemu tveganju za suše, kar v zadnjih desetletjih opazamo tudi v Sloveniji. V obliki pogostejših in intenzivnejših sušnih dogodkov postaja kmetijska suša redna gostja kmetijske pridelave v Sloveniji, glede na obete za prihodnja desetletja pa preteča grožnja kmetijstvu in gozdarstvu. Vse izrazitejši vplivi suš v ranljivih sektorjih gospodarstva nas tako silijo k učinkovitejšemu soočanju s sušo, začenši z izboljšanjem zgodnjega zaznavanja prvih signalov suše. Če so nekoč suše opisovali preko subjektivne ocene dolžine sušnega obdobja in povzročenih škod na vegetaciji, pa so v zadnjem obdobju z razvojem sodobne tehnologije napredovali tudi pristopi in orodja. S pomočjo različnih modelov, ki simulirajo količino vode v zgornjem sloju tal, ter z zaznavanjem stanja vegetacije in vlažnosti tal s sateliti se je namreč izboljšalo tudi spremljanje (kmetijske) suše. Ob tem pa je za natančnost modelskih in satelitskih rezultatov o signalih suše bistvenega pomena še vedno neposreden stik s stanjem na terenu. V ta namen se v okviru mednarodnega projekta DriDanube – Tveganje za sušo v Podonavju, ki ga vodi Agencija RS za okolje (ARSO), vzpostavlja tudi mreža poročevalcev s terena o sprotnih vplivih suše na kmetijskih rastlinah.

Ključne besede: spremljanje suše, daljinsko zaznavanje, DriDanube, agrometeorološke aplikacije.

New agrometeorological applications for better detection of vegetation water needs – from satellites to on-field observations

Abstract

Changing climatic patterns and their effects are seen all across Europe. Simultaneous increase in air temperature and unfavourable distribution of precipitations, among others, contribute to reduced water availability and the increased risk for drought which in recent decades has also been observed in Slovenia. Through more frequent and more intense drought events, agricultural drought is becoming a regular companion of agricultural production in Slovenia and, in the view of the outlook for the upcoming decades, also an imminent threat to agriculture and forestry. Increasing impacts of drought in

vulnerable sectors of the economy thus direct us towards effective drought management, starting with improving early detection of first drought signals. While in the past, drought used to be described through subjective assessment of its length and damages to vegetation, the development of modern technology has advanced drought monitoring approaches and tools in recent years. Various models that simulate the amount of water in the upper soil layer as well as remote sensing of soil moisture and vegetation with satellites have helped improve monitoring of (agricultural) drought. At the same time, direct contact with the on-field situation remains essential for validation and complementation of models and satellites signals of drought. For this purpose, national reporting networks are being established in the frame of transnational project DriDanube – Drought Risk in the Danube Region, led by the Slovenian Environment Agency (ARSO). Built on engaged individuals, their aim is to regularly collect in-situ information on state of soil and vegetation, including possible damages due to drought.

Ključne besede: drought monitoring, remote sensing, DriDanube, agrometeorological applications

Prvi rezultati projekta »LIFE for Acid Whey« – ponovna uporaba odpadne kisle sirotke za ekstrakcijo bioaktivnih proteinov z visoko dodano vrednostjo

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Izvleček

V okviru projekta LIFE for Acid Whey, v katerem se posvečamo izolaciji različnih bioaktivnih proteinov iz sirotke, smo uspeli razviti nov tehnološki pristop za pridobivanje proteina laktoferina (LF). V projektu smo se osredotočili na kisko sirotko (KS), ki za mlekarstvo industrijo običajno predstavlja breme, poleg tega pa v primerjavi s sladko sirotko vsebuje višje koncentracije LF. Naš postopek izolacije LF, ki temelji na uporabi ionsko izmenjevalne kromatografije na monolitnih kolonah, nam omogoča doseganje visokih izkoristkov izolacije in produkcijo visokokakovostnega produkta. Naš produkt smo s pomočjo HPLC kromatografije, SDS PAGE analize ter merjenjem bioaktivnosti LF primerjali z drugimi na trgu prisotnimi LF. Rezultati karakterizacije z uporabo omenjenih metod so pokazali, da v primerjavi z ostalimi produkti dosegamo primerljivo, večkrat celo višjo čistost (>98%), ter bistveno višjo celokupno bioaktivnost (C + A vrednost =74,9%) v primerjavi z vsemi analiziranimi vzorci (C+A vrednost <66%). Vse to kaže na velik potencial omenjene tehnologije za izolacijo LF in nadaljnjo obdelavo sirotke za pridobivanje produktov z višjo dodano vrednostjo na trgu.

Ključne besede: Laktoferin, sirotka, izolacija, kromatografija, monolitna kolona

First results of “LIFE for Acid Whey” project – reuse of waste acid whey for the extraction of bioactive proteins with high added value

Abstract

In the frame of LIFE for Acid Whey project dealing with isolation of different bioactive proteins from whey, we succeeded to develop a new technological approach for lactoferrin (LF) protein production. In the project, we focused on acid whey (AW), as it often presents a burden for the dairy industry, and in addition, it contains higher concentrations of LF compared to other types of whey. The newly developed process of LF isolation, based on the use of ion-exchange chromatography on monolithic columns, enables us to achieve high isolation efficiency and produce a high-quality product. Using HPLC chromatography, SDS PAGE analysis, and measurements of the LF activity, we compared our product with other LFs present on the market. Characterization results using these methods showed that compared to other products, we achieved comparable, often even higher purity (>98%), and significantly higher total bioactivity (C+A-value =74,9%) compared to all analysed samples (C+A-value <66%). All this points to the high potential of mentioned technology for the isolation of LF and further whey processing for the production of products with higher added value on the market.

Keywords: Lactoferrin, whey, isolation, chromatography, monolithic column

Osveščanje dijakov o odgovornem odnosu do narave

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Izvleček

Projektno delo na naši šoli je del obveznega programa, pri katerem dijaki spoznavajo konkretne življenjske situacije in reševanje problemov, pri tem pa uporabljajo teoretična znanja, pridobljena pri pouku. V prispevku bom predstavila primer projektne dela, kjer smo se pogovarjali o odlaganju in skladiščenju ter recikliranju odpadkov (kako recikliramo, kje in na kakšen način). Dijaki so predstavili, kakšen je njihov prispevek k čistejšemu okolju in varčevanju z vodo. Z njimi sem si ogledala delovanje čistilne naprave za odvajanje in čiščenje odpadne vode, ki je v našem kraju. Cilj tega projekta je bil vzgoja za kritičen in odgovoren odnos do narave ter oblikovanje pozitivnega odnosa do varovanja našega zdravja in zdravja drugih.

Ključne besede: odnos do narave, projektno delo, čistilna naprava, voda, okoljska vzgoja, recikliranje odpadkov

Raising awareness among students about responsible attitude towards nature

Abstract

The project work at our school is part of a compulsory program where students learn about concrete life situations and problem solving, using theoretical knowledge gained in class.

In the article I will present an example of a project work where we talked about the disposal, storage and recycling of waste (how to recycle, where and in what way). Students also presented their contribution to cleaner environment and water saving. Together we were able to see how the municipal wastewater treatment plant for the extraction and purification of waste water operates. The purpose of this project was to educate students to use critical thinking skills in responsible dealing with the problems related to environment as well as to create a positive attitude towards protecting our health and the health of others.

Keywords: attitude towards nature, project work, wastewater treatment plant, environmental education, waste recycling

Zbiraj, zamenjaj, aktiviraj

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Izvleček

Projekt Erasmus+ omogoča številnim mladim izmenjavo in pridobivanje različnega znanja. To priložnost dobijo zgolj najboljši dijaki. V šolskem letu 2016/17 je Živilska šola Biotehniškega izobraževalnega centra Ljubljana sodelovala pri mednarodnem projektu Erasmus+ Zbiraj, zamenjaj, aktiviraj (ZZA), v katerega so se lahko vključili tudi dijaki, ki običajno niso povsem motivirani za dodatno delo. Projekt, sestavljen iz treh vrst aktivnosti, je trajal med novembrom 2016 in majem 2017. Prva dejavnost je zajemala študijski obisk nacionalnega parka Fruška gora v Srbiji. Trije dijaki programa naravovarstveni tehnik so praktično spoznavali okoljevarstveno področje.

V drugem koraku je sledilo sodelovanje z Mladinskim združenjem za trajnostni razvoj (MZTR). Že omenjeni dijaki so načrtovali vrstniške delavnice s tematikami okoljevarstva in recikliranja ter jih izvedli v vseh oddelkih Živilske šole.

V tretjo dejavnost so bili vključeni vsi dijaki Živilske šole in se je imenovala List za list. Dijaki so zbirali odpadni papir in glede na količine zbranega papirja dobili v zameno semena ali sadike rastlin.

Po navedenem kriteriju je organizacija MZTR razdelila mladim več kot šestdeset lončnic in sadik ter okoli štirideset zavojčkov semen.

Ključne besede: Erasmus+, Zamenjaj, zbiraj, aktiviraj, motiviranje vrstnikov, okoljsko osveščanje.

Exchange, Collect, Activate

Abstract

Numerous young people have gained a diverse set of knowledge as part of the Erasmus+ programme (EU programme for education, training, youth and sport). Unfortunately, only the best pupils have the chance to be a part of Erasmus+. In the school year 2016/17 at BIC Ljubljana, The School of Food Processing was involved in an international Erasmus+ project called Exchange, Collect, Activate (ECA), which also included a lot of otherwise unmotivated pupils.

Between November 2016 and May 2017 three activities took place. First, three fervent pupils were sent from our Educational programme Nature Protection Technician to study sustainable development in the Serbian national park Fruška gora. The intention was practical recognition of environmental reality. The second step was cooperation with The Youth Association for Sustainable Development (YASD), where the aforementioned pupils planned peer workshops on topics concerning environmental protection and recycling. Those workshops have now been carried out in all departments of The School of Food Processing. In the final activity, all pupils of The School of Food Processing participated in a program called »List za list« or Leaf for leaf. Pupils collected waste paper and exchanged it for seeds or saplings depending on the amount of collected paper. With this criteria, The Organization YASD distributed more than 60 potted plants and samplings and around 40 packages of seeds.

Keywords: Erasmus +, Exchange, Collect, Activate, motivate peers, environmental awareness

Uporaba petih čutil za izboljšanje rodovitnosti tal

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Izvleček

Analizo tal pogosto izvajamo za določevanje onesnaženosti tal in določevanje gnojilvenega načrta. Mnogi vrtničkarji gnojijo svoje vrtove po občutku. Takšno početje lahko hitro privede do presežka hranil v tleh, to pa preprečuje zelene učinke. Prav je, da širšo javnost spodbujamo k samooskrbi in posameznike poučimo, kako s hitrimi testi preveriti splošne lastnosti tal. Obstajajo namreč cenovno ugodni testerji, ki so dovolj dobri za določitev potreb izboljšanja rodovitnosti tal. Pri tem sodelujejo naša čutila: vonj, sluh, dotik, vid in okus (slednjega raje ne uporabimo), ki prav tako dobro zaznavajo dogajanje v okolju. V prispevku so navedeni konkretni primeri analiz, ki jih lahko vsakdo izvede na svojem vrtu in oceni splošno stanje tal. Zajeti so tudi predlogi za ukrepanje, kolikor bi zaznali neprimernosti lastnosti tal. Potrebno pa je vedeti, da hitri testerji ne nadomestijo natančnih laboratorijskih analiz, potrebnih za določevanje gnojilvenega načrta.

Ključne besede: rodovitnost, analiza tal, izboljšava kvalitete tal, samooskrba

Using the 5 senses to improve soil fertility

Abstract

Soil analysis is often carried out to determine soil contamination and create a fertilization plan. Many gardeners, however, fertilize their gardens by feel. This can quickly lead to a surplus of nutrients which would not yield the intended effects. It is right that we encourage the general public to be self-sustainable and at the same time teach them how to check the general characteristics of soil with quick tests. There are, for example, affordable tools that are good enough to determine the needs for improving soil fertility. Our senses, such as smell, hearing, touch, vision and taste, are involved in this (we do not want to use the latter) and are well aware of developments in the environment. In the article I will give concrete examples of analyses that everyone can carry out in their garden and assess the general state of the soil. I will also make suggestions for actions which would detect the lack of some soil properties. However, it should be borne in mind that these quick tests do not replace the exact laboratory analyses needed to create a proper fertilization plan.

Keywords: Fertility, Soil analysis, Soil quality improvement, Self-supply

Uresničevanje ciljev okoljske vzgoje

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Izvleček

Okoljska vzgoja je medpredmetno področje, ki temelji na spodbujanju okoljske pismenosti, ki naj bi jo glede na naraščajoče okoljske probleme našega planeta pridobili vsi državljani. Elementi okoljske vzgoje se povezujejo z naravoslovnimi, družboslovnimi in umetnostnimi predmeti. Okoljsko vzgojo pojmuje kot vzgojo odgovornosti do vseh živih bitij in vzgojo za trajnostno prihodnost. To pomeni usposabljanje učencev, da bodo globlje razumeli okoljske pojave in probleme ter iskali nove načine reševanja le-teh. K okoljskemu ozaveščanju lahko veliko doprinese tudi ekološka umetnost, ki za ustvarjanje uporablja odpadne snovi. V prispevku predstavljam projektno učno delo. Okoljske vsebine so bile podane interdisciplinarno z medpredmetnim povezovanjem s poudarkom na naravoslovju in likovni umetnosti z namenom ekološko ozaveščati ter razvijati akcijsko kompetenco pri učencih, da bodo tudi kaj naredili v dobro okolju. Učenci so ponovno uporabili in reciklirali različne odpadne materiale ter ob tem ustvarjali umetnost. S ponovno uporabo odpadnih materialov so istočasno čistili okolje, ustvarjali umetnine, odkrivali ustvarjalne možnosti in se zabavali. Odkrivali so, da je umetnost učinkovita povezava med ljudmi in okoljem, s katero so tudi sami aktivno reševali ekološke težave.

