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Abstractbook

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Katharina Brugger was born in Vienna, 1980. She received her Mag. rer. nat. (MSc) and Dr. rer. nat. (PhD) degrees in Meteorology from the University of Vienna, Austria, in 2004 and 2008, respectively. Since 2009 she is Assistant Professor at the Institute for Veterinary Public Health at the University of Veterinary Medicine Vienna. Her currently focus on research is on simulation of mosquito-borne diseases in the context of climate change. In 2008 she established a mosquito monitoring for the investigation of bluetongue disease vectors (Culicoides spp.). She is lecturer for biostatistics and veterinary epidemiology.

Long-term monitoring of livestock-associated Culicoides spp. in Vienna and its implications for disease risk assessment

Katharina Brugger

Within the last few years *Culicoides* spp. (Diptera: *Ceratopogonidae*) emerged as a major vector for epizootic virus diseases in Europe, such as Bluetongue or Schmallenberg. Commonly the basic reproduction number R_0 is used as an epidemiological key parameter for estimating the risk of a disease outbreak. R_0 represents the number of new infections, which arise from one infected individual in an entire susceptible population (i.e. at the onset of an epidemic) and depends on temperature dependent rates such as biting rate, virus reproduction rate (i.e. the reciprocal of the extrinsic incubation period) and vector mortality rate. Further, host and vector populations are considered. While the rates can be in large part determined in laboratory or field studies and the number of domestic hosts is known from veterinary databases, the midge density is mostly unknown. Therefore we established a continuously operating midge monitoring on a daily basis at the University of Veterinary Medicine Vienna (Austria), period 2009-2013, to determine the seasonal abundance of the vector population. This - to the author's knowledge - unique five-year dataset is used to assess the risk of a potential disease outbreak by means of Bluetongue and African Horse Sickness. For Bluetongue, a basic reproduction number above one, indicating the risk for a major disease outbreak, was generally found between June and August. Contrary, no risk for African Horse Sickness was estimated. Risk assessments are broadly used by veterinary authorities to establish efficient protection and control measures when facing diseases with economic impact.

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She received her doctor degree in Biology in Austria, in 1988, respectively. At first she worked at the Department of Medical Parasitology on the Institute of Hygiene, Medical University of Vienna, where she did her thesis about the occurence of *Toxoplasma gondii* in swine and wildboar in Austria.
In 1989 she changed from the Medical Parasitology to the Veterinary Parasitology.

Her main research interests include seroepidemiological studies concerning parasites like *Toxoplasma gondii* in different animals; *Babesia* in cattle and dogs; *Nesopora caninum* in cattle and dog; *Trichinella spiralis* in wildboar and foxes; *Leishmania donovani* in dogs and different other vector borne diseases like *Anaplasma* and *Ehrlichia*.

She is member of several Austrian and International scientific societies, reviewer in various scientific journals (e.g. Vet. Par., Parassitologia, Parasitol. Res., …).

She lectures general parasitology with topics in tropical veterinary parasitololgy.

Differentiation of *Babesia bigemina, B. bovis, B. divergens* and *B. major* by Western blotting - first report of *B. bovis* in Austrian cattle

Renate Edelhofer

To establish an assay for the serological differentiation of bovine *Babesia* species (*B. bigemina, B. bovis, B. divergens* and *B. major*), antigens from experimentally infected cattle were Western blotted and probed with homologous and heterologous sera. Varying antigen patterns for each species allowed the determination of species-specific diagnostic antigens. Blood samples from 36 naturally infected cattle from the province of Styria were tested by indirect immunofluorescence antibody test (IFAT) against B. divergens, as well as by Western blotting against *B. bigemina, B. bovis, B. divergens* and *B. major*, 3 weeks after clinical babesiosis was diagnosed by blood smears. All 36 cattle were *B. divergens*-positive when tested by IFAT. In four cases (11%), an infection with both *B. bovis* and *B. divergens* and in two cases a single infection with *B. bovis* were diagnosed when tested by Western blot. *B. bigemina* and *B. major* infections were not detected. These are the first serologically confirmed cases of *B. bovis* in Austrian cattle.

