UNIVERSITÄT HOHENHEIM

RESEARCH PROJECT (3000-321)

Research Topics

*Last updated: February 13th 2023

* This list will be updated by March 24th.

UNIVERSITÄT HOHENHEIM

Modul	**Research Project (3000-320)**
Department	Integrative Infection Biology Crops-Livestock (460K)
Supervisor	Jan W. Böhm & Prof. Dr. Michael Kube
Examiner	Prof. Dr. Michael Kube
Topic	**Stolbur phytoplasma, infections in volunteer potatoes as a threat?**
In brief	
In recent years phytoplasmoses pose an increasing threat for potato crops. After harvesting, low-quality tubers largely remain in the field and are incorporated in the course of the process. This results in volunteer potatoes growing in the next crops which might still be infected. How many plants are infected and are these infections detectable in all plant parts? For this purpose, plant material will be collected (leave, stem & root) and examined in molecular diagnostics (PCR & qPCR).	
Key words	Phytoplasmas, *Solanum tuberosum*, molecular diagnostics
Area	Phytopathogenic bacteria, potato cultivation
Methods	DNA-purification, PCR, Real-Time PCR, sanger sequencing
Interests	Sample collection, diagnostics, wet lab experiments
Organisation	Individual work or teamwork (on request)
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Modul	**Research Project (3000-320)**
Department	Integrative Infection Biology Crops-Livestock (460k)
Supervisor	Dr. Christina Zübert
Examiner	Prof. Dr. Michael Kube
Topic	**Detection of specific putrefactive pathogens in food chicken meat**
In brief	
Chicken meat is a perishable food product that may be contaminated with germs. In retail poultry meat samples, total DNA was extracted from the liquid tissue lysate present in the packaging and the bacterial 16S rRNA genes were partially PCR amplified and sequenced. The project will determine the diversity and interpret the origin of the contaminants. Primers will be designed and EndPoint-PCRs will be performed to screen additional samples.	
Key words	Chicken meat juice, microbial composition
Area	Microbiome and detection of microorganisms
Methods	Bioinformatic analysis of sequencing data (MEGAN, MEGA; BLAST), primer design, EndPoint-PCR.
Interests	PCR, bioinformatic software, database analysis
Organisation	Individual work
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Modul	**Research Project (3000-321)**
Department	Phytopathologie (360a)
Supervisor	Dr. Tobias Link, Seema Pawar
Examiner	Dr. Tobias Link
Topic	**Induction of disease resistance in grass**
In brief	
Turf grass is not only found in gardens and parks but also cover the ground in many sports facilities. Perfect lawn is especially important on football fields and golf courses. Pathogens infesting the grass are getting more problematic recently. The reasons are that these lawns are in strong demand, new pathogens are introduced from elsewhere or make host jumps to turf grass. Control of these pathogens is difficult because the regulation of pesticide use in sports facilities are currently strongly tightened. An alternative control strategy is induction of disease resistance, for example using UV-C light. In this project we will show and measure the induction of resistance in grass. For this, using RT-qPCR, we will measure the expression of genes that are up-regulated in plant resistance. In the lab we are irradiating freshly grown grass and then inoculate with pathogens. At the same time there will also be an outdoor experiment on the golf course in St. Leon-Rot. The main task in the project will be to measure gene expression in grass samples using RT-qPCR. In parallel we will also monitor pathogen load.	
Key words	Induced resistance, sports turf, UV-C
Area	Phytopathology, alternative pathogen control
Methods	Growing of microorganisms, RNA-preparation, RT-qPCR, optical assessment of turf grass
Interests	Phytopathology, molecular biology, lab work
Organisation	Individual work
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Modul	**Research Project (3000-321)**
Department	Livestock Infectiology and Environmental Hygiene (460 e)
Supervisor	Dr. Thorben Schilling
Examiner	Prof. Dr. Ludwig E. Hölzle
Topic	**Characterisation of psychrophilic bacteria in broiler meat**
In brief	
Packaged, vacuum-sealed broiler meat is part of the classic portfolio of food discounters. Bacterial contamination during the slaughtering process or packaging usually occurs and also leads to growth during the shelf-life of the food. As part of this project, insights into the psychrophilic species should be gained.	
Key words	Food hygiene, bacterial culture, psychrophilic saprophytes
Area	Microbiology