Ključne besede: okoljska vzgoja, okoljsko ozaveščanje, trajnostni razvoj, naravoslovje, likovna umetnost, ekološka umetnost, projektno učno delo

Implementation of environmental education goals

Abstract

Environmental education is a cross-curricular area. It is based on the promotion of environmental literacy. Because of the growing environmental problems of our planet it should be achieved by all citizens. Natural sciences, sociology and art subject associate with elements of environmental education. This education is understood as the education of responsibility to all living beings and the education of a sustainable future. This means training pupils to understand better environmental phenomena and problems and to look for new ways of solving them. Environmental awareness can also contribute a lot to ecological art that uses waste materials for creation of new contents. In the article I present a project study work. Environmental contents were given interdisciplinary with cross-curricular links, focusing on science and fine art, in order to raise awareness of ecology and develop action competence among pupils, so that they can do something good for the environment. Pupils reused and recycled various waste materials and at the same time they were creating art. With the reuse of waste materials, they also cleaned the environment, created artworks, discovered creative possibilities and enjoyed themselves. They discovered that art with which they actively dealt with ecological problems is an effective connection between people and the environment.

Keywords: environmental education, environmental awareness, sustainable future, natural science, fine art, ecological art, project study work

Naravovarstvo in okoljevarstvo pri pouku geografije

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Izveček

Geografski prostor je že od nekdaj prostor, ki je umeščen v neko naravno okolje. To naravno okolje je potrebno zaščititi pred vplivi človeka, ki ga lahko zelo uniči. Z mislijo na to pri pouku geografije dijake izobrazim o tem, kako pomembno je za nas, da skrbimo za okolje, kakšne so posledice onesnaževanja okolja (voda, zrak, tla), zakaj prihaja do podnebnih sprememb in kateri so glavni krivci zanje. Teme imamo razdeljene na okoljevarstvo ter naravovarstvo. Pri tem uporabljam različne metode in materiale dela-diskusijo, ppt predstavitev, spletne strani, delovne in učne liste. Vse to poteka v povezavi z učitelji biologije, kemije in naravoslovja. Medpredmetno sodelovanje profesorjev in dijakov na področju družboslovnih in naravoslovnih predmetov nam omogoča usvajanje novih znanj in drugačno izvedbo pouka. Za nas se je izkazalo, da je najboljša oblika sodelovanja ekskurzija. Tukaj se lahko dijaki hkrati poučijo tako o geografiji kot o naravoslovju (biologija, kemija). V prihodnjih letih bo medpredmetno sodelovanje še naprej potekalo v takšnem obsegu kot sedaj.

Ključne besede: Naravovarstvo, okoljevarstvo, geografija, podnebje, diskusija, ekskurzija, medpredmetno sodelovanje

Nature conservation and environmental protection during geography lessons

Abstract

Geographic area has always been an area that fits into a certain natural environment which needs protection from the damaging effects of human kind. Bearing that in mind, during my geography lessons I educate the pupils about how important it is for all of us to take care of the environment, what the consequences of environmental pollution are (water, air, land), why climate change happens and who the main culprits are. The topics are divided into nature conservation and environmental protection. To deal with these topics I use various methods and study materials (study-discussion), power point presentations, web pages, and worksheets. All this happens in cooperation with biology and chemistry teachers and teachers of natural sciences. Field trips, where students learn about geography and natural sciences (biology, chemistry) at the same time, seem to be the best form of cross-curricular cooperation for us. In the future, cross-curricular cooperation will proceed to the same extent as now.

Keywords: nature conservation, environmental protection, geography, climate, discussion, field trip, cross-curricular cooperation

Didaktični material iz odpadkov

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Izvleček

Odpadki se kopičijo iz dneva v dan. Kupujemo nove stvari in mečemo stran stare. Večkrat se na žalost med odpadki znajdejo tudi nove in uporabne stvari. Namen prispevka je spodbujanje interesa za varovanje narave in razvijanje odgovornega odnosa, kateri cilj je zapisan v učnem načrtu za spoznanja okolja v osnovni šoli. Namen raziskovalne naloge je bil ozaveščanje otrok, da z zmanjšanjem odpadkov skrbijo za bolj čisto okolico in naravo. Raziskovalno delo je potekalo frontalno, v skupinah, v parih in individualno. Iskali smo rešitve, kako lahko oni poleg pravilnega ločevanja odpadkov in manjšega potrošništva, še prispevajo k zmanjševanju odpadkov. Zaključili smo, da iz odpadkov lahko sami izdelajo nove izdelke, jih reciklirajo. Osredotočili smo se na izdelke, ki bi jih lahko uporabili pri pouku. Odločili smo se, da izdelamo marionete in sicer živalske figure. Pripravili smo načrt izdelave. Uporabili smo plastenke, plastične pokrovčke, plutovinaste zamaške, zobotrebce, vrvico, blago, karton in lesene palčke. Raziskovalno nalogo sem uporabila pri medpredmetnem povezovanju. Pri likovni umetnosti je potekala reciklaža. Pri slovenskem jeziku so učenci napisali scenarij za lutkovno igro na temo odpadki in jo zaigrali. Pri matematiki smo jo uporabili kot didaktični pripomoček za poštevanje števil 2, 4, 6 in 8, saj smo izdelali živali, ki imajo različno število nog. Pri glasbeni umetnosti se je lutka spremenila v ritmični instrument. Učenci so spoznali, da so odpadki lahko tudi koristni in uporabni. Preden jih zavržejo lahko pomislijo, kaj vse se da iz njih narediti. Skozi raziskovalno nalogo so učenci razvijali bolj odgovoren odnos do varovanja narave in želijo si več ustvarjalnih nalog.

Ključne besede: naravovarstvo, odpadki, didaktični material, lutka, plastična embalaža, raziskovalno delo, medpredmetna povezava

Didactic material from waste

Abstract

Waste accumulates day by day. We buy new things and throw away the old one. Unfortunately, there are new and useful things in the waste. The purpose of the contribution is to promote the interest in protecting nature and developing a responsible relationship, the goal of which is set out in the curriculum for environmental awareness in elementary school. The purpose of the research was to raise children's awareness of the need to reduce the waste for a cleaner environment and nature. The research work was carried out frontally, in groups, in pairs and individually. We have been looking for solutions for waste reduction in addition to the proper separation of the waste and lower consumption. We have concluded that they can create new products from waste and recycle it. We focused on products that could be used in the class. There came a decision to make puppets - animal figures. We have prepared a production plan. We used plastic bottles, plastic caps, cork stoppers, toothpicks, string, goods, cardboard and wooden sticks. I used the research task for cross-curricular integration. Recycling took place during the subject of fine arts. During the lesson of Slovene language pupils wrote a script for a puppet play on the topic of waste and played it. In mathematics we used puppets as didactic tools for the observation of numbers 2, 4, 6 and 8, since we made animals with different quantity of legs. During the subject of musical art, the puppet was turned into a rhythmic instrument. Pupils realized that waste could also be useful, that's why they can think of what can be done from it before it will be discarded. Through the research tasks pupils developed a more responsible attitude towards nature protection and they expressed their desire for extra creativity.

Keywords: nature conservation, waste, didactic material, doll, plastic packaging, research work, cross-curricular connection

Energetski potencial metan hidrata

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Izveček

Svetovna bilanca porabljene energije govori o tem, da večino potreb po energiji zagotavljajo fosilna goriva. Nahajališča fosilnih goriv so izjemno velika, vendar glede na trenutno rast svetovnega gospodarstva lahko zaloge fosilnih goriv porabimo v naslednjih 100 letih. Prihodnost bo tako v prestrukturiranju energetike in proizvodnje energije s pomočjo drugih virov. Prestrukturiranje energetike na svetovnem nivoju bo najverjetneje potekalo počasi, zato bo glavni izziv zagotovitev zadostnih količin energije iz drugih virov. Uporaba doslej skoraj nepoznanih fosilnih goriv lahko podaljša izrabo fosilnih goriv in omogoča daljše časovno obdobje za prestrukturiranje. En izmed manj poznanih fosilnih goriv je metan hidrat. Metan hidrat nastane z mešanjem vode in metana v določenih pogojih. Pogoji za nastanek na zemlji najdemo ob obrobjih vseh večjih oceanov. Iz energijskega vidika en kubični meter metan hidrata predstavlja približno 160 kubičnih metrov metan plina. Iz enega kubičnega metra metana lahko pridobimo 10,8 kWh energije v obliki toplote. V primerjavi s tekočimi in trdimi fosilnimi gorivi metan gori bolj čisto. Zaradi čistejšega izgorevanje je bil že prepoznan kot pogonsko gorivo vozil v javnem prevozu. V industriji je mogoča uporaba v težkih strojih, vilicarjih in kot medij za segrevanje. V kmetijstvu se za pogon traktorjev, uporablja bioplin. Metan je ena izmed glavnih sestavin bioplina.

Ključne besede: Metan hidrati, goreči led, metan, voda, nepoznana fosilna goriva

Energy potential of methane hydrate

Abstract

World balance of energy shows that majority of energy used is produced from fossil fuels. Resources of fossil fuels are enormous but with this ratio of usage resources will be depleted in next 100 years. Therefore humanity will need to look for new sources of energy. Deformation of energy markets and usage of new energy resources will take time. Biggest obstacle will be production of sufficient amount of energy. Usage of new types of fossil fuels could be the answer to extend the time to implement new green technologies. One of unknown fossil fuels is methane hydrate. Methane hydrate is made by mixing water and methane under special condition. Places where methane hydrate can form its structure are at the coast line of all major oceans. From energy side one cubic meter of methane hydrate can release 160 cubic meter of gas methane. Researches on methane hydrates are numerous. Because of complexity of drilling deep in earth crust result are often negative. From one cubic meter of gas methane we can potential produce 10,8 kWh energy in form of heat. Like other fossil fuels methane hydrate releases energy at burning. Beside energy there are produced toxic and green gases. In comparison with hard and liquid fossil fuels burning produces much less of those products therefore has a big potential for substitution. Because of smaller impact on environment is known to be used in public transport. There are numerous options of usage in industry. In the agriculture sector farmers often use bio gas which mostly is consisted with methane.

Keywords: Methane hydrate, burning ice, methane, water, unknown fossil fuels

Manj odpadkov – več surovin

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Izvleček

Kakovost okolja je osrednjega pomena za naše zdravje, počutje in za naše gospodarstvo. Količina odpadne embalaže se vsako leto povečuje, zato jo je treba zbirati z različnimi pristopi in postopno zmanjševati količine za končno uničenje.

V prispevku smo analizirali vpliv delovno aktivnega prebivalstva, število prebivalcev in povprečne bruto plače na količine ločeno zbrane odpadne embalaže na lokalnem trgu. Od odpadnih embalaž smo analizirali papir, steklo, plastiko in kovine (mešano embalažo) ter les. Ugotavljali smo, ali se poveča posamezna količina odpadne embalaže, če se spreminjata delovno aktivno prebivalstvo, število prebivalcev in povprečna bruto plača. Pri analizi mesečnih podatkov za obdobje enajstih let smo ugotovili, da ima delovno aktivno prebivalstvo negativen vpliv na količino zbrane odpadne embalaže, medtem ko za število prebivalcev in povprečno bruto plačo ne moremo trditi, da ima značilen vpliv, razen za odpadni papir in mešano embalažo.

Ključne besede: odpadna embalaža, komunalni odpadki, zbiranje odpadkov, lokalni trg

Less waste – more raw materials

Abstract

Quality of the environment is crucial for our health, well-being and for the economy. The amount of waste is increasing with each year, which is why it needs to be collected with different approaches and to gradually reduce the volume of waste set for final destruction. This article analyses the impact of the working population, the number of inhabitants and the average gross wage on the volume of separately collected packaging waste on the local market. We analysed waste paper, glass, plastic and metal (mixed packaging) and wood. We have examined whether an individual quantity of waste increases if the working population, number of inhabitants and average gross wage change. When analysing monthly data for a period of eleven years, we found that the working population has a negative impact on the quantity of collected waste, while for the population and for the average gross wage, we cannot claim to have a significant impact, except for waste paper and mixed packaging.

Keywords: Packaging Waste, Municipal waste, Waste collection, Local market

Ko odpadki postanejo izziv – eko sinergija odpadkov

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Izveček

Odpadek je obremenilen za okolje in človeka, vendar učinkovito ravnanje z odpadki, lahko prispeva k učinkoviti rabi virov in ti so bistvenega pomena za zadovoljevanje potreb človeške družbe in zagotavljanje njenega nadaljnega razvoja.

V prispevku smo analizirali povprečno letno količino komunalnih odpadkov, zbranih z javnim prevozom, v kilogramih na prebivalca. Ugotavljali smo, ali se povprečne količine med primerljivimi občinami razlikujejo in ali se količine razlikujejo od povprečne slovenske količine zbranih odpadkov. Ugotovili smo, da se zbrane količine odpadkov razlikujejo med primerljivimi občinami, ne razlikujejo pa se med analizirano občino Jesenice in slovenskim povprečjem. Namen analize je bil preveriti primerljiva območja, kjer bi lahko še ob podobnih zbranih količinah komunalnih odpadkov izvajali projekt v okviru krožnega gospodarstva.

Ključne besede: komunalni odpadki, zbiranje odpadkov, odpadna embalaža, eko sinergija

When waste becomes a challenge – EcoSynergy system

Abstract

Waste has a burdensome effect on the environment and population, but effectively managing the waste can result in an efficient use of resources, which are crucial for the society and its development.

This paper analyses the annual volume of municipal waste gathered by public waste removal in kilograms per capita. Our goal was to find out, whether the average quantities of waste differ in comparable municipalities and if it varies from the Slovenian average. We found that the collected waste average differs from comparable municipalities, but it doesn't vary between the analysed municipality of Jesenice and Slovenian average. The purpose of the analysis was to check comparable areas with comparable waste quantities, where a similar project could be carried out in the context of a circular economy.

