

Opis raziskovalnega dela (Research work description)

1. Članica UL (UL member):

Biotehniška fakulteta

2. Ime, priimek in elektronski naslov mentorja/ice (Mentor's name, surname and email):

Tatjana Pirman, tatjana.pirman@bf.uni-lj.si

3. Raziskovalno področje (Research field):

Prehrana

4. Opis raziskovalnega dela (Research work description):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce (It includes any additional conditions that the candidate for a young researcher must meet, which are not listed in the call to tender for young researchers.).

Slov.: Raziskave na področju prehrane in zdravja prebavil so ključne tako pri rejnih kot pri laboratorijskih živalih. Pri rejnih živalih zdrav prebavni trakt omogoča učinkovito izkoriščanje hranil, večjo odpornost proti boleznim in trajnostno prirejo, s čimer se poveča produktivnost in zmanjša okoljski odtis. Pri laboratorijskih živalih pa so raziskave nepogrešljive za razumevanje fizioloških in patofizioloških procesov, ki so pogosto primerljivi s človekom, zato predstavljajo dragocen model za preučevanje vpliva prehrane na zdravje ljudi.

Za oceno zdravja prebavil se uporabljajo morfološke analize (npr. resice, kripte), funkcionalne analize (prebavljivost hranil, encimska aktivnost, prepustnost črevesne barriere) ter mikrobiološke in molekularne metode, ki osvetljujejo vlogo črevesne mikrobiote. V zadnjem desetletju pa so se uveljavile tudi napredne biotehnološke metode, kot so metagenomika, metabolomika in transkriptomika, ki omogočajo poglobljen vpogled v povezave med prehrano, mikrobioto in gostiteljem. Analiza tako obsežnih podatkov zahteva bioinformatiko, ki združuje različne »-omike« in razkriva nove biomarkerje zdravja prebavil ter potencialne tarče prehranskih intervencij.

Pomemben raziskovalni izziv predstavlja debelost pri ljudeh, kjer je zdravje prebavil in mikrobiota tesno povezana s presnovnimi boleznimi. V ta namen se pogosto uporablja mišji model, ki omogoča preučevanje mehanizmov, preko katerih prehrana, mikrobiota in genetski dejavniki vplivajo na razvoj debelosti.

Glavni fokus dela mladega raziskovalca bi bil tako usmerjen v razumevanje povezav med prehrano, črevesno mikrobioto in zdravjem prebavil z uporabo kombinacije klasičnih fizioloških metod, naprednih biotehnoloških analiz in bioinformatike. Poseben poudarek bi bil na preučevanju, kako prehranske strategije vplivajo na zdravje in produktivnost rejnih živali ter kako se lahko spoznanja iz mišjih modelov, zlasti pri preučevanju debelosti, prenesejo v širši kontekst človeškega zdravja.

Eng.: Research in the field of nutrition and gut health is crucial both in farm animals and in laboratory animals. In farm animals, a healthy digestive tract enables efficient nutrient utilization, greater disease resistance, and sustainable production, thereby increasing productivity and reducing the environmental footprint of livestock farming. In laboratory animals, such studies are indispensable for understanding

physiological and pathophysiological processes that are often comparable to humans, making them valuable models for studying the impact of nutrition on human health.

To assess gut health, several complementary approaches are applied. Morphological analyses (e.g., villi and crypt evaluation) provide insight into the intestinal mucosa structure, while functional analyses include nutrient digestibility, enzyme activity, and intestinal barrier permeability. Microbiological and molecular methods highlight the role of the gut microbiota, which strongly influences metabolism, immune responses, and disease resistance. In the past decade, advanced biotechnological methods such as metagenomics, metabolomics, and transcriptomics have become increasingly important, as they allow a deeper understanding of the interactions between diet, microbiota, and the host. The complexity of these datasets requires bioinformatics, which integrates different “omics” approaches and identifies novel biomarkers of gut health as well as potential targets for nutritional interventions.

An important research challenge is obesity in humans, where gut health and microbiota composition are closely linked to metabolic diseases. In this context, the mouse model is frequently used, as it enables controlled dietary interventions and the study of mechanisms through which diet, microbiota, and genetic factors contribute to the development of obesity.

The main focus of young researcher would therefore be to understand the interactions between diet, gut microbiota, and intestinal health through a combination of classical physiological methods, advanced biotechnological analyses, and bioinformatics. Special emphasis would be placed on studying how nutritional strategies affect the health and productivity of farm animals and on translating findings from mouse models, particularly in the context of obesity, to human health.

