Р Е З Ю М Е Т А

на научните трудове

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АВТОРЕФЕРАТ И ДИСЕРТАЦИЯ

1. Беев, Г. 2009. Микотоксикологична оценка на замърсяването на зърнени култури с микроскопични гъби от род *Fusarium* и техни микотоксини. *Автореферат на Дисертация* за присъждане на научна и образователна степен „Доктор", шифър 01.06.12, Микробиология. Тракийски университет, Стара Загора.

2. Беев, Г. 2009. Микотоксикологична оценка на замърсяването на зърнени култури с микроскопични гъби от род *Fusarium* и техни микотоксини. *Дисертация* за присъждане на научна и образователна степен „Доктор", шифър 01.06.12, Микробиология. Тракийски университет, Стара Загора.

Резюме: Производството на храни и фуражи с високо качество е една от най-важните цели на аграрното производство, поради това замърсяването им с микроскопични гъбички и микотоксини, се счита за един от най-важните фактори, свързани с тяхната безопасност за консуматора.

Целта на дисертационния труд е да се изследва степента на замърсяване на зърнени култури, произведени в различни еколого-географски райони на България, с микроскопични гъби от род *Fusarium*, като се направи и екологична оценка, свързана с разпространението на зеараленон и фумонизинпродуциращите видове.

Чрез използваната за пръв път в България систематика на Gerlach & Nirenberg, е направено секционно и видово идентифициране на общо 889 щама микроскопични гъбички от род *Fusarium*, изолирани от пшеница и царевица. Сред най-разпространените микроскопични гъбички по пшеницата и царевицата в изследваните еколого-географски райони на страната са видовете *F. verticillioides*, *F. sporotrichioides, F. solani* и *F. poae*.

Установено е, че основният продуцент на зеараленон в изследваните проби е видът *F. graminearum*, докато при *F. verticillioides* не е отчетено достоверно образуване на този микотоксин.

Установено е, че изследваните нови селекционни линии и сортове твърда пшеница притежават различна степен на устойчивост към фузариоза, но тя не е висока. Също така е потвърдено, че твърдата пшеница е по-податлива на фузариумни инфекции в сравнение с меката пшеница.

ПУБЛИКАЦИИ, СВЪРЗАНИ С ДИСЕРТАЦИОН НИЯ ТРУД

3. Беев, Г., 2004. Видов състав на гъбите от род *Fusarium* в български зърнени култури. *Животновъдни науки*, 5: 90-93.

Abstract: The aim of the present study was to identify and determine the distribution of species from the genus *Fusarium* in Bulgarian cereals, produced in different eco-geographical regions in country. On this basis an assessment was made for the degree of inoculation with toxic species as well as to predict the possible risk of producing *Fusarium* mycotoxins in them. The study included 106 samples of Bulgarian cereals from the 2001-2002 crop which were taken from different eco-geographical regions in country. Overall 108 isolates were separated form the sample taken and their degree of inoculation varied in a wide range. The samples were studied according to the standard methods for myco-toxicological analysis of cereals. The species identifications of the pure culture obtained was made after Gerlach and Nirenberg (1983). The results of this study showed that the main contaminants of cereals produced in different eco-geographical regions of the country belonging to the genus *Fusarium* were: *F. moniliforme, F. graminearum, F. oxysporum, F. sporotrichioides, F. poae, F. solani, F. culmorum, F. proliferatum*. With the widest distribution among them were the species *F. moniliforme* and *F. graminearum* which are potential producers of *Fusarium* mycotoxins.
Key words: *Fusarium* spp, mycotoxins, cereals, distribution**.**

4. Лалев, Ц., М. Георгиев, **Г. Беев**, С. Недялкова. 2005. Устойчивост на български сортове твърда пшеница спрямо три вида на род. *Fusarium*. Юбилейна научна конференция с международно участие към СУБ, Юни 2-3, Стара Загора. 2: 192-197.

Abstract: The resistance of 5 Bulgarian durum wheat varieties has been studied in the course of 2003-2005 period at the Cotton and durum wheat institute – Chirpan, Bulgaria.
On the base of the results obtained from the study no immune and high resistance varieties has been established. Good resistance toward *Fusarium graminearum* has been shown Beloslava variety, while toward *Fusarium culmorum* the similar results were obtained for Zagorka, Progres, Beloslava and Aida. All varieties studied were susceptible towards *Fusarim avenaceum*.
Key words: durum wheat, *Fusarium* spp., resistance.