Introduction

Babesia bigemina, B. bovis, B. divergens and *B. major* are endemic bovine *Babesia* species in Europe. Hinaidy (1981a) suggested that only *B. divergens* exists in Austria. Infections with *B. bovis* have previously been suspected (Holler 1959; Leber 1963) but have remained unconfirmed. Since this time, no other reports on the occurrence of *Babesia* species in Austria have been published. *B. divergens* babesiosis is widely spread in the Alpine regions of Austria with prevalences of almost 50% (Edelhofer and Baumgartner 1996). During field trials carried out in different parts of Austria (Edelhofer et al. 1998b), larger forms of merozoites were detected in erythrocytes of cattle from Kapfenberg/ Styria. Although vaccinated, these cattle had to be treated against babesiosis repeatedly. In order to differentiate the detected *Babesia* species from each other and from other European species, sera from experimentally and naturally infected cattle were examined by immunofluorescence and Western blot techniques.

Materials and methods

Babesia-free calves were infected with monospecific reference strains of *B. bigemina* EXCY 190 (Central Veterinary Laboratory, Weybridge), B. bovis EXCY 194 (Central Veterinary Laboratory, Weybridge), *B. divergens* strain Hannover (Institute for Parasitology, Hannover Veterinary School), and *B. major* EXCY 102 (Central Veterinary Laboratory, Weybridge), and either bled at regular intervals for serum antibody collection or killed at a high level of parasitaemia at the onset of clinical symptoms, i.e. 8—12 days post-infection (p.i.), depending on the species. Antigen was prepared as described (Edelhofer and Baumgartner 1996), separated by SDS-PAGE and silver-stained or Western blotted. Blood samples from 36 cattle from Kapfenberg/Styria exhibiting clinical babesiosis were collected. Stained smears were examined for confirmation of the infection. Antibody titres were determined by IFAT using an antigen preparation from gerbils as described by Edelhofer and Baumgartner (1996) during the acute stage of infection and 3 weeks later.

Results

All serum samples from experimentally infected animals were positive for *B. divergens* by IFAT. Each *Babesia* species showed different major protein bands by Western blotting with homologous antisera. *B. bigemina* displayed four protein bands (I=55, II=49, III=42, and IV=39 kDa), *B. bovis* four bands (I=183, II=39, III=33, and IV=17 kDa), *B. divergens* two (I=141and II=33 kDa), and *B. major* four (I=167, II=115, III=57, and IV=50 kDa). When heterologous antisera were tested, *B. divergens* serum cross-reacted with band I from *B. bovis* and with non-specific bands (25 kDa, 43 kDa, 59 kDa) of *B. major. B. bigemina* antiserum cross-reacted with B. major antigen bands I, III and IV, and *B. bovis* antiserum cross-reacted with *B. major* antigens I, III and IV and a non-specific band of 79 kDa. Parasite free lysates did not react with any of the four *Babesia* sera. All 36 field samples were microscopically positive for *Babesia* spp. Sera tested shortly after infection showed 47.2% (n=17) positive reactions in the IFAT, either as a result of acute infection, latent infection or due to vaccination. At 21 days after

acute infection, 26 samples were positive and five negative while five animals had to be resampled on day 42 and one on day 63. By that time all animals had seroconverted. Of the 36 field sera tested 21 days after acute infection, six (16.6%) reacted with *B. bovis* antigen bands II, III or IV or a combination of these and were considered positive. In the blood smears of these animals, morphologically larger merozoites than those of *B. divergens* could be distinguished. Only 29 (82.9%) reacted with the *B. divergens* cross-reactive band I. At the time of acute infection, 22 (61%) sera reacted with specific *B. divergens* bands in Western blots. Of the sera obtained later, an additional nine were positive. No serum reacted with the *B. major* or *B. bigemina* specific bands. When IFAT and Western blot (3–6 weeks after acute infection) were compared, the IFAT displayed a sensitivity of 100% compared to 88% for the Western blot (31/36 animals tested were positive for *B. divergens*, six of which were also positive for *B. bovis*). Since all animals were positive in blood smears during the acute stage of infection, false positive results can be excluded. The specificity of the Western blot as determined by testing against heterologous experimental sera was assumed to be 100% when cross-reactive bands were excluded from the evaluation. Compared to this, the IFAT had a specificity of only 25% since all experimental sera reacted with *B. divergens* antigens.