5. Priloge, ki jih kandidat priloži k prijavi (*Documents that the candidate submits with the application*):

☒ **diplomska listina/potrdilo o zaključku študijskega programa** (*diploma certificate for study programme, with which the candidate has enrolled/ will enroll in a doctoral degree programme*)

☒ **priloga k diplomi/ potrdilo o opravljenih obveznostih** (*official transcript of all the grades for study programme, with which the candidate has enrolled/will enroll in a doctoral degree programme*)

☒ **potrdilo o do sedaj opravljenih obveznostih z ocenami študijskega programa, s katerim se bo kandidat prijavil na študij** (*official transcript of all the grades the candidate has received so far for the study programme, with which the candidate will enroll to a doctoral degree programme*)

☒ **nagrade** (*awards (e.g. Prešeren Prize of the University of Ljubljana, Prešeren Prize of a University of Ljubljana member and/or another equivalent award)*)

☒ **bibliografija** (*bibliography*)

☒ **življenjepis** (*CV*)

☒ **motivacijsko pismo** (*motivation letter*)

☒ **opis dosedanjega sodelovanja pri raziskovalnem delu** (*description of the candidate's research work*)

Opis raziskovalnega dela (Research work description)

1. Članica UL (UL member):

Bitehniška fakulteta / Biotechnical faculty

2. Ime, priimek in elektronski naslov mentorja/ice (Mentor's name, surname and email):

Tomaž Polak; tomaz.polak@bf.uni-lj.si

3. Raziskovalno področje (Research field):

4.02; Biotehnika; Živalska produkcija in predelava; Hibridni mesni izdelki
4.02; Biotechnical sciences; Animal production; Hybrid meat products

4. Opis raziskovalnega dela (Research work description):

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slo:

Iščemo **doktorskega kandidata**, ki se bo pripravil vključiti v našo raziskovalno skupino Integrirano živilstvo in prehrana, ki povezuje pomembne tehnologije predelave hrane in prehrano ljudi z namenom zagotavljanja kakovostne in varne hrane. Področje raziskave vključuje aktualne teme, ki zajemajo inovativne in trajnostne tehnologije predelave živil. Razvijali in proučevali bomo različne tipe hibridnih mesnih izdelkov, ki predstavljajo vmesno stopnjo med tradicionalnim mesom in mesnimi nadomestki. Z rezultati izvedene študije bomo pomembno prispevali k bolj trajnostni preskrbi s hrano. Večina raziskovalnega dela bo potekala v laboratoriju, posvetili pa se bomo tudi analitiki (LC-MS/MS).

Od kandidata pričakujemo:

- motiviranost in veselje do dela v laboratoriju;
- zaželeno poznavanje osnov tekočinske kromatografije;
- samostojnost, samoiniciativnost in zanesljivost;
- komunikacijske in timske veščine;
- aktivno znanje slovenskega in angleškega jezika;
- prednost bodo imeli kandidati s predznanjem na področju živilstva in sorodnih smeri.

Nudimo:

- vključitev v raziskovalno ekipo in delo v laboratorijih z vrhunsko analitsko opremo;
- možnost gostovanja v tujini;
- možnost predstavitve objav na konferencah.

eng:

We are looking for a PhD candidate to join our research group Integrated Food Science and Nutrition, which connects key food processing technologies with human nutrition in order to ensure high-quality and safe food. The research area includes current topics focusing on innovative and sustainable food processing technologies. We will develop and study various types of hybrid meat products, representing an intermediate stage between traditional meat and meat substitutes. The results of the study will make an important contribution to a more sustainable food supply. Most of the research work will take place in the laboratory, with a strong focus also on analytical methods (LC-MS/MS).

Expected qualifications and skills:

- Motivation and enthusiasm for laboratory work;
- Basic knowledge of liquid chromatography (preferred);
- Independence, initiative, and reliability;
- Good communication and teamwork skills;
- Proficiency in Slovenian and English (spoken and written);
- Advantage will be given to candidates with prior knowledge in food science or related fields.

We offer:

- Integration into a research team and work in laboratories equipped with state-of-the-art analytical instruments;
- Opportunity for research stays abroad;
- Opportunity to present research results at scientific conferences.

5. Priloge, ki jih kandidat priloži k prijavi (*Documents that the candidate submits with the application*):

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