5. Беев, Г., Ц. Лалев, М. Георгиев, 2006. Устойчивост на нови селекционни линии твърда пшеница спрямо някои широко разпространени гъби от род *Fusarium*. *Екология и Бъдеще*, 4: 42-46.

Abstract: The resistant of 22 Bulgarian durum wheat selection lines has been studied for resistance toward *F. graminearum, F. culmorum* and *F. avenaceum* in the course of 2002-2004 period at the Cotton and Durum Wheat Institute – Chirpan and Trakia University – Stara Zagora. On the base of the results obtained no immune and high resistance lines has been established. Good resistance toward *Fusarium* species has been established selection lines № 4477, 5791 and M-1323. All selection lines studied show susceptibility toward *F. avenaceum*.
Key words: durum wheat, *Fusarium* spp. selection lines, resistance, susceptibility.

6. Беев, Г., С. Денев, Ц. Лалев, Д. Павлов, 2007. Сравнително проучване върху поразеността с *Fusarium* spp на различни сортове и селекционни линии твърда и мека пшеница в района на гр. Стара Загора. *Екология и Бъдеще*, 3: 29-34.

Abstract: Susceptibility of 10 commercial soft wheat cultivars, 4 commercial durum wheat cultivars and 9 selection lines to *Fusarium* pathogens forming natural population on this area, were compared under common environment conditions in Stara Zagora. The *Fusarium* species predominantly found in tested samples were *F. solani, F. poae* and *F. verticillioides*. The results indicate species-specific difference between durum wheat and soft wheat. Durum wheat cultivars and selection lines were more susceptible than soft wheat cultivars to *Fusarium* infection at P<0.0281.
Key words: durum wheat, soft wheat, wheat cultivars, selection lines, susceptibility, *Fusarium* spp. pathogens, population.

ПУБЛИКАЦИИ, НЕСВЪРЗАНИ С ДИСЕРТАЦИОННИЯ ТРУД

I. Публикации в международни научни списания

7. Beev, G., 2014. A Need for New Analytical Approach for Assessment Zearalenone Exposure of Pigs. *Journal of Microbiology & Experimentation*, 1(4): 00023.

Abstract: In contrast to many other mycotoxins, zearalenone (ZEA) exhibits a very low acute toxicity, but it possesses a powerful estrogenic activity Therefore, the presence of ZEA is of the greatest concern for reproducing animals, especially pigs. There are well established analytical techniques for determination and quantification of ZEA, mainly based on the GS, GS-MC, HPLC, LC-MC and ELISA, but the problem with these techniques remains obtaining representative samples and the presence of so called "masked" by certain nutrients mycotoxins making them undetectable. Therefore, there is an increasing demand for developing innovative, modern, easy and fast tools for correct

diagnostic of zearalenone-toxicoses in pigs. A possible approach to achieve this goal is "omics" technologies and especially transcriptomics. One major promise of the transcriptomics is that it could increase our knowledge about toxic mechanisms on basis of which the hazard and potentially the risk of a toxic compound can be assessed.

8. Zaprianova, D., N. Rusenova, **G. Beev**, P. Parvanov, T. Mircheva, S. Denev, D. Georgiev, 2014. Changes in the Activity of Aspartate- and Alanine Aminotransferase in Dogs with Experimentally Induced *Staphylococcus aureus* Infection. *Kafkas Üniversitesi Veteriner Fakültesi Dergisi*, 20(4):621-624. (**IF= 0.29, 2013**)

Abstract: The main purpose of this study was to evaluate the aspartate aminotransferase (AST) and alanine aminotransferase (ALT) plasma concentrations in dogs with experimentally-induced *Staphylococcus aureus* infection. Correlations between AST, ALT and Respiratory Rate (RR), Pulse Rate (PR) and Internal Body Temperature (IBT) were also calculated. Bacterial suspension with density of 3.1×10^9 cfu/mL was subcutaneously injected to 9 mongrel 2 years old male dogs whereas 6 other dogs served as negative controls. The concentrations were determined using commercial kits before application (0 h), 6, 24, 48, 72 h and 7, 14, 21 days after. The aminotransferase concentrations were higher in infected dogs than in the controls - AST peaked on days 7 and 14, and ALT - at the 72 and h. Strong positive correlations were recorded between ALT and AST concentrations and between RR and IBT. It was observed that the transaminases activities were slightly affected by the experimentally induced staphylococcal infection in dogs.
Key words: *Staphylococcus aureus*, AST, ALT, Clinical signs, Dogs.