Keywords: Municipal waste, Waste collection, Packaging Waste, Eco synergy

Identifikacija priložnosti Nature 2000 v okoljskem izobraževanju

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Izvleček

V preglednem članku sem predstavila priložnosti vključevanja vsebin in ciljev Nature 2000 v okoljsko izobraževanje in ozaveščanje. V uvodnem delu sem pripravila pregled ključnih raziskav in krovnih dokumentov, ki so pomembni za to področje. V drugem delu prispevka pa sem prikazala predvsem metodologijo in primere, ki smo jih razvili v sklopu projekta Nat2Care (Spodbujanje skupnosti za ohranjanje in obnavljanje čezmejnih območij Natura 2000, Program sodelovanja INTERREG V-A Italija-Slovenija 2014-2020). Poudarila sem pomen prilagajanja edukacijskih vsebin in metod različnim ravnam izobraževanja, starosti in interesom deležnikov ter uporabo pristopov vzgoje in izobraževanja za trajnostni razvoj (VITR).

Ključne besede: Natura 2000, okoljsko izobraževanje, trajnostni razvoj, ekosistemi, biotska pestrost

Identification of Natura 2000 opportunities in environmental education

Abstract

Opportunities for integrating Natura 2000 goals and contents into environmental education and awareness-raising activities were presented in the article. Key researches and strategic documents that encourage these aspects were reviewed in the introductory part. In the second part, the methodology and examples developed by Nat2Care project (Activation of citizens for the recovery and preservation of the Nature 2000 cross-border areas, cooperation Programme INTERREG V-A Italy-Slovenia 2014-2020) were stressed. The importance of adapting content to different levels of education, age and interests of stakeholders and the use of approaches of education for sustainable development (ESD) were emphasized.

Keywords: Natura 2000, environmental education, sustainable development, ecosystems, biodiversity

Analiza (geno)toksičnosti energijskih pijač s čebulnim testom *Allium cepa* cv.

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Izvleček

Energijske pijače so pomemben del našega vsakdanjika, njihova poraba pa v zadnjem času narašča. Vsebujejo najrazličnejše poživiljajoče snovi, ki so lahko škodljive same po sebi, lahko pa tudi v kombinaciji z ostalimi sestavinami. Škodljivi učinki se lahko pojavijo takoj ali pa se pojavijo ob dolgotrajnem uživanju teh pijač. Testiranje genotoksičnosti energijskih pijač s čebulnim testom je eden od možnih načinov ugotavljanja škodljivosti energijskih pijač. V svoji diplomski nalogi sem med seboj primerjala dve energijski pijači iz pločevinke in dve alternativni, kavo in zeleni čaj. Destilirana voda je bila negativna kontrola. Za najbolj škodljivo se je izkazala ena od energijskih pijač iz pločevinke, vendar so rezultati pokazali tudi škodljivost kave. V primerjavi z ostalimi testiranimi pijačami so bili učinki zelenega čaja na dedno snov najmanjši.

Ključne besede: energijske pijače, kava, zeleni čaj, genotoksičnost, biotest, *Allium* test, mitotski indeks, kromosomske aberacije

Assessment of (geno)toxicity of some energy drinks using *Allium cepa* test

Abstract

Stimulant drinks play a very important role in our everyday life and its use is increasing. They can contain stimulative substances which can be harmful on their own or in combination with other ingredients. Harmful effects can be observed immediately after use or after chronic exposure. Genotoxicity testing of energy drinks with *Allium* test is one of many possible ways to determine their harmfulness. In my thesis, I compared two store-bought energy drinks from a tin and two alternatives, coffee and green tea. Distilled water was used as a negative control. According to the results, one of the energy drinks from a tin was the most genotoxic, but similar genotoxicity was observed in coffee samples. Green tea showed the least genotoxic effects.

Keywords: stimulant drinks, coffee, green tea, genotoxicity, biotest, *Allium* test, mitotic index, chromosome aberration

Ali obstaja povezanost med okoljskimi poročili in okoljsko uspešnostjo podjetij? Raziskava na vzorcu podjetij predelovalne panoge RS

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Izvleček

Raziskava ugotavlja povezanost med kakovostjo okoljskega poročanja in okoljsko uspešnostjo podjetij. Za raziskovanje slednjega je oblikovan Indeks okoljske uspešnosti, ki na podlagi emisijskih podatkov, pridobljenih na ARSU, omogoča ugotavljanje, ali in koliko podjetja predelovalne dejavnosti zmanjšujejo svoje onesnaževanje. Rezultati kažejo, da ne obstaja signifikantna povezanost med okoljsko uspešnostjo in kakovostjo okoljskega poročanja podjetij predelovalne dejavnosti v RS.

Ključne besede: kakovost okoljskega poročanja, okoljska uspešnost, Indeks okoljske uspešnosti, predelovalna dejavnost

Is there any correlation between environmental reports and environmental performance of companies? Research based on a sample of companies in the processing industry field of the Republic of Slovenia

Abstract

The aim of our research was to determine whether there exists a correlation between the quality of environmental reporting by companies and companies' environmental performance. For this purpose, we created the Environmental Performance Index using the Slovenian Environment Agency's data from its emissions databases. The Index allowed us to determine whether and to what extent companies in the processing industry managed to reduce their environmental pollution. The results revealed that there is no correlation between the companies' environmental performance and the quality of environmental reporting by companies in the processing industry field of the Republic of Slovenia.

Keywords: quality of environmental reporting, environmental performance, Environmental Performance Index, processing industry

Odpadna hrana – okoljski in družbeni vidik

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Izvleček

Na svetu zavržemo več kot eno tretjino hrane, ki jo je mogoče pojesti. To predstavlja 1,3 milijarde ton odpadne hrane na leto. Največ hrane se zavrže v gospodinjstvih (48% vse zavržene hrane). Prebivalci razvitih držav kupijo 12-krat več hrane kot prebivalci držav v razvoju. 12-krat več je tudi zavržejo. 20 % hrane v Evropi se zavrže samo zaradi navedbe roka uporabnosti. Če bi bila odpadna hrana država bi bila druga največja po velikosti, bila bi daleč največja porabnica vode, tretja največja onesnaževalka zraka, imela bi BDP Švice (650 milijard €/leto) in nahranila bi 870 milijonov lačnih ljudi. Izvedla sem 16 intervjujev s predstavniki različnih področij na poti nastajanja odpadne hrane: iz področja pridelave in predelave, področja distribucije in porabe, področja ravnanja z odpadno hrano ter področja reševanja problematike s strani vladnih in nevladnih organizacij. Večina ljudi je prepričanih, da sami zavržejo zelo malo hrane, medtem ko se na splošno (torej s strani drugih) zavrže veliko hrane. Srž problema odpadne hrane in njegovo reševanje tiči prav tukaj – dokler ljudje sami ne bodo kritični do svojih lastnih praks, tudi napredka ni mogoče pričakovati.

Ključne besede: odpadna hrana, vplivi na okolje, lakota

Food waste – environmental and social aspects

Abstract

In the world we discard more than one third of the food that can be eaten. This represents 1.3 billion tons of wasted food per year. Most food is discarded in households (48% of all discarded food). Residents of developed countries buy 12 times more food than residents of developing countries. They also discard 12 times more food. 20% of food in Europe is discarded only due to the indication of the expiration date. If the food waste was a country it would be the second largest in size, it would be by far the largest consumer of water, the third largest air pollutant, had a Swiss GDP (650 billion €/year) and would feed 870 million hungry people. I conducted 16 interviews with representatives of various fields on the food waste path: from the field of production and processing, distribution and consumption, waste management, and the areas of problem solving by governmental and non-governmental organizations. Most people are convinced that they throw away very little food by themselves, while in general (by others) a lot of food is discarded. The core of the problem of waste food and its solution is right here – as long as people themselves are not critical of their own practices, progress can not be expected.

Keywords: waste food, environmental effects, hunger

Stroškovno optimiranje in učinki uporabe naprednih tehnologij pri upravljanju z energijo

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Izveček

Biotehniški center Naklo v Strahinju je izobraževalna ustanova, kmetijsko gospodarstvo ter s športno dvorano rekreacijski objekt. Poraba električne energije se je od izgradnje centra spreminjala glede na dinamiko rasti izobraževalnih programov, števila slušateljev šolskih, izvenšolskih in gospodarskih dejavnosti. Pred desetimi leti je bila na strehah hleva za govedo in konje zgrajena sončna elektrarna Strahinj kot partnersko razvojno-izobraževalni projekt po modelu DP2MIR obnovljivih virov Gorenjskih elektrarn in Biotehniškega centra Naklo. Z zavedanjem pomembnosti alternativne rabe je nastal izobraževalni in promocijski projekt SLOVENAKLO sonaravnega bivanja dejavnosti ter rabe energije v okviru načrtovanja. Sodelovanje se je usmerilo v proučevanje idejnih alternativnih dopolnilnih rešitev s proizvodnimi viri bioplina, ogrevanja toplote z lesno biomaso in zemeljskim plinom. Leta 2016 je bila s poskusom stroškovnega optimiranja celotnih stroškov energentov izdelana optimizacija priklopa porabnikov na lokaciji in vključitev sončne elektrarne v interno instalacijo šole. Izvedena je bila analiza stroškovnih in energetskih učinkov načrtovane optimizacije upravljanja z energijo. Rezultati stroškovnega optimiranja in učinkovite rabe energije so osnova za izdelavo programa nadaljnjih aktivnosti z uporabo naprednih tehnologij in ukrepov izboljšav v centru ter implikacijo novih znanj energetske analitike in osveščanje za družbeno odgovorno rabo energije v centru in javnosti.

Ključne besede: električna energija, proizvodnja, poraba, upravljanje z energijo, učinkovitost, stroški, multivariatne statistične analize

Cost optimization and effects of using advanced energy management technologies

Abstract

The Biotehnični Center Naklo (Naklo Biotechnical Centre) at Strahinj is an educational institution, an agricultural holding and a recreation facility with a sports hall. Since the construction of the centre, electricity consumption has been changing with regard to the dynamics of the growth of educational programs, the number of students in school, extra-curricular and economic activities. Ten years ago, the Strahinj Solar Power Plant was built on the roofs of cattle and horses stable as a partner development and education project under the DP2MIR model of renewable sources of Gorenjske Elektrarne and Biotehnični Center Naklo. Being aware of the importance of alternative use, an educational and promotional project of SLOVENAKLO was created for the sustainable living activities and the use of energy within the planning. The cooperation was focused on the study of conceptual alternative complementary solutions with biogas production sources, heating by wood biomass and natural gas. In 2016, with an attempt to optimize the cost of energy products, there was implemented the connection of consumers optimization at the location and the inclusion of the solar power plant into the internal installation of the school. An analysis of the cost and energy effects of the energy management planned optimization was carried out. The results of cost optimization and efficient use of energy are the basis for the preparation of further activities program by using advanced technologies and improvement measures in the centre, as well as the implication of new energy analytics knowledge and awareness raising for socially responsible energy use in the centre and the public.

Keywords: electricity, production, consumption, energy management, efficiency, costs, multivariate statistical analyses

Strokovno izpopolnjevanje Erasmus + kot pomoč pri iskanju družbeno odgovornih pristopov k poučevanju

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Izveček

Udeležba na strokovnem izobraževanju na francoski srednji šoli (La Legta Peyrouse, Lycee de Perigeux) mi je dala nov zagon pri iskanju idej kako pouk družboslovja, geografije in predvsem naravovarstva narediti še bolj praktičen, inovativen, uporaben in predvsem družbeno odgovornejši. Na osnovi v prispevku kratko opisanih primerov in videnih praks sem v istem šolskem letu našla možnosti za udejanjanje podobnih idej in nadgradnjo le-teh. Članek je potrditev, da z mednarodno mobilnostjo širimo obzorja, izmenjujemo neprecenljive izkušnje s tujimi šolami in tamkajšnjimi zaposlenimi in predvsem izboljšamo lastne poklicne kompetence oz. pridobimo nova znanja. S tem učencem oz. dijakom zagotovo nudimo kvalitetnejši pouk in jih uspešneje motiviramo za učenje. Ker je področje naravovarstva izrazito družbeno odgovorno usmerjeno, dijake namreč učimo sonaravnega gospodarjenja z vsemi temeljnimi naravnimi sestavinami, se mi zdi še toliko pomembneje pisati, govoriti o pridobljenih dobrih praksah.

Ključne besede: strokovno izpopolnjevanje, mobilnost, Erasmus +, Francija, naravovarstvo;

Erasmus + professional training mobility program helps looking for Socially Accountable approaches in teaching

Abstract

Attending professional training at the French Secondary School (La Legta Peyrouse, Lycee de Perigeux) motivated me to find new ideas on how to make the teaching of Social Sciences, Geography and especially Nature Conservation more practical, innovative, useful and above all socially responsible. Based on the described examples in the article and observed practices I managed to find ways to realize similar ideas and upgrade them as well. The article proves that international mobilities help spread our horizons, exchange precious experiences with foreign schools and their employees, and above all, improve our own professional competences and help gain new knowledge. With the mentioned, we offer students and pupils higher quality lessons and motivate them more successfully to learn. Social responsibility in the field of nature conservation is essential, therefore, it seems even more important for me to write and talk about the acquired good practices, since the students already learn about sustainable management with all its basic natural components.

Keywords: professional training, mobility program, Erasmus +, France, nature conservation

Vpliv uvajanja električnih avtomobilov na zmanjšanje obremenjevanja ozračja

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Izvleček

Prispevek obravnava vpliv električnih avtomobilov na zmanjšanje obremenjevanja ozračja. V začetnem delu je prikazan kratek zgodovinski pregled razvoja električnih avtomobilov, ki so bili v začetnem obdobju avtomobilizma povsem konkurenčni avtomobilom na bencinski pogon. Nato so električni avtomobili imeli vrsto desetletij povsem obrobno vlogo, v zadnjih dveh desetletjih pa njihov pomen predvsem zaradi okoljevarstvenih razlogov spet narašča. V nadaljevanju so prikazani škodljivi vplivi na ozračje, ki jih povzročajo izpušni plini avtomobilov z bencinskim in dizelskim motorjem. Škodljivi učinki so tako zaradi izpustov onesnažil kot tudi toplogrednih plinov. Med onesnažili so predvsem problematični trdni delci in ozon. Povišane koncentracije trdnih delcev predvsem povečajo nevarnost srčno-žilnih obolenj in so krive za veliko število prezgodnjih smrti. Zvišane koncentracije prizemnega ozona pa so škodljive za dihala. Z uvajanjem električnih avtomobilov bi lahko izboljšali kakovost zraka v mestih in tako zmanjšali zdravstvena tveganja. Nekoliko bolj kompleksno pa je stanje glede toplogrednih plinov. V primeru, ko je večji del električne energije pridobljen iz trajnih in obnovljivih virov ali tudi jedrske energije, električni avtomobili lahko učinkovito pripomorejo k znižanju izpustov ogljikovega dioksida. V kolikor pa prevladuje električna energija pridobljena iz termoelektrarn, pa je zmanjšanje emisij toplogrednih plinov ob uporabi električnih avtomobilov vprašljivo.