Discussion

Antibodies against *B. divergens* can be detected by IFAT for as long as 2 years after infection (Ross and Löhr 1968; Edelhofer et al. 1998a). IFAT represents a useful laboratory test, as the technique is simple, economical and rapid. However, lack of specificity is a problem in areas where more than one *Babesia* species occurs. Cross-reactions between the four *Babesia* species in cattle have previously been reported using IFAT (Leeflang and Perie 1972). Disadvantageous cross-reactions can be overcome by testing IFAT positive sera with Western blots, which provide a species-specific diagnosis based on specific antigen bands. We developed such a test based on the antigen patterns of four bovine *Babesia* species, determined species-specific antigen bands and tested 36 field sera 3 weeks after natural infections. Sera were regarded as *B. divergens*-positive when a clearly visible reaction with *B. divergens* major protein bands I and/or II was present. *B. bovis* immune sera were regarded as *B. bovis* positive when one or more of the three species-specific major protein bands (II–IV) were seen. By testing the four different *Babesia* antigen preparations against heterologous immunsera, cross-reactivity was not demonstrated for *B. bigemina* antigens, while *B. divergens*, *B. bovis* and *B. major* preparations displayed considerable cross-reactivity. Cross-reactive bands were consequently excluded from the evaluation of Western blots with field sera. Previous work describes varying diagnostic antigen patterns for the different *Babesia* species (Montenegro-James et al. 1987; Winger et al.1987, 1990; Hines et al. 1989; Gorenflot et al. 1991; McElwain et al. 1991; Madruga et al. 1996, Machado et al. 1997; Passos et al. 1998), which may be due differences in strain composition or preparation protocols. Standard protocols for routine diagnosis must consequently include the definition and propagation of strains and standardised antigen preparation to ensure sufficient reproducibility. In Austria, *B. bovis* was detected by Western blot for the first time. The detection of *B. bovis* cases is of great economic importance as this species is more pathogenic than *B. divergens*. While *B. divergens* is transmitted by *Ixodes ricinus, Boophilus* species are described as vectors of *B. bovis.*

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Since 1999 she has been Associate Professor at the Institute of Nutrition, University of Veterinary Medicine, Vienna. From 1973–1980 she studied veterinary medicine in Vienna and Hanover. Before taking up employment at the Institute of Nutrition in1983, she worked as a practitioner in Germany.
The recent research areas include amino acids requirement of broiler chicken, fat and glucose metabolism in cats, and effect of probiotics; the effect of different feeding strategies of dogs and cats like barf or vegan belongs to her special interests.
In 2000, she became a member of the Society of Nutrition Physiology and a Diplomate of the European College of Veterinary and Comparative Nutrition, where she chairs the Education Committee. From the European Society of Veterinary and Comparative Nutrition, she is the Vice-President. She is a member of the editorial board of the Journal of Animal Physiology and Animal Nutrition.

Effect of concentrate–mineral supplements on the overall nutritional status of cross bred milking cows in two small farms in Sri Lanka

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Introduction

The primary constraint to livestock production in Sri Lanka is the scarcity and fluctuating quantity and quality of the year round feed supply. The small farmers in Sri Lanka have limited resources available for them for feeding their ruminant livestock and are often unaware of appropriate feeding strategies for combining poor quality feeds with high quality available green fodder resources and low cost concentrate-mineral supplements to improve ruminant production. Therefore, objectives of this study were to educate farmers to develop feeding strategies to boost their production level especially where feeds are scarce.