9. Dinev, I., S.A. Denev, and **G. Beev**, 2013. Clinical and Morphological Studies on Spontaneous Cases of *Pseudomonas aeruginosa* Infections in Birds. *Pakistan Veterinary Journal*, 33 (3): 398-400. (**IF=1,39, 2013**)

Abstract: Clinical, pathoanatomical, histological, and bacteriological studies were performed on broiler chickens, growing broiler parents, and growing egg layers, in three different poultry farms, after an outbreak of *Pseudomonas aeruginosa* infections. The method of contamination of the birds was established. Several local and systemic clinico-morphological forms of spontaneous *P. aeruginosa* infections in various categories of stock birds were described: cases of *P. aeruginosa* infection resulting from injection of contaminated vaccines; case of *P. aeruginosa* infections through contaminated aerosol vaccine and cases of pododermatitis, periarthritis and arthritis in broiler chickens associated with *P. aeruginosa* infection. In different cases mortality range between 0.5 and 50%. The results showed that apart from embryonic mortality in hatcheries, and septicemic infections in newly hatched chickens, the pathogenicity of *P. aeruginosa* was associated with localized and systemic lesions in this category, as well as in young and growing birds. On one hand, these results have a theoretical significance, contributing for the confirmation and expansion of the wide array of clinico-morphological forms of P. aeruginosa infections in birds. On the other hand, the knowledge on these forms has a

purely practical significance in the diagnostics of *P. aeruginosa* infections by poultry pathologists and veterinary practitioners.

Key words: Broilers, Clinico-morphological forms, Infection, Layers, *P. aeruginosa*.

10. Beev, G., S. Denev, D. Bakalova, 2013. Zearalenone - Producing Activity of *Fusarium graminearum* and *Fusarium oxysporum* Isolated from Bulgarian Wheat. *Bulgarian Journal of Agricultural Science*, 19(2):255-259. **(IF=0,136, 2013)**

Abstract: Several *Fusarium* species are important pathogens of cereals and corn, causing severe crop yield reduction. In addition, some isolates are able to produce mycotoxins. The most important Fusarium mycotoxins, which can frequently occur at biologically significant concentrations in cereals, are fumonisins, zearalenone (ZEA) and trichothecenes (deoxynivalenol, nivalenol and T-2 toxin). The aim of the current study was to establish ZEA-producing activity of some wheat *Fusarium* species (*F.graminearum* and *F. oxysporum*) originated from different geographical regions in Bulgaria. 40 wheat *Fusarium* isolates were screened for their ability to produce ZEA , by cultivating on the sterile wheat. To determine the presence of ZEA was used a monoclonal antibody-based affinity chromatography, ZearalaTest™ by using Fluorometer & HPLC, Series-4, VICAM®, USA. The results of the mycotoxicological analysis revealed that 22 (55%) of the wheat samples tested were contaminated with ZEA. Obtained data show also that the *F. graminearum* is among the main species producing ZEA in Bulgarian wheat. On the other hand, for the first time 7 (35%) in 20 isolates of *F. oxysporum* in Bulgarian wheat were found to synthesize ZEA.

Key words: *Fusarium graminearum*, *Fusarium oxysporum*, Zearalenone, wheat.

11. Sirakov, I., K. Velichkova, **G. Beev**, Y . Staykov, 2013. The influence of organic carbon on bioremediation process of wastewater originate from aquaculture with use of microalgae from genera *Botryococcus* and *Scenedesmus*. *Agricultural Sciennce and Technology*, 5(4): 443-447.

Abstract: Advantages of using algae for wastewater treatment include: low operational cost, possibility of recycling assimilated nitrogen and phosphorus within the algae biomass as a fertilizer, accumulated biomass for biofuel. Our purpose was to study the influence of organic carbon on bioremediation process of wastewater originate from aquaculture with use of microalgae from genera *Botryoccocus* and *Scenedesmus*. Algae cultivation was initiated in a bioreactor of 500ml Erlenmeyer flask containing 250ml wastewater. The experiment was conducted in variants without any organic carbon sources and the other with organic carbon source – glucose (1,125g.l). Light regime was adjusted at 15:9 h light:dark cycle in an illumination incubator until the end of experiment. The temperature was kept between 25 and 27 C. The pH varied between 6.5 and 7.5 and by this reason it was not adjusted. Species grown in wastewater with added glucose showed a better cleansing effect compared with the same grown in wastewater without any carbon sources. Better growth indicators and faster absorption of wastewater compounds was observed in *S. dimorphus*.

12. Daskalov, P., Ts. Georgieva, P. Veleva-Doneva and **G. Beev**, 2013. Quality assessment of corn kernels (healthy and *Fusarium* infected) using decision tree. *Science & Technologies* 3(6): 237-242.