Ključne besede: električni avtomobili, motorji z notranjim izgorevanjem, onesnažila, toplogredni plini, kakovost zraka, zdravstveno tveganje.

Impact of introduction of electric cars on reducing of atmospheric pollution

Abstract

The present paper is concerned with the role of electric cars in the lowering of air pollution. At the beginning is included a brief historical review of electric cars development. In the initial period of the automotive era electric cars were quite competitive to the cars with internal combustion engine. Later the role of electric cars was marginalized for several decades. In the last two decades, however, according mainly to environmental reasons electric cars become important again. In the continuation of the paper harmful impacts of internal combustion engines powered cars on the atmosphere are briefly described. These impacts reflect in the emissions of air pollutants and greenhouse gases. When regarding pollutants particulate matter and tropospheric ozone are particularly problematic. Increased levels of particulate matter especially increase the risk of cardio-vascular diseases and are responsible for a great number of premature deaths. Elevated tropospheric ozone concentrations are harmful for respiratory tract. Introduction of electric cars can help to improve urban air quality and to reduce health risk. The situation regarding greenhouse gases is something more complicated. According to the performed calculations in the case when majority of electric energy derives from permanent or renewable sources or even from nuclear energy the use of electric cars can lower emissions of greenhouse gases substantially. However, if electric energy derives predominantly from fossil fuels lowering of carbon dioxide emissions is questionable.

Keywords: electric cars, internal combustion engines, pollutants, greenhouse gases, air quality, health risk

Zemlja kliče na pomoč

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Izveček

V današnjem času smo priča vse hitrejšemu gospodarskemu napredku, tudi na račun izkoriščanja našega planeta.

Pri slovenščini se velikokrat medpredmetno povezujemo z drugimi predmeti, za večjo dinamičnost v pouk vključujemo tudi sodobno tehnologijo. V okviru projekta Rastem s knjigo so letos dijaki prvih letnikov prejeli knjigo *Planet, ki ne raste*, zato je bilo potrebno najti način, s pomočjo katerega bi dijake spodbudili k razmišljanju o aktualnih okoljskih temah. In seveda k branju literature.

Pri urah smo tako določali vrste odpadkov in jih ustrezno ločevali. Na svojih telefonih so dijaki iskali spletne aplikacije, povezane z varovanjem okolja, in jih predstavili sošolcem.

Nato smo se lotili obravnave knjige □ vsaka skupina je sošolcem predstavila eno od tem in izdelala plakat, s katerim so pokazali, koliko znanja so usvojili. Napisati so morali tudi razmišljanje na temo predstavljenega članka.

Dijaki so po končanem projektne delu ugotovili, da bodo pridobljeno znanje lahko koristno uporabili v vsakdanjem življenju in da branje strokovnih knjig sploh ni tako dolgočasno, kot so domnevali.

Glavne besede: ločevanje odpadkov, varovanje okolja, mobilne aplikacije, spodbujanje branja

The Earth is Crying for Help

Abstract

Nowadays we are faced with rapid economic growth, partly due to the fact that we exploit our planet. At Slovene classes the teacher often makes cross-curricular connections with other subjects and uses advanced technology to enhance classroom dynamics. In the framework of the “Growing up with a book” project this year our 1-grade students were given the book *The Planet that Doesn't Grow*. Thus the approach of how to motivate students to think more deeply about current environmental issues and how to encourage them to read such literature has been adopted. At classes we defined waste and separated it properly. Students used mobile web applications focused upon environmental protection and presented them to school friends. In the next phase which was book discussion, groups of students presented themes to each other and made a poster to show their knowledge gained in the project. One of their tasks was also writing a reflection based on the theme of the article that they presented. Students' evaluation at the end of the project work has shown that their knowledge gained throughout the project will be used in their everyday lives, as well as that reading technical books is not as boring as they had thought it would be.

Keywords: waste separation, environmental protection, mobile web applications, reading motivation

Možnost biotičnega zatiranja alpske kislice s patogenimi glivami

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Izvleček

Alpska kislica (*Rumex alpinus*) je rastlina, ki se nenadzorovano širi na planini Korošica (1300 – 1700 m nv). V raziskavi smo poskušali preučiti možnosti zatiranja alpske kislice s pomočjo uporabe fitopatogenih gliv. Hkrati želimo na planini ohranjati habitat volkovja, saj ga prednostno varuje Natura 2000. Glede na znane povzročitelje bolezni pri drugih vrstah kislic, predvidevamo, da so podobni povzročitelji bolezni prisotni tudi pri alpski kislici. Julija 2017 smo na planini Korošica nabrali vzorce domnevno okuženih listov alpske kislice in jih analizirali v mikrobiološkem laboratoriju. Na podlagi laboratorijskih rezultatov smo ugotovili, da alpsko kislico okužujejo predvsem fitopatogene glive kot sta rja *Uromyces rumicis* in črna listna pegavost *Alternaria* sp.. Ker ima *Alternaria* sp. zelo širok spekter gostiteljev, obstaja nevarnost, da bi se zaradi njene laboratorijske namnožitve in vnosa v okolje lahko razširi tudi na ostale netarčne rastline. Rja *Uromyces rumicis* bi bila za omejevanje alpske kislice na planini Korošica bolj primerna.

Ključne besede: alpska kislica, *Rumex alpinus*, biotično varstvo, planina Korošica, Natura 2000, habitat volkovja

The possibility of biological control of alpine dock with pathogenic fungi

Abstract

Alpine dock (*Rumex alpinus*) is a plant that is uncontrolledly spread on the Korošica mountain (1300 - 1700 m above sea level). In these study, we tried to study the possibilities of suppressing alpine dock by using phytopathogenic fungi. At the same time, we want to preserve the Nardus grasslands habitat on the mountain, because it is primarily protected by Natura 2000. According to known pathogens in other types of docks, it is assumed that similar pathogens exist in alpine dock. In July 2017, we collected samples of allegedly infected leaves of alpine dock on the Korošica mountain and analyzed them in a microbiological laboratory. On the basis of laboratory results, we found that alpine dock is mainly infected by phytopathogenic fungi such as *Uromyces rumicis* and black leaf spot *Alternaria* sp. Because *Alternaria* sp. has a very wide spectrum of hosts, there is a danger that due to its laboratory multiplication and application into the environment it could be extended to other non-target plants. Based on our results, *Uromyces rumicis* would be more suitable for suppressing alpine dock on the Korošica mountain.

Keywords: alpine dock, *Rumex alpinus*, biological control, Korošica mountain, Natura 2000, Nardus grasslands habitat

Ultrazvočna dezintegracija digestata v bioplinarnah: model za večjo proizvodnjo bioplina

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Izveček

Bioplinarne so postale del vsakdana, saj omogočajo pretvorbo hranljivih snovi kot so odpadna hrana, gnojnica, silaža v bioplin in uporabno gnojilo. Bioplinarne proizvajajo bioplin, ki se uporablja za proizvodnjo elektrike, ki je običajno subvencionirana in toplote. V prispevku je prikaza modelski pristop ocene izboljšanja delovanja bioplinarne, če se vanjo vgradi ultrazvočni dezintegrator. Namen je prikazati, kako nadgraditi laboratorijske poskuse z modelom, ter s tem zmanjšati stroške nadaljnjih pilotnih raziskav. V modelu je dobljeno preko 20 % povečanje proizvodnje bioplina, če se uporabi ultrazvočni dezintegrator.

Ključne besede: bioplinarna, ultrazvok, dezintergracija, bioplin

Ultrasonic disintegration of digestate in biogas plants: a model for increased biogas production

Abstract

Biogas plants have become part of everyday life, as they enable the conversion of nutrients such as waste food, slurry, silage to biogas and useful fertilizers. Biogas plants produce biogas, which is used to produce electricity, which is usually subsidized, and heat. The paper presents a model approach to assessing the improvement of the biogas plant's performance if an ultrasonic disintegrator is incorporated therein. The purpose of article is to show how to upgrade the laboratory experiments with the model and reducing the costs of further pilot studies. In the model, more than 20% increase in biogas production is obtained if an ultrasonic disintegrator is used.

Keywords: biogas plant, ultrasound, desintegration, biogas

Vzgoja in izobraževanje o gorah in projekt YOUrALPS

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Izvleček

Na življenje v Alpah vplivajo posebni okoljski, gospodarski in socialni pogoji, ki vladajo v alpskem prostoru. Ti posebni pogoji predstavljajo izziv ter zahtevajo integrativne pristope za trajnostni razvoj in oblikujejo okvir, ki opredeljuje Alpe kot testno območje za razvoj inovativnih socialno-ekonomskih modelov, med katere sodijo tudi inovativni izobraževalni modeli in pristopi, kot je na primer vzgoja in izobraževanje o gorah (VIG). Gre za koncept projekta YOUrALPS, ki je povezal različne akterje iz alpskih držav, ki delujejo na področju VIG, z vizijo mladim predstaviti potencialne alpskega sveta, (ponovno) vzpostaviti povezavo med podedovano dediščino Alp in mladimi ter okrepiti njihovo alpsko identiteto. Vplivi projekta bodo neposredni in dolgoročni, saj bo ustvaril nove priložnosti za mlade in povečal možnosti aktivnejšega vključevanja v alpskem območju z namenom oblikovanja boljše prihodnosti zanje in jih pripraviti na izzive, ki jih še ne poznamo, a vemo, da jih čakajo v prihodnosti.

Gljučne besede: trajnostni razvoj, okoljska vzgoja in izobraževanje, izobraževanje za trajnostni razvoj, model alpske šole, Alpe, zaščiten območje, kompetence, participacija

Mountain-oriented education and the project YOUrALPS

Abstract

Life in the Alps is influenced and conditioned by the specific environmental, economic and social conditions that prevail in the Alpine region. These special conditions pose a challenge that require integrated approaches for sustainable development and at the same time create a framework that defines the Alps as a test area for the development of innovative socio-economic models, including innovative educational models and approaches such as mountain-oriented education (MoE). It is a concept of the project YOUrALPS, which has joined various stakeholders from different Alpine countries working in the MoE field, with a shared vision to present the young people the potentials of the Alpine world, to (re)establishing a link between the legacy of the Alps and the young and strengthening their Alpine identity. The impacts of the project will be immediate and long-term, as it will create new opportunities for young people and more possibilities for their more active integration in the Alpine region in order to create a better future for them and prepare them for challenges that are not yet known, but are awaiting them in the future.

Keywords: sustainable development, outdoor education, education for sustainable development, Alpine School Model, Alps, protected area, competencies, participation

Komercialna energetika – priložnost za tržne storitve

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Izveček

Izraba obnovljivih virov in učinkovitejša raba električne energije v javnem sektorju in gospodarstvu sta področji, ki ponujata številne priložnosti za ustvarjanje prihrankov. Koliko smo sposobni izkoristiti priložnosti, da nam bodo prinašale dodatne prihranke na področju obnovljivih virov in učinkovite rabe energije, je osrednje vprašanje Forumov o obnovljivih virih prihodnosti, ki jih na vsaka tri leta pripravljajo od leta 2007. S predstavljenimi referati in primeri dobrih praks skupine Elektro Gorenjska, ki jo sestavljata obvladujoča družba Elektro Gorenjska d.d. in odvisna družba Gorenjske elektrarne, d.o.o., smo organizatorji spodbudili uporabnike h konkretnim dejanjem. Četrty Forum o obnovljivih virih in učinkoviti rabi energije je bil zaključek procesa vzpostavitve sistema upravljanja z energijo po standardu ISO 50001:2011 v družbi Gorenjske elektrarne. Med udeleženci smo izvedli anketo za ugotovitev mnenj deležnikov o varčevanju z energijo, energetske učinkovitosti in virih energije. Kot metode analize smo na anketnih podatkih uporabili opisno statistično analizo z izračunom srednjih vrednosti, korelacijsko analizo in multivariatno faktorsko analizo. Ugotovili smo medsebojno povezanost posameznih dejavnikov in njihov vpliv znotraj ugotovljenih skupnih faktorjev. Rezultati faktorske analize s štirimi skupnimi faktorji so v oblikovanju modela KE – Komercialna energetika s tržnimi storitvami, ki zagotavlja kakovostno upravljanje z energetske viri z implementacijo razvojnih projektov, uporabo znanj in osveščenih upravljavcev.

Ključne besede: upravljanje z energijo, učinkovitost, kakovost, izobraževanje, razvoj, mnenjska raziskava, opisna statistična analiza, korelacijska analiza, multivariatna faktorska analiza, model

Commercial energy sector – an opportunity for market services

Abstract

The use of renewable energy sources and more efficient use of electricity in the public sector and in the economy are areas that offer many opportunities for creating savings. The extent to which we are able to seize opportunities to bring us additional savings in the area of renewable energy sources and efficient energy use is the central issue of the Forums on renewable energy sources of the future, which have been prepared each three years from 2007. With the presented papers and examples of good practices of the Elektro Gorenjska Group, which consists of the controlling company Elektro Gorenjska d.d. and the subsidiary company Gorenjske elektrarne, d.o.o., the organizers have encouraged the users towards particular acts. The Fourth Forum on Renewable Energy Sources and Efficient Use of Energy was the conclusion of the process of establishing an energy management system according to the ISO 50001:2011 standard in the company Gorenjske elektrarne. We conducted a survey among the participants to identify the shareholders' views on energy saving, energy efficiency and energy sources. As analysis methods, the descriptive statistical analysis by calculating the mean values, correlation analysis and multivariate factor analysis was used on the survey data. We have established the interconnectivity of individual factors and their influence within the established common factors. The results of the factor analysis with four common factors are in forming the CE - Commercial Energy with Market Services model, which provides quality management of energy sources by the implementation of development projects, the use of knowledge and informed operators.