Animals, materials and methods

Daily excretion of purine derivatives (PD) and creatinine by crossbred (Australian Frisian Sahiwal) lactating cows (185±5.4 kg body weight) fed four different rations were examined in a small farm at Kamburupitiya area during the period of six months. The four diets used were 1) mixture of natural forages mainly rice field weeds–farm diet (FD); 2) FD + 225g DM/head/d low cost concentrate-mineral supplement (GT); 3) FD + 432g DM /head/d *Gliricidia sepium* tree fodder (TF); 4) FD+GT+TF, respectively. Another experiment was conducted in a medium scale farm at Gonapinuwala, during a period of six months with cross bred Jersy cows (300±4.5 kg body weight). The diets used were Treatment 1) mixture of forages *Brachiaria rusisiensis* + *Penissetum purperium*-Clone 13, 1.1 ratio, 25 kg Fresh Matter /head/day + mineral mixture (farm diet; FD) Treatment 2) FD + 675g DM /head/d low cost concentrate-mineral supplement – (GT) Treatment 3) FD + 427 g DM/head/d *Gliricidia sepium* tree fodder (TF) Treatment 4) FD + farm made concentrate mixture (1800 g/DM/head/day), respectively. The 4 diets were fed for three weeks in each period in a latin square design.

Results: The intake of organic matter and nitrogen was increased with supplementation in association with higher dry matter intake in trial 1. In trial 1, milk yield was not increased due to supplementation but fat and total solids were slightly changed with FD+GT+TF (Treatment 4). The level of allantoin, uric acid, total PD and creatinine (mmol/l) in urine responded positively towards supplementation in response to higher nitrogen status of supplemented diets. The highest response was observed when farm diet was supplemented with Treatment 4. The PD:Creatinine index (PDC Index) and estimated daily PD excretion (mmol/d) also responded significantly towards supplementation in both trials.
The organic matter and nitrogen intakes were more or less similar by feeding of low cost concentrate mineral mix + tree fodder or high cost farm made concentrate mixture. The nitrogen use efficiency for milk substantially improved through supplementation of low cost concentrate mineral mixture and tree fodder. Low cost concentrate mixture and tree fodder were more effective as compared with high cost concentrate ration in improving the quality of milk rather than the yield.

Discussion:

In the first experiment, according to the banding system based on PDC index and estimated microbial nitrogen production, underfeeding condition was observed when only farm diet was fed to lactating cows. However, supplementation with TF or GT could enhance the microbial nitrogen production to reach the maintenance level of feeding. Supplementation both with GT and TF could boost the microbial nitrogen production to reach a satisfactory level of feeding. In the second experiment, better feeding conditions with Forage alone could reach maintenance level of feeding but with TF+GT or farm made concentrate mix could provide a good level of nutritional supply.

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1998-2008: head of section food of animal origin of Austrian Veterinary society.
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Delegate in IDF, Codex Alim Austriacus,..

Research in chemical reactions in Food, Oxidation of Cholesterol, reaction kinetics in food, residues, effects of heat treatment.

Food safety and Quality Effect of technology and storage

Wolfgang Luf

Food safety is a very important part of food hygiene and got growing importance since last 15 years especially in the European Union caused by different crises (Dioxin, BSE etc.) New regulations and concepts were the result of this development. New keywords and phrases-from the stable to the table, from the farm to the fork, HACCP -were established.

Criteria which define food are among other things scientific and technological knowledge, historical aspects, tradition and legal regulations. Beside the classic hygienic risks as pathogenic microorganisms, coronary heart disease (CHD) and cancer are very important nutrition related injuries.

Effects of technology and storage are discussed in the case of milk production and treatment. Different forms of heat treatment, desired and undesired effects are described.