Abstract: New approach for classification of corn kernels into two classes healthy and *Fusarium* diseased using classification tree is presented in the paper. Spectral characteristics of diffuse reflectance are obtained from each of the kernels in the range 440–110 nm. Principal component analysis is used for spectral data reducing. The corn kernels are classified using classification tree and first three principal components. The classification accuracy is in range from 75 to 100 % for class healthy kernels and from 90 to 100% for class diseased. The influences of kernel variety and position of the kernel when the spectral data is obtained are reduced using classification tree as a classifier.
Key words: *Fusarium*, corn kernels, NIR spectroscopy, recognition

13. Беев, Г., 2013. Микотоксикологичен мониторинг върху степента на контаминация с фумонизини в царевица и царевични продукти. *Science & Technology*, 3(6): 292-299.

Abstract: Fumonisin B1 (FB1) is a mycotoxin that commonly occurs in corn. FB1 causes a variety of toxic effects in different animal species and has been implicated as a contributing factor of esophageal cancers in humans. The aim of the present study is to evaluate the presence of fumonisin B1 as natural contaminant in corn and corn-based products. A total of 150 samples were analyzed for fumonisin contamination using immunoaffinity columns and Fluorometer & HPLC, Series-4. Fumonisins in corn have showed a widespread distribution (in 75,8% of tested samples). Maximum fumonisin concentrations were found in processed feeds for pigs. One the other hand, all tested samples of corn starch were negative regarding the presence of fumonisins
Key words: fumonisin B1, natural contamination, corn, corn-based products.

14. Беев, Г., 2013. Деоксиниваленолът като замърсител на храните. *Science & Technology*, 3(6): 300-305.

Abstract: Deoxynivalenol (DON) is a part of the family of mycotoxins called trichothecenes which are produced by a number of different *Fusarium* species with worldwide distribution. In its evaluation of deoxynivalenol, European Food Safety Authority (EFSA) concluded that this toxin exhibited toxic effects in all species which determines it as a very important food-associated hazardous factor. In this article, the most characteristic features of DON are describe, including chemical structure, distribution, mode of action and symptoms of acute and chronic toxicity.
Key words: mycotoxins, deoxynivalenol, food quality, food safety

15. Беев, Г., Д. Запрянова, 2013. Микотоксини: Разпространение, токсичност и биологична активност. *Science & Technology*, 3(6): 283-291.

Abstract: Mycotoxins are secondary metabolites produced by saprophytic and/or phytopathogenic fungi, which may be present on a variety of crops. They are considered a major issue worldwide because of their harmful effects on animals and humans. These contaminants lead to great economic losses and represent dangerous health implications. Over 400 mycotoxins have been identified. However, only few of them have a significant toxic effect and are of major concern. In this article, the most important mycotoxins are described, including aflatoxins, ochratoxin A (OTA), deoxynivalenol (DON), zearalenone (ZEN) and fumonisins. For each toxin, its chemical structure, distribution, mode of action and symptoms of acute and chronic toxicity are discussed.
Key words: mycotoxins, toxigenic fungi, animal health, food safety

16. Беев, Г., М. Георгиев, Ц. Лалев, П. Велева-Донева, 2013. Влияние на някои органични торове върху устойчивостта на пшеница спрямо фитопатогени от род *Fusarium. Science & Technology*, 3(6): 306-313.

Резюме: Целта на настоящото изследване е да се установи влиянието на нови органични торове (Хумусил, Хумус лайф и Биохумакс) и екологично безопасни химични вещества (калциев пероксид) върху устойчивостта на пшеница, спрямо фитопагенните видове *F. culmorum, F. avenaceum* и *F. poae*. Анализът на получените резултати показа, че изследваните препарати не притежават фунгициден ефект, но могат да се използват за стимулиране развитието на пшеницата. Най-добро комплексно въздействие, при определяне и на двата изследвани показателя показва препаратът Биохумакс. По отношение ефекта на различните видове от род *Fusarium* при пшеницата, видът *F. culmorum* оказва най-силен инхибиращ ефект върху кълняемостта, докато *F. poae* върху дължината на кълновете.
Ключови думи: Пшеница, фузариумни инфекции, органични торове.

17. Veleva-Doneva, P., S. Atanassova, T.Stoyanchev, Ts. Draganova, and **G. Beev**, 2012. Intelligent Classifiers For Dairy Products Quality Assessment Using Near-Infrared Spectra. *Academic Journal of Science*, 1(2):105–114.