Keywords: energy management, efficiency, quality, education, development, opinion research, descriptive statistical analysis, correlation analysis, multivariate factor analysis, model

Izračun pretoka v cevovodu elektrarne z inštalirano Pelton turbino

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Izveček

V Sloveniji je poleg velikih HE elektrarn na rekah Sava, Drava in Soča inštaliranih še veliko malih HE (MHE). Velike HE s svojo proizvodnjo pokrijejo stroške, ki nastanejo pri vzdrževanju in posodobitvah. V primeru večjih elektrarn se velikokrat izvaja optimizacija proizvodnje v odvisnosti od pretoka. Sodobnejše (rentabilnejše) HE imajo za ta namen nameščene merilnike pretoka v cevovodu. Namestitev takšnega merilnika je lahko velik strošek glede na proizvodnjo električne energije v HE. Za lažji prikaz pretoka in s tem odjema količine vode si bomo ogledali izračun. Za izračun pretoka bomo potrebovali nazivne podatke elektrarne in proizvodne moči na pragu elektrarne.

Ključne besede: Q_{es} , Hidrološki minimum, Ribje steze, Neto padec, Izkoristek HE

Water flow in the pipeline of plant with installed Pelton turbine

Abstract

Beside big hydro power plants on rivers Sava, Drava and Soča there are many small hydro power plants in Slovenia. Big hydro power plants have bigger budgets than small ones. Bigger ones can afford cost which result in constant maintenance and updates. In the case of big hydro power plants there are often several optimizations made in correlation with water flow. Modern and more profit hydro power plants have installed special measuring instrument to measure water flow. Installation of this type of sensor can represent big cost in hydro power plant budget. For easy representation of water flow and water consumption upstream we can use simple equations. For the input, we will need basic data of hydropower plant and production power on the measuring point.

Keywords: Q_{es} , hydrological minimum, fish ladder, net fall, efficiency of HE

Družbeno odgovorna uporaba naprednih tehnologij in novih znanj pri učinkovitem upravljanju z energijo

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Izvleček

Strateško vodenje podjetja temelji na razvoju novih energetskih storitev. Za prepoznavnost zaupanja vrednega podjetja na trgu v luči razvojnih projektov in investicijskih vlaganj je pomembno zaupanje naročnikov, ki izhajajo iz referenc ponudnika. S prestrukturiranjem proizvodnega podjetja v storitveno podjetje s ciljem doseči večjo dodano vrednost, je bil razvojni premik z uvedbo sistema vodenja kakovosti in vključevanjem mednarodnih standardov ISO v poslovno okolje. Podjetje Gorenjske elektrarne je kot prvo podjetje v elektroenergetskem sistemu, ki je leta 2016 uspešno implementiralo standard ISO 50001:2011 in ga integriralo v sistem vodenja kakovosti in povežalo s standardom ISO 9001:2008 in leta 2017 z novelacijo standarda ISO 9001:2015. Za merjenje in analizo energetske učinkovitosti je bilo razvito napredno orodje GEKenergija in uporabljena nova znanja za ciljno spremljanje porabe energije. V obdobju 2015-2017 so se izboljšali ključni energetski kazalniki merjeni na enoto površine. Zmanjšale so se specifične vrednosti porabe toplotne energije za 13,2 %, porabe vse energije za 14,9 %, porabe električne energije za 31,0 % in emisij CO₂ za 18,6 %. Empirični rezultati regresijske analize potrjujejo pozitivno povezanost med pojasnjevalnimi in odvisnimi spremenljivkami s področja energetike, ekonomike in ekologije. Sistematično upravljanje energije je privedlo do prihrankov z zmanjšanjem porabe energije, finančnih stroškov za energijo in zmanjšanja emisij toplogrednih plinov.

Ključne besede: upravljanje z energijo, energetska učinkovitost, poraba, prihranki emisije CO₂, tehnologije, kvantitativne analize, statistična analiza, regresijska analiza

Socially responsible use of advanced technologies and new knowledge in efficient energy management

Abstract

The strategic management of the company is based on the development of new energy services. For the visibility of a trusted company in the market in the light of development projects and investments, the trust of clients that comes from the provider's references is important. With the restructuring of the manufacturing company into a service company with the objective of achieving greater added value, the development shift with the introduction of a quality management system and the integration of international ISO standards into the business environment. The Gorenjske elektrarne Company is the first company in the power system, which successfully implemented the ISO 50001:2011 standard in 2016, and integrated it into the quality management system and linked it to the standard ISO 9001: 2008 and in 2017 with the revision of the ISO 9001:2015 standard. For the measurement and analysis of energy efficiency an advanced GEKenergy tool was developed and new knowledge was used for targeted monitoring of energy consumption. In the period of 2015-2017, key energy indicators, measured per unit of area, were improved. The specific values of thermal energy consumption decreased by 13.2%, the consumption of all energy by 14.9%, electricity consumption by 31.0% and CO₂ emissions by 18.6%. The empirical results of the regression analysis confirm the positive correlation between the explanatory and dependent variables in the field of energy, economics and ecology. Systematic energy management has led to savings by reducing energy consumption, financial costs for energy, and reducing greenhouse gas emissions.

Keywords: energy management, energy efficiency, consumption, CO₂ emissions savings, technologies, quantitative analysis, statistical analysis, regression analysis

3. sekcija: HORTIKULTURA IN FLORISTIKA
3rd session: HORTICULTURE AND FLORISTICS



Spremljanje kakovosti treh sort paradižnika (*Solanum lycopersicum* L.) med dozorevanjem

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Izveček

V poskusu, izvedenem leta 2017, smo spremljali morfometrične in biokemične spremembe na plodovih paradižnika v času pobiranja plodov, in sicer na hibridnih sortah 'Tadim F1', 'Belle F1' in 'Amaneta F1', ki so bile cepljene na podlago 'Beaufort'. V osmih terminih pobiranja med julijem in oktobrom smo merili maso, širino, višino, trdoto, vsebnost suhe snovi in barvo povrhnjice plodov. Določali smo tudi vsebnost skupnih kislin, sladkorjev, fenolov, nitratov in nitritov. Pri vseh treh hibridih je intenziteta rdeče barve bila največja sredi rastne dobe. Intenziteta rumene barve se je med rastno dobo zmanjševala. Zmanjševala se je tudi čvrstost plodov. Med rastno dobo je naraščala vsebnost suhe snovi, sladkorjev ter skupnih fenolov. Vsebnost nitratov in nitritov je bila po pričakovanjih v plodovih paradižnika nizka. Pri hibridih 'Amaneta F1' in 'Belle F1' je vsebnost skupnih kislin bila največja sredi rastne dobe. Hibrid 'Tadim F1' je imel največjo vsebnost skupnih kislin na začetku raste dobe. Plodovi hibrida 'Belle F1' so vsebovali največjo vsebnost skupnih fenolov, plodovi hibrida 'Amaneta F1' največ sladkorjev in suhe snovi, ter najmanjšo čvrstost. Plodovi hibrida 'Tadim F1' so dosegali najmanjšo maso in največjo čvrstost. Sklepali smo, da je optimalen čas pobiranja plodov vseh treh hibridov druga polovica avgusta oziroma od 165 do 180 dni po presajenju.

Gljučne besede: paradižnik, hidroponika, karpometrične lastnosti, biokemične lastnosti

Monitoring the quality of the three varieties of tomatoes (*Solanum lycopersicum* L.) during ripening

Abstract

The research, which was conducted in 2017, consisted of monitoring morphometric and biochemical changes in the fruits of the hybrid varieties 'Tadim F1', 'Belle F1' and 'Amaneta F1', grafted onto the rootstock 'Beaufort'. During eight harvesting terms between July and October, we measured mass, width, height, firmness, dry matter content and the colour of fruits. The content of total acids, sugars, phenols, nitrates and nitrites were determined. In all three varieties intensity of the red colour is highest in the middle of the growing season. Intensity of the yellow colour decreased during the growing season. The firmness of the fruits also decreased. Content of sugars, phenols and dry matter content increased during the growing season in all three varieties. Nitrates and nitrites content in fruits were, as expected, low. In the varieties 'Amaneta F1' and 'Belle F1' total acids content was highest in the middle of the growing season. Variety 'Tadim F1' had highest total acids content in the beginning of the growing season. Fruits of the variety 'Belle F1' had the highest phenols content, fruits of the variety 'Amaneta F1' highest sugar and dry matter content and lowest firmness. Fruits of the variety 'Tadim F1' had lowest mass and highest firmness. We concluded that the optimum harvesting period for all three varieties is the second half of August i.e. 165 to 180 days after planting.

Keywords: tomatoe, hydroponics, carpometric properties, biochemical properties

Odziv izbranih kakovostnih parametrov v plodovih paprike (*Capsicum annuum* L.) na rastlinsko hranilo Mineral

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Izvleček

Poskus je potekal od 27. maja do 20. septembra 2018 v raziskovalnem rastlinjaku (steklenjaku) in plastenjaku na Laboratorijskem polju Biotehniške fakultete v Ljubljani (nadmorski višini 305 m; $\varphi = 46^{\circ} 3' 23''$; $\lambda = 14^{\circ} 30' 29''$). V raziskavi smo preučevali vpliv rastlinskega hranila Mineral na nekatere kakovostne parametre plodov paprike (*Capsicum annuum* L.) v odvisnosti od sorte, sistema gojenja in stopnje zrelosti. V poskus smo vključili 4 sorte paprike, 2 sorti smo obirali v tehnološki zrelosti ('Blondy' in 'Belldonna') in 2 sorti v fiziološki zrelosti ('Madonna' in 'Bobita'). Izbrali smo tri sisteme gojenja in sicer dva hidroponska (s standardno hranilno raztopino po Hoagland in Arnonu in z raztopino Mineral) in klasično gojenje v tleh. Dobljene rezultate smo obdelali z multifaktorsko analizo ANOVA. Vsi izmerjeni barvni parametri so potrdili značilno obarvanost tehnološko in fiziološko zrelih plodov. Vsebnost glukoze je bila največja pri gojenju v raztopini Mineral in pri sortah 'Madonna' in 'Bobita' (74,6 in 83,1 g/kg sveže mase). Vsebnost fruktoze je bila v povprečju največja pri gojenju v raztopini Mineral. Delež saharoze je bil zanemarljiv. Največje vsebnosti citronske kisline smo izmerili pri sortah 'Madonna' in 'Coritno' (8,7 in 8,6 mg/g sveže mase) v raztopini Mineral. Vsebnost jabolčne kisline je bila največja pri gojenju v raztopini Mineral pri sortah 'Blondy' in 'Belldonna' (2,4 in 2,1 mg/g sveže mase). Ne glede na sistem gojenja, smo največ glikozida luteolin izmerili v plodovih sorte 'Blondy'. Delež ostalih fenolnih spojin je bila največja v plodovih rastlin, ki smo jih gojili v tleh.

Ključne besede: rastlinsko hranilo, Mineral, paprika, *Capsicum annuum*, kakovost

Response of selected quality parameters in fruit of a sweet pepper (*Capsicum annuum* L.) to plant nutrient Mineral

Abstract

The experiment was carried out from May 27th 2018 until October 10th 2018 in a research glass house and plastic greenhouse of the laboratory field of Biotechnical Faculty in Ljubljana (an altitude: 305 m; $\varphi = 46^{\circ} 3' 23''$; $\lambda = 14^{\circ} 30' 29''$). We studied the impact of the natural biodegradable agent Mineral on some qualitative parameters of sweet pepper fruits (*Capsicum annuum* L.) depending on the variety, cultivation techniques and maturity. The experiment included four varieties of peppers, two varieties are harvested in technological maturity ('Blondy' and 'Belldonna') and two varieties, were harvested in physiological maturity ('Madonna' and 'Bobita'). Peppers were grown on three ways: in two hydroponics system (standard nutrient solution with Hoagland and Arnon and nutrient solution with Mineral) and production in the soil. The obtained results were statistically processed with multifactor analysis ANOVA. All the measured colour parameters confirmed the characteristic of technological and physiological maturity of the fruits. The content of glucose was higher in 'Madonna' and 'Corinta' (74.6 and 83.1 g/kg fresh weight), which were grown in the Mineral solution. The levels of fructose were higher in the Mineral solution grown fruit. The rate of saharose was negligible. Citric acid (8.7 and 8.6 mg/g fresh weight) were higher in 'Madonna' and 'Bobita' grown in the Mineral solution, while the content of malic acid was also higher in the Mineral solution in variety 'Blondy' and 'Belldonna' (2.4 and 2.1 mg/g fresh weight). The highest content of luteolin glycoside we measured in variety 'Blondy' independent of cultivation technique. The content of other phenolic compounds was the highest in fruits of pepper, which were grown in the soil.

Keywords: biodegradable agent, Mineral, sweet pepper, *Capsicum annuum*, quality

Uporaba IKT pri poučevanju v programu hortikulturni tehnik na primeru UNESCO projekta Milky Way

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Izvleček

V prispevku smo se osredotočili na razvijanje digitalnih kompetenc dijakov programa hortikulturni tehnik. Zanimalo nas je, koliko digitalnega znanja imajo dijaki in kako to znanje vključiti v učni proces učenja gospodarske geografije, ter ga navezati na strokovna znanja njihovega izobraževalnega področja. Zato smo povezali učne vsebine urejanja krajine in oblikovanja z gospodarsko geografijo. Dijaki so se vključili v UNESCO nacionalni projekt z mednarodno udeležbo *Milky Way*, v katerem smo združili razvijanje strokovnih kompetenc s področja osnov krajinarstva, oblikovanja in urejanja naravne, kulturne in urbane krajine, trajnostnega razvoja in oblikovanja z uporabo različnih informacijsko-komunikacijskih tehnologij. Dijaki in učenci so iskali samopostrežne mlekomate v svoji bližnji okolici in ob njih ustvarjali sebke (selfije) in fotografije. Razmišljali so o umestitvi mlekomatov v okolje in krajinskih elementih, ki mlekomate obdajajo. Ustvarjene fotografije so objavili na spletu. Obenem so dijaki oblikovali simbol, ki bo na odprtokodnem zemljevidu OpenStreetMap označeval mlekomate. Na koncu so ustvarjene fotografije in simbole oblikovali in uredili v kratek video. Tako so dijaki spoznavali krajinske značilnosti in elemente svojega lokalnega okolja, obenem pa so usvajali nove digitalne kompetence.