Methods	Cultivation, microscopy, PCR, Sanger sequencing
Interests	Microbiological lab work; production of food of animal origin
Organisation	Individual work or teamwork (on request)
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Modul	**Research Project (3000-321)**
Department	animal nutrition
Supervisor	Dr. M. Schollenberger, Prof. Dr. Rodehutscord
Examiner	Prof. Dr. Rodehutscord
Topic	**In vitro phytate degradation of different wheat species in poultry**
In brief	
Phytate is the main storage form of phosphorus in wheat and many other feed components. It can be broken down with the help of phytases, releasing inorganic phosphate. Phosphorus is a vital element for the animal organism. However, phosphorus in phytate form is only partially accessible to non-ruminants due to the lack of intestinal phytases. Therefore, inorganic phosphorus is added to the feed. Some feed components such as wheat contain plant-specific phytases with which the breakdown of phytate in the digestive tract of non-ruminants can be increased. This can help to reduce the supplement of mineral phosphorus and thus the emission of phosphorus into the environment. The aim is to investigate the degradation of phytate in vitro by different types of wheat in a system that simulates the digestive tract of poultry. Here, the wheat species are incubated under conditions that simulate the digestive tract of the poultry in terms of residence time, temperature, pH value and enzyme concentration. The remaining phytate is then extracted and determined using ion exchange chromatography. Phytate degradation rates for different wheat species are compared.	
Key words	Phytate, wheat species, in vitro model, poultry
Area	Analysis of feeds and matrices of animal origin
Methods	Literature study, incubation, simulation of the poultry gastrointestinal tract, chromatography, statistics
Interests	Substitute methods, types of wheat such as spelt, urkorn
Organisation	Individual work with integration into the work of the Department of Animal Nutrition
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Modul	**Research Project (3000-321)**
Department	animal nutrition
Supervisor	MSc. N. Klein, Prof. Dr. Rodehutscord
Examiner	Prof. Dr. Rodehutscord
Topic	**Influence of 3-nitrooxypropanol on methane formation in ruminants**
In brief	
The methane formed in the forestomach system is of microbial origin. Although the formation of methane is an integral part of the microbial activities that are beneficial for the animal, it means a loss of energy for the animal. The organic compound 3-nitrooxypropanol (3-NOP) has the potential to inhibit methane formation in the rumen and is therefore climate-influencing. In this research project, the dose-response relationship of 3-NOP when used in different total mixed rations will be elaborated. The experimental implementation is carried out with the help of the in vitro system Hohenheim feed value test. The results will be used to estimate the potential for practical cattle feeding.	
Key words	Methane, rumen, microbes, Hohenheim feed value test
Area	Ruminant nutrition
Methods	Literature study, HFT (*in vitro*), statistics
Interests	Cattle nutrition, environmental impact, biological relationships, alternative methods
Organisation	Individual work with integration into the work of the Department of Animal Nutrition
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Modul	**Research Project (3000-321)**
Department	Conversion Technologies of Biobased Resources (440f)
Supervisor	Dr. Jan Willem Straten
Examiner	Prof. Dr. Andrea Kruse
Topic	Synthesis of sustainable binders for bio-based electrodes
In brief	
The binders available on the market mostly consist of polymers containing flour, which are added to an electrode for cohesion and stability. The best-known representative is Teflon. An enormous problem in the fabrication of such polymers is that harmful and aggressive chemicals, such as hydrofluoric acid and chloroform, are used. Within the framework of research at our department, we will therefore investigate whether it is also possible to synthesize sustainable binders from bio-based feedstocks. Experiments in the lab are planned for this purpose. The aim is to develop a green binder for electrochemical applications.	
Key words	Biomass, activated carbon, binders, electrochemical applications
Area	Material synthesis
Methods	Formulation of binders, activated carbon production, analytics
Interests	Syntheses (formulations), experiments in the lab, analytics, electrochemical applications
Organisation	Individual work
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