Abstract: The aim of this research was development of classification models, based on probabilistic neural network (PNN) and different wavelet transformation functions, for nondestructive dairy products assessment. Two data sets of cow milk and yellow cheese were investigated. Presence of *Staphylococcus aureus* and *Streptococcus agalactiae* was obtained in some of the milk samples by classical microbiological methods. Spectra of milk samples were obtained in a range from 600 to 1880 nm. Cheese samples were artificially contaminated by two bacterial species: *Listeria monocitogenes* and *Escherichia coli*. The samples were investigated by both microbiology and near-infrared spectroscopy methods. The spectral region for yellow cheese set investigation includes spectra from 1100 to 2500 nm. The measured samples from the two data sets are divided in a 2:1 ratio for cheese samples and 3:1 ratio for milk samples. Two thirds (or three fourth) of them are used for training of PNN, while the others are used as an independent test set. Five wavelet functions were used for transformation of spectral data and wavelet

coefficients were used for inputs of PNN. The accuracy of classification depends on wavelet function and decomposition level. The percent of correct recognition of milk samples was 78.72% for class Contaminated, 89.24%, for class Negative, 95.02% for class *Staphylococcus* and 90.33 % for class *Streptococcus*. The correct recognition for cheese samples was 74.86% for class Contaminated, 100% for class Control, 93.28% for class *L.mono*, and 98.47 % for class *E.coli*. Near infrared spectroscopy in combination with nonlinear multivariate classification techniques offers an large potential for a rapid and nondestructive quality control of dairy products.

Key words: Probabilistic neural network, Wavelet transformation, Bacteria contamination, Dairy products, NIRS.

18. Bivolarski, B., **G. Beev**, S. Denev, E. Vachkova, G. Kostadinova and T. Slavov, 2011. Development of the caecal microbiota in rabbits weaned at different age. *Agricultural Sciennce and Technology*, 3 (3): 212-219.

Abstract: The experiment was conducted to study the post-natal development of the caecal microbiota in rabbits weaned at different age. A total of 60 healthy New Zealand White rabbits of both sexes, born the same day, were used in the experiment (after controlling for the effect of litter origin and weaning weight and variability). Rabbits were weaned both at 21 days (W21 group, 30 litters) and at 35 days (W35 group, 30 litters) of age. The weaned animals were randomly housed in wire net cages measuring in well-controlled experimental facility. They received standard commercial pelleted diet without antibiotics. Feed and drinking water were available ad libitum. Results of the microbiological examination of the caecal contents indicated that rabbits weaned at 35 day had higher total bacterial count (TBC) per g of caecal content, in comparison with rabbits weaned at 21 day (P<0.001). The TBC in the caecum of earlier and later weaned rabbits after weaning increased significantly (P<0.001). The obligate anaerobic bacteria, particularly *Bacteroides* spp. constitute an important group of microorganisms in the rabbit caecum. The population of *Bacteroides* spp. increased with advancing of age. The differences between groups on days 35, 42 and 49 were statistically significant (P<0.001). Sporulating bacteria and especially *Cl. perfringens* was present in low variable amounts in all the caecal samples obtained from healthy animals. Caecal counts of *Cl. perfringens* at weaning (21 and 35 day) were very low (1.656 and 1.654 log10 CFU/g, respectively) and not affected by weaning age. To the end of the study, earlier weaned rabbits had higher caecal count of *Cl. perfringens* (P<0.01). *Enterococcus* spp. and coliforms, including *E.coli* are an important part of the caecal microbial population of rabbits. The caecal number of coliforms was considerably high at weaning, then decreased linearly and stabilized on low level at day 49. Our study demonstrated the absence of *Lactobacillus* spp. in the rabbit caecal tract. The pH of the caecal content fell linearly throughout the experiment - there are not significant differences between groups at days 21 and 49. Compared to the W21 group, rabbits in the W35 group, had a higher live body weight (P<0.001) and low mortality during the trial.

Key words: rabbits, caecal microbiota, weaning age.

19. Beev, G., S. Denev and D. Pavlov, 2011. Occurrence and distribution of *Fusarium* species in wheat grain. *Agricultural Sciennce and Technology*, 3 (2): 165-168.