Ključne besede: hortikultura, simbol, krajina, eko turizem, mlekomat, zemljevid, OpenStreetMap, naravna in kulturna dediščina

Using ICT in the Milky Way UNESCO project in the horticultural technician programme

Abstract

The research focused on developing digital competences of the students of the horticultural technician programme. We were interested in not only how much digital knowledge the students have but also in how to include the knowledge in the learning process of teaching Economic Geography and link it to professional knowledge of their field of expertise. For that reason, we have linked the learning content of landscaping and design to Economic Geography. The students joined the Milky Way UNESCO national project with the international participation, in which the use of different information communication technologies was combined with the development of professional competences in the fields of landscaping, design and management of natural, cultural and urban landscape, sustainable development and design. In addition, the students focused not only on how to place milk vending machines in the local area but also on the landscape elements around the milk vending machines. Selfies and photographs were published on the internet. At the same time, the students created a symbol which would mark milk vending machines on the OpenStreetMap open source map. In the end, they edited the taken photographs and symbols and created a short video. The students learnt not only about the landscape features and elements of their local area, but also gained new digital competences.

Keywords: horticulture, symbol, landscape, ecotourism, milk vending machine, map, OpenStreetMap, natural and cultural heritage

Možnosti akvaponskega gojenja solate (*Lactuca sativa* L.)

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Izvleček

Poskus je potekal od 25. februarja do 30. junija 2017, v raziskovalnem rastlinjaku (steklenjaku) in plastenjaku na laboratorijskem polju Biotehniške fakultete v Ljubljani (nadmorski višini 305 m; $\varphi = 46^{\circ} 3' 23''$; $\lambda = 14^{\circ} 30' 29''$). V raziskavi smo primerjali gojenje solate (*Lactuca sativa* L.) na treh sistemih in sicer na akvaponskem, hidroponskem in v tleh. Namen poskusa je bil ugotoviti, kako različni pridelovalni sistemi vplivajo na količino pridelka in kakovost rastlin. V poskus smo vključili 3 sorte solate: 'Comice', 'Noisette' in 'Maritima'. Semena smo posejali v gojitvene plošče in ko so imele sadike razvite od 3 do 4 prave liste, smo jih presadili v mrežaste lončke s premerom 4 cm. 35 dni po setvi smo lončke s sadikami razporedili v luknje na stiropornih ploščah, ki smo jih nato položili v akvaponski in hidroponski bazen. Poskus je bil zasnovan v treh ponovitvah, posamezno ponovitev je predstavljalo po šest rastlin. Rastline smo med rastno dobo oskrbovali po priporočilih iz strokovne in znanstvene literature. Poskus je pokazal, da obstajajo razlike med načini gojenja rastlin, ponekod pa so se pokazale razlike tudi med sortami. Glede tržnega pridelka smo ugotovili, da je najboljši izbor hidroponski sistem. Največjo maso glavic so imele rastline sorte 'Maritima' na hidroponskem sistemu (400 g), najmanjšo pa rastline sorte 'Noisette' v akvaponskem sistemu (160 g). Rastline iz hidroponske vzgoje so imeli največje vrednosti nitratov. Ugotovljeno je bilo tudi, da so bile z glivo *Erysiphe cichoracearum* najmanj okužene rastline gojene v tleh.

Ključne besede: solata, hidroponika, akvaponika, pridelek, biokemične lastnosti

Evaluation of aquaponics lettuce (*Lactuca sativa* L.) production

Abstract

From February 25 to July 30, 2017, an experiment was carried out at the research glasshouse and greenhouse on the Laboratory field of Biotechnical Faculty in Ljubljana. There has been made a research of growth lettuce (*Lactuca sativa* L.) that compared three different systems: aquaponic, hydroponic and production in the soil. It was conducted with the objective of finding the effect of different growing systems on quantity and quality of the crops. The experiment included 3 cultivars of lettuce: 'Comice', 'Noisette' in 'Maritima'. The seeds were sown in plug trays, and when crops had three to four true leaves, they were transplanted in net pots with a diameter of 4 cm. 35 days after the sowing, the net pots were put into perforated polystyrene panels which were then put in aquaponics and hydroponics pool. The experiment was repeated three times, and in each repetition, there were six plants. During their growing period, the plants were provided for according to the technical and scientific recommendations. The experiment showed that there are differences between all three methods used, and that there are also differences between the lettuce cultivars. In view the marketable yield, we found that the best selection is the hydroponic system. The maximum weight of above ground part of plant had cv. 'Maritima' on hydroponic system and the light weight in cv. 'Noisette' in aquaponic system (160 g). The crops from hydroponic production had the highest value of nitrates. We also have found out that the least infected plants with fungus *Erysiphe cichoracearum* were in the soil.

Keywords: lettuce, aquaponics, hydroponics, yield, biochemical properties

Sajenje rožic: cesarjeva nova oblačila ali lažno zlato dobe

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Izveček

O družbeni odgovornosti, povezani z ustvarjanjem in prenosom znanja, je mogoče razpravljati tudi z vidika tistih »znanj«, ki nastajajo v območju kulture. Pri tem gre predvsem za vprašanja družbenega prepoznavanja in vrednotenja tovrstnih »znanj«. V prispevku se osredotočimo na en vidik »kulturne produkcije«, in sicer književnost. Sama literarna veda, ki bi morala biti v okvirih svoje aksiološke discipline prvi presojevalec kakovosti književnih produktov, je v praksi pravzaprav šele na zadnjem mestu. Spričo težav z znanstveno objektivnostjo vrednotenja prepušča prvo mesto manj znanstvenim, kritičnim peresom znotraj novinarskega ceha, ki s svojim pristopom prejkone potrjujejo tezo, da se vrednotenje osredotoča na zunajliterarne, socialne okoliščine, ki determinirajo literarna dela in njihove avtorje. Spre gledovanje intrinzične vrednosti književnosti pa v tem kontekstu ni in ne more biti znak njene odsotnosti, temveč kaže na nezmožnost njenega prepoznavanja. Ko se ta nezmožnost povzdigne v kriterij vrednotenja, se v humusu literarnega ustvarjanja razrase plevel, ki z lažno barvo svojih cvetov duši rast najlepšega cvetja.

Ključne besede: družbena odgovornost, kultura, literarna veda, literarna kritika, književnost, postmoderna, postmodernizem, postrealizem, literarno vrednotenje, umetnost, aksiologija

Sowing Flowers: the Emperor's New Clothes or Fake Gold of the Age

Abstract

Social responsibility related to the creation and transition of knowledge could be discussed from the perspective of "knowledge" which has been created in the area of culture. First and foremost, the idea of social recognition and evaluation of such "knowledge" should be pointed out. The focus of this contribution is made on a cultural production viewpoint, which is literature (fiction, drama and poetry). Literary science, which should be the first judge of the literature's quality, is actually the last. Due to problems, related to scientific objectivity, this evaluation seems to be left to the less scientific approach of literary criticism inside journalist practice, which leads to the evaluation of social circumstances surrounding authors and literature instead of the intrinsic value of literary works. Not being able to comprehend the intrinsic value of literature does not mean that such value does not exist, it just cannot be recognised. When this incapability is elevated to a criterion of evaluation, the soil of literary creativity becomes overgrown with weeds and their fake colours, which suffocate the growth of most gorgeous flowers.

Keywords: social responsibility, culture, literary science, literary criticism, literature, postmodern age, postmodernism, postrealism, literary evaluation, arts, axiology

4. sekcija: ŽIVILSTVO IN PREHRANA

4th session: FOOD PRODUCTION AND PROCESSING AND NUTRITION



Zdrav življenjski slog dijakov

Projektno delo kot primer zdravega življenjskega sloga dijakov

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Izveček

Podatki Nacionalnega inštituta za javno zdravje o življenjskem slogu slovenskih mladostnikov so me pritegnili v taki meri, da sem se odločila dijake ozavestiti o pomembnosti zdravja.

Na Srednji šoli Ravne dijake osveščamo o zdravju in skušamo spodbujati zdrav način življenja na različne načine: s športnimi dejavnostmi, predavanji in delavnicami, projektnimi tedni. Temeljni namen teh dejavnosti je, da dijake celostno poučimo o pomembnosti telesnega in duševnega zdravja, zato pogosto sodelujemo s strokovnjaki z različnih področij.

Projektno delo nam daje možnosti, da se poglobljeno ukvarjamo z določeno tematiko, ne samo teoretično, ampak poskušamo teorijo tudi udejaniti. Zastavljeni cilj je bil, da dijaki sami ozavestijo pomen zdrave prehrane in gibanja.

Poslužila sem se različnih raziskovalnih metod: pogovor, anketa, eksperiment, analiza, študij literature, praktične vaje.

Dijaki so aktivno sodelovali, projektno delo se je izkazalo za ustrežno obliko učenja, zastavljeni cilj je bil dosežen.

Ključne besede: zdravje, življenjski slog, gibanje, projektni teden

The Healthy Lifestyle of Students

Abstract

Data from the National Institute for Public Health on the healthy lifestyle of Slovenian adolescents have intrigued me to the point, where I wanted to inform our students about the importance of a healthy lifestyle.

At the Ravne na Koroškem High School, we try to raise awareness about health and encourage our students to live a healthier lifestyle with different sports activities, seminars, workshops and project weeks. The purpose of these activities is that we teach them about the importance of both physical and mental health, hence why we often work with experts from both fields.

Project work allows us to dive deep into a specific thematic, not only theoretically, but also practically. The goal is for our students to develop a healthy lifestyle on their own.

I used many different research methods: discussions, questionnaires, experiments, analysis, the study of literature and practical exercises.

The students actively participated as project work has proven to be an adequate way of teaching. The goal we set for our project week has been met.

Keywords: health, lifestyle, physical activity, project week

Sodobne prehranske smernice za uspešen trening

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Izveček

Avtor v prispevku obravnava različne smernice v prehranjevanju športnikov. Dotakne se področja urejene prehrane tako športnikov rekreativcev kot profesionalcev. V prvem delu prispevka predstavi splošne prehranske smernice, ki so temelj zdravega življenjskega sloga. V prispevku avtor obravnava pomembnost ustreznega prehranjevanja glede na trajanje in način športne vadbe ter omeni prehranska dopolnila za uspešno regeneracijo po vadbi. Avtor obravnava problematiko uspešnosti treninga, ki je v veliki meri odvisna od zdravega načina prehranjevanja. Ustrezna izbira živil je pomembna za zagotavljanje zadostne energije pri izvedbi kvalitetne vadbe, za regeneracijo organizma po vadbi, preprečevanja poškodb in padca imunskega sistema, ki v nasprotnem primeru zaustavijo trening. Avtor na koncu prispevka ugotavlja, da obstaja zelo veliko različnih splošnih prehranskih priporočil, ki se pogosto spreminjajo. Zaključuje, da mora biti prehranski načrt športnika individualiziran in dnevno prilagojen glede na energetske potrebe. Avtor meni, da osnovo za pripravo dobrega prehranskega načrta predstavlja sezonska, pretežno ekološko pridelana hrana, ki izvira iz okolja, v katerem živimo.

Ključne besede: zdrav življenjski slog, zdrava prehrana, ekološka hrana, šport, vadba, regeneracija

Modern dietary guidelines for a successful training process

Abstract

The author of this article discusses different dietary guidelines for athletes. Author covers directives for both recreational athletes and professionals. In the first section, the author presents general and basic nutrition guidelines for a healthy lifestyle. Further on, the author discusses the importance of adjusting diets with the duration and type of exercises and mentions various options of food supplements that help recovery after exercise. The author examines the question of the training process's success, which depends, to a large extent, to a healthy diet. Adequate food choices are important to ensure enough energy in carrying out quality training, recovering after exercise and preventing damage and failure of the immune system, which otherwise halt the entire training progress. In the end, the author concludes that a lot of various general dietary recommendations are changing. Author concludes that the athlete's dietary plan must be individualized and adjusted everyday according to the daily energy need. The author believes that the fundamental of a good training dietary plan is to eat seasonal organic food, which can be found locally.

Keywords: healthy lifestyle, healthy diet, organic food, sport, exercising, regeneration

Zdravo prehranjevanje predšolskih otrok v vrtcu

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Izvleček

Avtorica v prispevku govori o prehrani otrok v predšolskem obdobju. Prehrana ima pomemben vpliv na zdravje, saj vsak človek potrebuje hranilne snovi v ustreznem razmerju za rast kosti, mišic, organov in tudi na razvoj možganov. Vrtec, kot ustanova, ima pomembno vlogo pri prehranjevanju otrok, saj mora zagotoviti varno, zdravo, uravnoveženo in raznovrstno hrano. Poseben pomen mora dati lokalni in ekološki hrani. V prispevku so navedeni podatki, kakšno in katero hrano uživajo otroci v Vrtcu Tržič. V vrtcu strokovni delavci skrbijo tudi za vzgojo otrok, v smislu kulturnega prehranjevanja in spodbujanja zdravega prehranjevanja otrok. Pri vsakem obroku je potrebno zagotoviti dovolj časa za prehranjevanje in pripraviti prijetno vzdušje. Predstavljen je primer samostojnosti otrok pri pripravi prostora in postrežbe hrane. V prispevku avtorica predstavi projekt, ki ga je izvedla v skupini otrok starih 2–4 let, z naslovom Zdravje v vrtcu. V projektu se je dotaknila tudi zdrave prehrane v vrtcu. Z otroki so se pogovarjali o prehranski piramidi, o pomenu vode, pripravili so zdrave zelenjavne in sadne sokove. V tem starostnem obdobju se otrokom prehranjevalne navade šele oblikujejo, zato jim moramo privzgojiti zdrave prehranjevalne navade s svojim zgledom. S svojimi odločitvami in vedenjem lahko vplivamo na oblikovanje prehranskih navad in posledično na zdravje otrok.