Abstract: Wheat fungal infections caused by *Fusarium* spp. is of great economic importance in cereal growing countries including Bulgaria. These infections greatly reduced crop yields and significantly decrease grain quality, because of mycotoxins production, that make grain unsuitable for human food and livestock diets. To establish the occurrence and distribution of *Fusarium* spp. were tested 21 samples of wheat from Stara Zagora area. To determine the internal contamination by microscopic fungi of grains, the agar plate method was applied. One hundred grains were tested for each sample. The grains were sterilized with 70 % ethanol, rinsed with sterile water, dried and placed on Petri dishes containing Chapeck-Dox`s agar medium. After incubation, the number of fungal genera detected in each sample was calculated. Conclusive identification of *Fusarium* spp. was made after transfer of selected isolates on SNA (Synthetischer nährstoffarmer agar) on the basis of their morphological and cultural characteristics. As a result of mycological investigation, fungi of 9 genera were obtained: *Fusarium, Aspergillus, Penicillium, Alternaria, Mucor, Rhizopus, Cladosporium, Rhizoctonia* and *Nigrospora* spp. From contaminated with *Fusarium* spp. wheat samples were identified 62 isolates attributed to the 8 sections. Most common isolated species were *Fusarium verticillioides*, followed by *Fusarium poae* and *Fusarium solani*. Particular interest is the species *Fusarium equiseti*, which is isolated for the first time from Bulgarian wheat.

20. Georgiev, M., D. Pavlov, **G. Beev**, M. Gergzikova and R. Bazitov, 2011. Species composition of weeds in wheat and barley. *Agricultural Sciennce and Technology*, 3 (2): 143-149.

Abstract: During the period 2008-2009 investigation was performed to determine the species composition and density of weeds in the main cereals (wheat and barley). The aim of study was to establish the weed species diversity and the background of weed infestation in wheat and barley in the region. The number of weeds in wheat and barley was established in three regions west, east and south from Stara Zagora by itinerary method in 10 points for each region. Weed infestation and domination of weed species was established by Statistica for Windows. In the eastern region of Stara Zagora (the land of Dalboky) the most 2 propagate weed was *Veronica hederifolia* L. - 37,2 and *Convolvulus arvensis* L. - 10,3 plants per m . In the western area of the municipality (the land of Bogomilovo) prevail mainly *Avena fatua* L. - 16,4; *Veronica hederifolia* L. - 12,8 and *Galium aparine* L. - 6,6 plants of m. In the southern region (the land of Malko Kadievo) winter cereals have higher weed infestation compared to the other 2 regions. The most propagated weeds in this region were *Chenopodium album* L. 2- 36,2; *Convolvulus arvensis* L. - 7,3 plants per m etc. The type of weed infestation of wheat and barley in the investigated areas was as a whole the typical for these crops.
Keywords: wheat, barley, weeds, density

21. Denev, S., Y. Staykov, R. Moutafchieva and **G. Beev**, 2009. Microbial ecology of the gastrointestinal tract of fish and the potential application of probiotics and prebiotics in finfish aquaculture (Review). *International Aquatic Research*, 1:1-29.

Abstract: World aquaculture is the fastest growing food-producing sector in the world. Globally, aquaculture is expanding into new directions, intensifying and diversifying. With increasing demand for environment friendly aquaculture, the use of alternatives of antibiotic growth promoters in fish nutrition is now widely accepted. Science-based knowledge on probiotics and prebiotics has increased in recent years. No doubt exist that in the last decade we have greatly expanded our knowledge about pro- and prebiotics as important functional ingredients in finfish aquaculture. They have numerous beneficial effects: improved activity of gastro-intestinal microbiota and enhanced immune status, disease resistance, survival, feed utilization and growth performance. As natural products pro-and prebiotics have much potential to increase the efficiency and sustainability of aquacultural production. Therefore, comprehensive research to more fully characterize the intestinal microbiota of prominent fish species, mechanisms of action of pro-and prebiotics, and their effects on intestinal ecosystem, immunity, fish health and performance is warranted. All pro-and prebiotics must be evaluated for their safety before being used in fish nutrition. Also, there is need for establishing dose-response relationships. The application of up to date molecular procedures to study of the gut microbiota as well as the development and validation of research methods, in vitro, *ex vivo* and *in vivo* models, have provided important information to understand the mechanisms of action behind the effects. This review summarizes and evaluates current knowledge of microbial ecology of the gastrointestinal tract of fish as well as the potential application and challenges of pro-and prebiotics in finfish aquaculture.
 Key words: Probiotics, Prebiotics, Intestinal microbiota, Finfish, Aquaculture.

22. Dimitrov, T., L. Sotirov, G. Mihaylova, M. Tzankova, N. Naidenova and **G. Beev**, 2009. Lysozyme content in buffalo colostrums. *Agricultural Sciennce and Technology*, 1(2): 51-53.

Abstract: The lysozyme content in buffalo colostrum from Bulgarian Murrah breed was studied. The experiment was conducted during the summer of 2007 at the buffalo farm of Dimitrievo (Haskovo area), Bulgaria. The buffaloes selected for evaluation in this study were clinically healthy. They were selected by age, body weight and expected date of calving. All animals were on their first lactation. The diet of the experimental buffaloes was formulated to meet the nutritional requirements. It was established that the highest lysozyme content in colostrum was presented immediately after parturition (1.15 µg/ml, $p<0.001$). Twenty-four hours later, lysozyme content was reduced by 50% (0.74 µg/ml) after 2 days they were 0.30 µg/ml and by post parturient day $7 - 0.10$ µg/ml. Authors recommended newborn buffalo calves to sucle colostrum as early as possible after parturition, in order to receive higher concentrations of lysozyme that would protect them against pathogenic microflora.
Key words: buffalo colostrum, lysozyme, natural immunity

23. Denev, S.A., Tz. Peeva, P. Radulova, N. Stancheva, G. Staykova, **G. Beev**, P. Todorova and S. Tchobanova, 2007. Yeast Cultures in Ruminant Nutrition. *Bulgarian Journal of Agricultural Science*, 13: 357-374.

Abstract: Interest in the use of fungal direct-fed microbials in ruminant nutrition is considerable. The ban of antibiotic growth promoters in feed for production of animal foods has increased interest in evaluating the effect of yeast cultures (YC) on the gastrointestinal ecosystem, rumen microbial populations and function. The effects of specific YC preparations on the rumen environment and performance of ruminants have been well documented, and has generated considerable scientific interest over the last two decades. The precise mode of action by which YC, which are mostly derived from *Saccharomyces cerevisiae*, improve livestock performance has attracted the attention of a number of researchers in the world. It is clear from these research efforts that YC supplements can beneficially modify microbial activities, fermentative and digestive functions in the rumen. The research has demonstrated that viable YC preparations can stimulate specific groups of beneficial bacteria in the rumen, and has provided mechanistic models that can explain their effects on animal performance. The effects of YC on animal productivity are strain-dependant. So, all YC preparations are not equivalent in efficiency. This aspect opens a new field of research for new strains, each being more specialized in its use. The goal of many of these research activities has been to define the application and production strategies that can optimize animal responses to YC supplements. Continuous research with live YC supplements has clearly established scientifically-proven strategies for modifying and optimizing microbial activities in the gastrointestinal ecosystem and techniques for improving performance and health of ruminants. This article reviews the current status of the use of live yeast cultures in ruminant nutrition.
Key words: Yeast cultures, Yea-Sacc® 1026, Rumen microbial populations, Ruminal functions, Ruminant nutrition.

II. Публикации в български научни списания и сборници

24. Костадинова, Г., Д. Дерменджиева, Е. Вълкова, **Г. Беев**, Т. Пенев, Я. Миков. 2015. Качество на водите от собствени водоизточници в говедовъдна и овцевъдна ферма. *Животновъдни науки*, 1: ххх (под печат)

Abstract: The aim of this paper was to study and assess the quality of water obtained from own drilled wells in cattle and sheep farms, situated in an area with strong anthropogenic impact, as a natural resource and as a resource for the watering of animals, on basic organoleptic, physico-chemical and microbiological indices. It was found that the quality of water: a) as a natural resource, is defined in "good" quality in terms of the studied physico-chemical parameters: pH, conductivity, total hardness, Ca, Mg, oxidizability, NH_4^+, NO_2^-, NO_3^-, SO_4^{2-}, PO_4^{3-}, Cl^-, Mn, Fe, Zn, Pb and Cd; b) meets the stipulated norms for the watering of livestock on all organoleptic (taste, smell, transparency, color) and on part of the physico-chemical (pH, conductivity, total

hardness, Ca, Mg, Mn, SO_4^{2-}, Cl^-, Mn, Fe , Zn, Pb and Cd), and sanitary-hygiene (total number of microorganisms in water of well in cattle farm) indicators; c) does not match the quality standard for water for drinking purposes on content of NH_4^+ and PO_4^{3-} in water of well at cattle farm; on content of NH_4^+, NO_2^-, NO_3^-, PO_4^{3-} andtotal number of microorganisms in water of well at sheep farm; on values of number of coliforms in the water of wells at two farms; d) assessed on simultaneously presence of nitrates and nitrites in water, satisfies regulatory requirements (C≤1 mg/l) for water of well at cattle farms throughout the studied period, and for water of well at sheep farm - in 3 of the 5 months of the experimental period.