Ključne besede: zdrava prehrana, predšolski otrok, vrtec, vzgojitelj, zdravje

Healthy nutrition for preschool children in kindergarten

Abstract

In the article, the author discusses the nutrition of children in the pre-school period. Nutrition has a significant impact on health, as children in this period need nutrients to develop bones, muscles, organs, and it also influences their brain development. Kindergartens as institutions play an important role in children's nutrition, so they have to provide safe, healthy, balanced and diverse food. Kindergartens have to pay special attention to provide local and organic food. The article provides data on which and what kind of food the children eat in Kindergarten Tržič. The childcare workers also raise children in terms of promoting healthy eating habits. For each meal, it is necessary to provide enough time for eating, and a pleasant atmosphere. In the article, an example of the independence of children in the preparation of the playroom and food serving. The author presents a project in a group of children aged 2 to 4 years, entitled Health in kindergarten. The project also discusses a healthy diet in kindergartens. The childcare workers discussed the dietary pyramid with the children, as well as the importance of water, and also prepared healthy vegetable and fruit juices. At this age, the eating habits of the children are still developing, therefore the adults have to provide a healthy example to promote good eating habits. Through our decisions and behaviour, we can influence the shaping of eating habits and consequently the health of the children.

Keywords: healthy diet, preschool children, kindergarten, childcare worker, health

Odpornost proti antibiotikom pri izolatih komezalnih bakterij iz sirov

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Izvleček

Razvoj in širjenje odpornosti proti antibiotikom (OPA) predstavljata resno grožnjo za zdravje ljudi ter živali, zato je nujno identificirati rezervoarje odpornosti, ki so prisotni v zelo raznolikih okoljih vzdolž prehranske verige. Namen predstavljenega dela je bil raziskati občutljivost komezalnih bakterij iz sirov s slovenskega tržišča za deset klinično pomembnih antibiotikov. V analizo smo vključili 75 sevov mlečnokislinskih bakterij (*Lactobacillus*, *Pediococcus*) in bifidobakterij, ki so bili izolirani v našem laboratoriju iz tradicionalnih ali komercialnih sirov in identificirani na nivoju vrst. Minimalno inhibitorno koncentracijo (MIC) sevov smo določili z mikrodilucijsko metodo skladno s standardom ISO10932. Analiza je pokazala, da 66,7 % izolatov izkazuje odpornost proti enemu ali več antibiotikom. Zaskrbljujoč je visok delež odpornih izolatov proti tetraciklinu (28 %) z bimodalno razporeditvijo vrednosti MIC, kar kaže na verjetno pridobljeno odpornost. Pri kar 55,4 % laktobacilov in pediokokov smo ugotovili presežene mejne vrednosti MIC za kanamicin (EFSA, 2018). Pri laktobacilih je sicer, kakor kažejo naši rezultati in rezultati drugih raziskovalcev, v veliki meri prisotna intrinzična (neprenosljiva) OPA. Rezultati nakazujejo, da tudi sir lahko predstavlja rezervoar OPA, ter predstavljajo dobro izhodišče za identifikacijo genetskih determinant OPA, oceno zmožnosti prenosa OPA tekom prehranske verige ter morebitno revizijo mejnih vrednosti MIC, predvsem v primeru kanamicina.

Ključne besede: odpornost proti antibiotikom, komezalne bakterije, prehranska veriga, MIC

Antibiotic resistance in isolates of commensal bacteria from cheese

Abstract

The emergence and dissemination of antibiotic resistance (AR) in the food chain has become a subject of a major concern. Commensal bacteria from diverse environments along the food chain may act as a reservoir of AR determinants, which could be mobilized and transferred to human pathogens. The aim of the presented work was to evaluate the susceptibility of commensal bacteria from cheese, purchased from retail markets in Slovenia, to ten clinically relevant antibiotics. The 75 strains belonging to *Lactobacillus*, *Pediococcus*, and *Bifidobacterium* genera were isolated from commercial or traditional cheese and identified at species level. The minimal inhibitory concentration (MIC) was determined by microdilution in accordance with the standard ISO10932. We detected a high prevalence of resistance to one or more antibiotics (66.7 %). Bimodal MIC distribution could be observed for tetracycline, which indicates acquired resistance (28 % of the isolates). The highest prevalence of resistance (according to EFSA, 2018) in lactobacilli and pediococci (55,4 %) was recorded for kanamycin. Kanamycin resistance in lactobacilli is mainly an intrinsic feature, which is in concordance to our data and data of other researchers. Overall, our results suggest that cheese should be considered as a reservoir of resistance and provide a future basis for identification of AR determinants and assessing the transferability of AR along the food chain. Moreover, the data could be utilized for eventual reviewing of the current MIC breakpoints, especially those for kanamycin.

Keywords: antibiotic resistance, commensal bacteria, food chain, MIC

Bioaktivne snovi v živilih rastlinskega izvora

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Izvleček

Že več kot desetletje je poznano, da prosti radikali povzročajo poškodbe nastale med oksidativnim stresom. Nekatere so akutne (vnetja) oz. lahko vodijo do kroničnih bolezni kot so: arterioskleroza, kronično vnetje, hipertenzija, rak, avtoimune motnje, Parkinsonova in Alzheimerjeva bolezen, ki so rezultat izgube ravnotežja med antioksidativnimi obrambnimi mehanizmi in oksidativnim stresom. Kar se tiče dolgotrajne uporabe antioksidantov kot dodatkov v prehrani, moramo biti pri tem dovolj kritični in zmerni. Vsekakor so naravni antioksidanti v obliki rastlinskih živil v zmernih količinah, po vsebnostih referenčnih vrednosti vnosa, manj škodljivi in je njihova večkratna prisotnost v celodnevni prehrani lahko naložba v ohranjanje zdravja. Z rednim uživanjem zelenjave in sadja 5-krat na dan ni težko doseči priporočenega dnevnega odmerka 200 mg vitamina C. Pri zdravih ljudeh z uravnoteženo prehrano je dodaten vnos askorbata v obliki prehranskih dopolnil nepotreben. Večje potrebe po askorbatu imajo podhranjeni ljudje, kadilci in diabetiki. Do izčrpanja telesnih zalog askorbata pride največkrat pri bolnih ljudeh z odpovedjo ledvic oz. tistih, ki so v dolgotrajni intenzivni negi. Vir karotenoidov sta sadje in zelenjava intenzivne oranžne, rumene in rdeče barve. Veliko α -karotena najdemo v bučah, korenju, koruzi, rumeni papriki. Veliko β -karotena v korenju, brokoliju, mangu, marelicah, rdeči papriki, ohrovtu in špinaci. Karotenoidi se najbolje absorbirajo, če jih uživamo skupaj s hrano, ki vsebuje več maščob. Nasprotno se absorpcija zmanjša ob uživanju hrane z več vlaknine. Zanimivo je, da njihovo absorpcijo močno izboljšamo s toplotno obdelavo hrane. V rdeči pesi so identificirali betalaine (antioksidante): vulgaksantin I, vulgaksantin II, indikaksantin, betanin, prebetanin, izobetanin in neobetanin. Odkriti so bili tudi ciklodopa glukozid, N-formilciklodopa glukozid, glukozid dihidroksi-indol karboksilne kisline, betalaninska kislina, L-triptofan, *p*-kumarna kislina ter sledovi neznanih flavonoidov, ki delujejo v prehrani antioksidativno.

Ključne besede: bioaktivne snovi, sekundarni metaboliti, antioksidanti, antioksidacijski potencial

Bioactive compounds in plant based products

Abstract

It is known for over a decade that free radicals cause damage caused by oxidative stress. Some are acute (inflammation) and can lead to chronic diseases such as: arteriosclerosis, chronic inflammation, hypertension, cancer, autoimmune disorders, Parkinson's and Alzheimer's disease, resulting from a loss of balance between antioxidant defense mechanisms and oxidative stress. As far as the long-term use of antioxidants as additives in nutrition is concerned, we must be critical and moderate in this regard. In any case, natural antioxidants in the form of plant foods in moderate amounts, according to the content of the reference values of the intake, are less harmful and their multiple presence in the whole day's diet can be an investment in maintaining health. With regular consumption of vegetables and fruits 5 times a day, it is not difficult to achieve the recommended daily dose of 200 mg vitamin C. In healthy people with a balanced diet, additional ascorbate administration in the form of dietary supplements is unnecessary. Larger needs for ascorbate have malnourished people, smokers and diabetics. Ascorbate's exhaustion of body stocks occurs most often in sick people with renal failure and those who are in prolonged intensive care. Fruits and vegetables of intense orange, yellow and red are the source of carotenoids. Large amounts of α -carotene is found in pumpkins, carrots, corn, yellow peppers. Large amounts of β -carotene is found in carrots, broccoli, mango, apricots, red peppers, spawn and spinach. Carotenoids are best absorbed when consumed with foods containing more fats. Conversely, absorption is reduced when consuming more fiber. It is interesting that their absorption is greatly improved by heat treatment of food. Beta levels (vulgaxanthin I, vulgaxanthin II, indixanthin, betanin, prebetanin, isobetanin and non-neopenine) have been identified in the red beetroot. Cycladopic glucoside, N-formylcyclodepine glucoside, glucoside dihydroxy-indole carboxylic acid, betalaninic acid, L-tryptophan, *p*-coumaric acid and traces of unknown flavonoids, which act in the diet antioxidant, have also been discovered.

Keywords: bioactive compounds, secondary metabolites, antioxidants, antioxidative potencial

Senzorična analiza sušenega zelenjavnega čipsa

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Izveček

Sodobni tehnološki postopki dehidracije živil kot je vakuumsko in konvekcijsko sušenje nam omogočajo proizvodnjo izdelkov z boljšo prehransko, mikrobiološko in senzorično kakovostjo. Veliko novih načinov sušenja se lahko uporablja za proizvodnjo zelenjavnega čipsa ali prigrizkov, kot so: cvrtje v vakuumu, konvekcijsko sušenje, sušenje z zamrzovanjem, sušenje z mikrovalovi, vakuumsko sušenje, vakuumsko sušenje z mikrovalovi, sušenje z zamrzovanjem z mikrovalovi, sušenje z razprševanjem in kombinirano sušenje. Najbolj primeren način za proizvodnjo zelenjavnega čipsa je vakuumsko sušenje. Ta način sušenja omogoča izdelke z najboljšimi senzoričnimi lastnostmi. Za uspešno trženje zelenjavnega čipsa je potrebno izbrati najboljši postopek sušenja, ki med drugim zagotavlja prehranski izdelek dobre senzorične kakovosti. Senzorična analiza živil je priznana znanstvena disciplina, kjer lahko s pomočjo šolanih preskuševalcev podamo ocene za senzorične lastnosti živila. Šolani preskuševalci objektivno merijo, analizirajo, razlikujejo po kvaliteti in interpretirajo lastnosti živila, ki jih zaznajo s svojimi čutili. Všečnost novega prehranskega izdelka je nujno preveriti tudi med potrošniki, ki podajo organoleptične ocene na osnovi svojih izkušenj z določenimi živila. Če povzamemo skupne senzorične ocene raziskovanja zelenjavnega čipsa rdeče pese in korenja za barvo, enakomernost površine, vonj, teksturo, okus, značilnost arome in obstojnost arome, je najboljšo oceno, ki smo jo raziskali med vzorci čipsa korenja dobil vakuumsko sušen čips 'Jeannete' pri 40 °C in vakuumsko sušen čips korenja 'Rolanka' sušen pri 50 °C. Pri čipsu rdeče pese sorte 'Detroit' je najboljšo senzorično oceno dobil vakuumsko sušen čips pri 50 °C in pri sorti 'Forono' vakuumsko sušen čips pri temperaturi 60 °C. Pri večini vzorcev so slabšo oceno senzoričnih lastnosti dobili vzorci čipsa rdeče pese in korenja sušeni s konvekcijskim sušilnikom.

Ključne besede: senzorična analiza, sušen zelenjavni čips, čips korenja, čips rdeče pese, vakuumsko sušenje, konvekcijsko sušenje

Sensory evaluation of dried vegetable chips

Abstract

Modern technological processes of dehydration of food such as vacuum and convection drying allow us to produce products with better nutritional, microbiological and sensory quality. Many new drying methods can be used for the production of vegetable chips or snacks such as: frying in a vacuum, convection drying, freeze drying, microwave drying, vacuum drying, vacuum drying with microwaves, microwave freeze drying, spray drying and combined drying. The most suitable way to produce vegetable chips is vacuum drying. This method of drying allows products with the best sensory properties. For the successful marketing of vegetable chips, the best drying procedure should be selected, which, among other things, provides a nutritional product of good sensory quality. Sensory analysis of foods is a recognized scientific discipline where we can give estimates for the sensory properties of the food with the help of schooled testers. Schooled testers objectively measure, analyze, differentiate in quality and interpret the properties of the food they perceive with their senses. The likelihood of a new food product is also necessary to check among consumers who give organoleptic evaluations on the basis of their own experience with certain foods. To summarize the overall sensory estimates of beetroot and carrot vegetable chips of color, the uniformity of the surface, the odor, the texture, the taste, the flavor characteristic and the stability of the flavor, the best estimate among the chips of carrot was obtained by vacuum-dried chips 'Jeannete' at 40 °C and vacuum-dried beetroot chips dried at 50 °C. In the 'Detroit' beetroot chips, the best sensory estimate was obtained by vacuum-dried chips at 50 °C and vacuum-dried chips at 60 °C for the 'Forono' variety. For most samples, the samples of beetroot and carrots chips dried with a convection oven have been poorly assessed for sensory properties.