Key words: cattle and sheep farm, well, water, indices, quality, assessment

25. Драганова, Ц., **Г. Беев**, П. Даскалов и Р. Цонев, 2008. Изследване на влиянието на сортовата принадлежност на царевични семена върху спектралните характеристики при разпознаване на заболяването Фузариоза. *Сборник с научни трудове на Русенски университет*, 47(3.1): 120-124.

Abstract: Corn variety influence to the corn spectral characteristics in *Fusarium* disease recognition is considered in the paper. Spectral characteristics of healthy and diseased corn seeds of five varieties are presented. The difference between healthy and disease spectral characteristics show that the corn variety non influence to the *Fusarium* disease recognition by spectral characteristics.
Key words: corn seeds, *Fusarium* disease, NIR spectroscopy

26. Велева-Донева, П., Ц. Драганова, Ст. Атанасова, **Г. Беев,** 2008. Разпознаване на инфектирано с бактерии мляко чрез спектрален анализ в близката инфрачервена област, *Сборник с научни трудове на Русенски университет*, 47(3.1): 141-145.

Abstract: New approach for detection of milk samples infected with *Staphylococcus* spp. and *Streptococcus* spp., based on analysis of spectral characteristics of diffuse reflectance in near-infrared region is proposed in the paper. Mathematical and statistical methods are used for data processing. The specific wavelengths about the chemical structure of milk samples are determined. Index for *Staphylococcus* and *Streptococcus* spp. infected milk samples detection was created. Wavelet coefficients were used for recognition of infected milk samples.
Key words: *Staphylococcus* spp. and *Streptococcus* spp., milk samples, NIR spectroscopy, Wavelet.

27. Герчев, Г., Г. Михайлова, **Г. Беев**, 2006. Биологична стойност на протеин в млякото на Цигайски и Каракачански овце. *Животновъдни науки*, 3: 34-37.

Abstract: The study was performed during the grazing period (April-June) in 2 groups of 5 ewes each, in their 4th lactation: Group I – Tsigay sheep and group II – Karakachan sheep. The sheep were put under uniform conditions of rearing and feeding in the Sredna

Stara Planina mountain region. Until March, the animals were housed in stalls, fed with concentrate and hay, in April – reared both indoor and on pastures and the rest of time – on pastures. The milk samples were obtained during the milking period from each animal once monthly from the end of April to the end of July. The amino acid content of milk total protein was analyzed by ion-exchange column chromatography. The present study on amino acid content of milk total protein is continuation of previous studies of ours on physic-chemical properties of milk from those two breeds. It was established that the milk of Karakachan sheep was with higher proline, valine and isoleucine content compared to Tsigay breed. In both types of milk, the highest value was those of glutamic acid. The total content of nonessential amino acids in both group of milk was by 18% higher vs the essential amino acid content. The chemical index in Karakachan sheep milk was lower than in Tsigay sheep milk (66% vs 74%). The Karakachan sheep milk was with a higher biological value compared to Tsigay milk (94.7% and 93.6% respectively).

Key words: sheep milk, amino acid, biological value

28. Врабчева, Т., С. Лазарова и **Г. Беев**. 2004. Разпространение на видове от род *Fusarium* в зърно от житни култури в България. *Растениевъдни науки*, 41 (3): 240-243.

Резюме: Цел на настоящото проучване бе да се определи разпространението на видове от род *Fusarium* в зърно от житни култури и на тази база да се прогнозира евентуалния риск от образуването на фузариумни микотоксини. Изследването беше проведено върху 102 проби. От тях пшеница (38) и ечемик (12), реколта 2002 г., проби царевица (44) и царевични продукти (12), реколта 2001 г. Изолирането и идентифицирането на микроскопичните гъбички беше извършено според традиционните микологични методи. Въз основа на комплекса от културални и морфологични белези бяха определени видовете *Fusarium* според систематиката на Gerlach & Nirenberg. Бяха изолирани 108 изолата от видове на род *Fusarium*. С най-голяма честота на разпространение е вида *F. moniliforme* (66%), следван от *F. graminearum* (10%), *F. oxysporum* (8%), *F. sporotrichioides* (5%), *F. nivale* (3%), *F. poae* (3%), *F. solani* (2%), *F. culmorum* (2%), *F. proliferatum* (1%). Необходим е строг контрол по отношение фузариозната пораженост на зърнените култури и възможното съдържание на микотоксини в тях с оглед да се намали до минимум здравния риск за хората и селскостопанските продукти.

Ключови думи: пшеница, царевица, ечемик, видове *Fusarium*

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