Keywords: sensory evaluation, dried vegetable chips, carrot chips, beetroot chips, vacuum drying, convection drying

Milky Way (UNESCO projekt z mednarodno udeležbo) – uporaba odprtokodnega zemljevida OpenStreetMap pri poučevanju v programu živilsko-prehranski tehnik

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Izvleček

Geografija je kot šolski predmet izredno dinamična in zanimiva. Kljub temu pa moramo za večjo motiviranost dijakov učitelji pri poučevanju vključiti tudi drugačne pristope. Kako to storiti včasih predstavlja pravi podvig. V prispevku sem se zato osredotočil na razvijanje digitalnih kompetenc dijakov. Zanimalo me je, koliko digitalnega znanja imajo dijaki programa živilsko-prehranski tehnik in kako to znanje vključiti v učni proces učenja gospodarske geografije, ter ga navezati na strokovna znanja njihovega strokovnega področja. Zato smo povezali učne vsebine mlekarstva z gospodarsko geografijo. Dijaki so se vključili v UNESCO nacionalni projekt z mednarodno udeležbo *Milky Way*, v katerem smo združili razvijanje strokovnih kompetenc s področja mlekarstva (pridelava, predelava in prodaja mleka in mlečnih izdelkov) z uporabo različnih informacijsko-komunikacijskih tehnologij. Dijaki in učenci so iskali samopostrežne mlekomate v svoji bližnji okolici in jih kartografirali na odprtokodni zemljevid OpenStreetMap. Tako je nastala baza mlekomatov, ki je vidna na zemljevidu OpenStreetMap, obenem pa so dijaki v okviru strokovnih predmetov usvojili znanja s področja mlekarstva.

Ključne besede: mleko, mlekomat, zemljevid, OpenStreetMap, naravna dediščina, živilstvo, zdrava prehrana, eko turizem

Milky Way (UNESCO project with international participation) – using the OpenStreetMap open source map for teaching in the food processing technician programme

Abstract

Geography as a school subject is extremely dynamic and interesting. Nevertheless, teachers need to include other elements in teaching it to achieve greater motivation of the students, which sometimes represents a real challenge to the teachers. I often find myself wondering how to answer the students' questions, such as: "Where do we need this in practice?" It may not be right now, but Geography knowledge will be quite useful in the work they will perform. For that reason, I focused on developing students' digital competences in my research. I was interested in how much digital knowledge the students of food processing programme have. In addition, I was interested in not only how to integrate this knowledge in the learning process of teaching Economic Geography but also how to connect it to the professional knowledge of their area of expertise. That is why we linked the learning content of dairy farming with Economic Geography. The students joined the Milky Way UNESCO national project with the international participation, in which we combined the development of professional competences from the field of dairy farming (production, processing and sale of milk and dairy products) with the use of different information and communication technologies. The students and pupils searched for self-service milk vending machines in their vicinity and mapped them to the OpenStreetMap open source map. This way, not only a database of milk vending machines was created, which is visible on the OpenStreetMap map, but also the students gained professional knowledge in the field of dairy farming.

Keywords: milk, milk vending machine, map, OpenStreetMap, natural heritage, food processing, healthy diet, ecotourism

Protimikrobna aktivnost laktoferina, pridobljenega iz kisle sirotke

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Izveček

Kisla sirotka, stranski produkt pri proizvodnji mlečnih izdelkov (skuta, zrnati sir, grški jogurt in drugi), vsebuje med drugim tudi nekatere proteine z visoko biološko vrednostjo, ki jih je mogoče z naprednimi tehnološkimi postopki ekstrahirati in uporabiti v različnih funkcionalnih živilih ali prehranskih dopolnilih. En izmed takšnih proteinov je laktoferin, ki izkazuje številne biološke učinke, kot so protimikrobna aktivnost, protivirusna aktivnost, imunomodulatorno delovanje, izboljšana absorpcija železa, izboljšana proliferacija osteoblastov in druge ter ima zato velik terapevtski potencial. V prispevku predstavljamo rezultate preskušanja protimikrobne aktivnosti laktoferina, ki je bil pridobljen iz kisle sirotke s pomočjo ionske izmenjevalne kromatografije na monolitnih kolonah. Ugotovili smo protimikrobno aktivnost proti predstavnikom listerij, *E. coli* in salmonel, pri čemer je največjo občutljivost izkazal *E. coli* O157:H7. Rasti mlečnokislinskih bakterij in bifidobakterij preskušeni vzorci laktoferina niso zavirali. Izkazana protimikrobna aktivnost omogoča postavitve metode za spremljanje biološke aktivnosti laktoferina med postopki izolacije in proizvodnje novih izdelkov ter za spremljanje njihove obstojnosti.

Ključne besede: kislina sirotka, laktoferin, protimikrobna aktivnost, funkcionalna živila, prehranska dopolnila

Antimicrobial activity of lactoferrin obtained from acid whey

Abstract

Acid whey, a by-product in the production of dairy products (quark, cottage cheese, Greek yogurt and others), contains also some proteins of high biological value that can be extracted by advanced technological processes and used in various functional foods or dietary supplements. One of these proteins is lactoferrin, which exhibits many biological effects, such as antimicrobial activity, antiviral activity, immunomodulatory activity, improved iron absorption, improved osteoblast proliferation and others, and therefore has a great therapeutic potential. The article presents the results of testing the antimicrobial activity of lactoferrin, which was obtained from acid whey by means of ion exchange chromatography on monolithic columns. Antimicrobial activity was found against representatives of listeria, *E. coli* and salmonella, with *E. coli* O157:H7 showing the highest sensitivity. The growth of lactic acid bacteria and bifidobacteria was not inhibited by lactoferrin in the samples tested. The demonstrated antimicrobial activity enables the development of a method for monitoring biological activity of lactoferrin during isolation processes, during production of new products and in monitoring of their stability.

Keywords: acid whey, lactoferrin, antimicrobial activity, functional foods, dietary supplements

Poslovanje, strategije in dogajanje v času nedavne ekonomske krize: primer Skupine Mercator

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Izveček

V članku analiziramo poslovanje in strategije živilsko-trgovske verige Skupine Mercator (v nadaljevanju Mercator) v obdobju od leta 2007, ko so poslovanje Mercatorja še odlikovali zavirljivi rezultati in vse do poslovno znatno manj ugodnega leta 2013. V tem obdobju je svoje zobe pokazala globalna gospodarska in finančna kriza, ki številnim podjetjem ni prizanesla. Analizo poslovanja Mercatorja v obdobju od leta 2007 do leta 2013 smo napravili na osnovi kvantitativne analize javno dostopnih računovodskih izkazov ter kvalitativnega pregleda relevantnih strateških dokumentov. Vsebinski del članka je razdeljen na tri sklope. V prvem sklopu smo opisali poslovanje Mercatorja skozi leta v obdobju od leta 2007 do leta 2013. Nadalje smo v drugem sklopu predstavili strategije Mercatorja v že omenjenem obdobju. V tretjem delu pa smo analizirali dogajanje okoli prevzemanja oziroma odprodaje Mercatorja skozi leta. Po končanem vsebinskem delu članka pa smo v zaključku povzeli glavne ugotovitve.

Ključne besede: živilstvo, ekonomska kriza, strategije, državna last, zasebna last, analiza, Mercator

Business, Strategies and Events in the Time of the Recent Economic Crisis: the case of the Mercator Group

Abstract

The paper analyses the business operations and strategies of the trade & food chain Mercator Group (hereinafter referred to as Mercator) in the period from 2007, when Mercator's operations were still marked by enviable results and up to the less favourable conditions in 2013. In this period, the global economic and a financial crisis showed a negative influence on many companies. The analysis of Mercator's operations was made on the basis of a quantitative analysis of publicly available financial statements and a qualitative overview of relevant strategic documents. The substantive part of the paper is divided into three sections. In the first part, we described Mercator's operations over the period from 2007 to 2013. In the second part, we presented Mercator's strategies for the aforementioned period. In the third part, we analysed the events surrounding the takeover or sale of Mercator over the years. Afterwards, we summarized the main findings in the conclusion.

Keywords: food industry, economic crisis, strategies, state property, private property, analysis, Mercator

Pomen fermentiranih živil v prehrani

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Izvleček

Od naselitve dalje so bila fermentirana živila zelo pomemben del človekove prehrane. Bogatila so jedilnik in omogočala shranjevanje viškov hrane. Danes so fermentirana živila predmet intenzivnih raziskav, saj izkazujejo pomemben vpliv na zdravje človeka. Zdravstvene koristi fermentiranih živil se kažejo tako v probiotičnem učinku zaužitih živih mikroorganizmov kot v metabolitih, sintetiziranih tekom fermentacije. Učinek na zdravje teh živil je tako očiten, da se predvsem v zahodnem svetu širi ideja o nujnosti vključitve fermentiranih živil v nacionalne prehranske smernice, kajti kljub spoznanjem o koristih, ki jih prinaša uživanje, le-ta niso v zadostni meri sestavni del vsakodnevne prehrane. V prispevku so navedena spoznanja o vplivu fermentiranih živil na človekovo zdravje in mehanizmi, ki podpirajo te učinke.

Ključne besede: črevesna mikrobiota, fermentirana živila, mlečnokislinske bakterije, prebiotiki

Importance of Fermented foods in Human Diet

Abstract

Fermented foods have been an important part of human diet since the time of the first settlements. They enriched the cuisine and enabled storage of the surplus of food. In the present time, fermented foods are a subject of a growing area of research due to the increasing evidence of their impact on human health. Health benefits of fermented foods arise from the probiotic effects due to the consumption of living microorganisms, as well as from metabolites synthesized during the process of fermentation. Despite our increased understanding of their benefits, they are not sufficiently incorporated into daily diet. For this reason, it is becoming increasingly more evident that these foods should be included in the national food guidelines. This article summarizes the current understanding of the effects fermented foods have on human health and the associated mechanisms.

Keywords: gut microbiota, fermented food, lactobacteria, prebiotics

Prehranske navade dijakov Biotehniškega centra Naklo

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Izvleček

Namen raziskave je bil ugotoviti prehranske navade dijakov BC Naklo in le-te primerjati s prehranskimi navadami dijakov prvih letnikov srednjih šol v Sloveniji, ki so bile ugotovljene s pomočjo mednarodne raziskave HBSC (Z zdravjem povezano vedenje mladostnikov). Vzorec ankete BC Naklo je v povprečju treh let obsegal 592 dijakov vseh letnikov. Raziskava je pokazala nekatere razlike med prehranskimi navadami dijakov BC Naklo in dijaki raziskave HBSC. Pokazalo se je, da dijaki BC Naklo zajtrkujejo manj redno, uživajo manj sadja in več zelenjave kot povprečni slovenski dijak prvega letnika. Dijaki BC Naklo uživajo tudi več sladkarij, brezalkoholnih sladkih gaziranih pijač in energijskih napitkov ter manj sladkih negaziranih pijač. Pokazale so se tudi spremembe v načinu prehranjevanja dijakov BC Naklo v zadnjih treh letih, saj je opaziti rahel porast rednega zajtrkovanja, znaten porast uživanja sadja in zelenjave ter trend zmanjševanja uživanja sladkanih pijač.

Ključne besede: prehranske navade, dijaki, anketa, Biotehniški center Naklo

Nutritional habits of students in Biotechnical Centre Naklo

Abstract

The purpose of the research was to identify the nutritional habits of the students of BC Naklo and to compare them with the nutritional habits of the first year of secondary schools students in Slovenia, based on information collected through the international HBSC research (Health Behavior in School-Aged Children). The sample of the BC Naklo poll included 592 students in the average of three years of all grades. The research showed certain differences between the nutritional habits of the students of BC Naklo and the students from HBSC research. It is shown that BC Naklo students eat breakfast less regularly, eat less fruits and more vegetables than average Slovene first year student. Students of BC Naklo also enjoy more sweets, non-alcoholic sweet carbonated drinks, energy drinks and less sweet non-carbonated drinks. Additionally, the research showed changes in eating habits of students of BC Naklo in the past three years, as there is a slight increase in eating regular breakfast, a significant increase in the consumption of fruit and vegetables, and the trend of the decrease of the consumption of sweet drinks.

Keywords: nutritional habits, students, poll, Biotechnical center Naklo

Uživanje beljakovinskih prehranskih dodatkov med dijaki BC Naklo

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Izvleček

Beljakovine so hranilne snovi, ki telesu dovajajo energijo, sodelujejo pri tvorbi tkiv, obrambi telesa, gibanju in živčnem sistemu. Mladostnik potrebuje od 0,8 do 0,9 g beljakovin na kilogram telesne teže. Pri športnikih se potrebe po beljakovinah povečajo, vendar analize kažejo, da imajo preveliki vnosi beljakovin lahko za posledico neželene učinke na zdravje.

Naloga raziskuje načine športnega udejstvovanja in pogostost uživanja beljakovinskih prehranskih dodatkov med dijaki Biotehniškega centra Naklo. Pokazalo se je, da največ dijakov Biotehniškega centra trenira dva- do štirikrat na teden, večinoma v fitness centrih. Od 26 % tistih, ki prehranske dodatke uživajo, jih večina, tj. 10 %, to počne manj kot enkrat na teden, 3 % dijakov pa proteinske prehranske dodatke uživajo vsak dan, tudi več kot enkrat.

Ključne besede: beljakovine, proteinski prehranski dodatki, Biotehniški center Naklo, anketa

Protein dietary supplements consumption among students in Biotechnical Centre Naklo

Abstract

Proteins are nutrients that give energy to the body, participate in the formation of tissues, the human body's defense, the movement and the nervous system. The adolescent person requires from 0.8 to 0.9 grams of protein per kilogram of its body weight. For athletes, protein requirements increase, however the analyzes show, that excessive protein intakes can result in unwanted health effects.

The survey explores the different ways of sports activity and the frequency of using protein dietary supplements among students of the Biotechnical Center Naklo. It is shown that most students of the Biotechnical Center train two to four times a week, mostly in fitness centers. Out of 26% of the students who use the dietary supplements, majority of those (10%) use them less than once a week, while 3% of the students use protein supplements every day, even more than once.

Keywords: proteins, protein dietary supplements, Biotechnical Center Naklo, poll

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