Arteriosclerosis and its resultant disorders as well as cancer are the most common causes of death in most western countries. Numerous risk factors are known, which may contribute to the emergence of arteriosclerosis. Most of these factors are susceptible to external influences. In this context, the greatest significance is attributed to cholesterol, which is deposited in the blood vessel walls and is the basis of calcification. Recommendation of the restriction of cholesterol intake was a dietetic consequence. But further studies have shown, that pure cholesterol did not damage the endothelium although it deposited, when lesions occurred. More important for the first attack of the vascular endothelium may be oxidation products of cholesterol, the COPs. They occur in food of animal origin induced by processing and storage. Absorption of COPs from food sources into the blood stream has been evidenced.

Analyses were done with a method based on high performance liquid chromatography coupled with mass spectrometry (HPLC-MS).

Processing came out to be a very important factor as well as storage of unpacked food samples. Industrially packed foodstuff appears to be more stable against oxidative influence.

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From end of 2012 he is President of Eurasia Pacific Uninet, an Austrian university network supported by the Austrian Federal Ministry of Science, Research and Economy with Asia including Nepalese Universities.

Do tree fungi contain neuroprotective substances

Wolf-Dieter Rausch, Mei Zhu and Shan Shan Guo

Introduction:
The number of mushroom species on Earth is estimated at 140,000, yet maybe only 10% (approximately 14,000 named species) are known. Mushrooms comprise a vast and yet largely untapped source of powerful new pharmaceutical products. Most importantly for modern medicine, they represent an unlimited source of polysaccharides with antitumor and immunostimulating properties. Such polysaccharides are of different chemical composition, which mostly belong to the group of β-glucans.
A growing numbers of studies indicate that polysaccharides influence signaling events that are important for brain function. Polysaccharide modulation of neuronal signals is speculated to promote synaptogenesis and cell maintenance. Therefore a potential therapeutic or long term protective effect on the process of neurodegeneration in aging diseases would be of high value.
Polysaccharides and polyphenols in this study were isolated from four kinds of tree fungi including Phellinus igniarius, Phellinus linteus, Fomitopsis pinicola and Ganoderma lucidum. Crude polysaccharides were extracted for three times with hot water (90°C) and precipitated with ethanol at a final concentration of 75%. The extraction yield of polysaccharides was in the range of 1.8-5.2%. Crude polyphenols were extracted with 95% ethanol for 35 min at a material/liquid ratio of 1:3, 70°C temperature. The yield of polyphenols was about 1%.
Methods:
To investigate the neuroprotective effect of the above compounds primary neural cell cultures were prepared from embryonic mouse mesencephala. MPP^+-induced cell death of dopaminergic neurons represented the neurotoxic model with relation to Parkinson´s disease.
At gestation day 14, uterine horns were dissected after abdominal laparotomy and embryos were removed carefully. The embryonic brains were dissected, ventral mesencephala excised and primary cultures were prepared with dispersing steps. Neuronal cultures containing dopaminergic neurons were treated with MPP^+ (10μg/ml) with compounds (1,10,100 μg/ml) at day 10 for 48 hrs. At day 12 the neuronal cells were fixed and incubated with anti-tyrosine hydroxylase (TH) antibody overnight at 4°C, and a biotinylated secondary antibody was added for 90 min. Then TH-ir (ir immunoreactive) neurons were counted in 12 randomly selected fields.
Results:
Crude polysaccharides and polyphenols increased the number of surviving TH-ir neurons both in control as well as MPP^+ damaged cultures. Antioxidant properties of these compounds were found by either the FRAP-test (ferric iron reducing ability of plasma) or by scavenging of DPPH free radicals. Trolox was used as a positive control, crude polyphenols of Phellinus igniarius and Phellinus linteus exhibited significant antioxidant effect at concentrations of 0.1mg/ml and 1mg/ml and and crude polyphenols of Fomitopsis pinicola and Ganoderma lucidum showed remarkable antioxidant activity at the concentration of 1mg/ml. Anti-inflammatory activities were detected in BV-2 cell systems as clear reduction of LPS-induced NO-concentrations .
Conclusion:
Neuroprotective activity in vitro does not mean clinical usefulness. Thus a full clarification as well of clinical efficacy is still a long way to go.

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Epidemic models to visualize and predict Foot-and-Mouth disease outbreaks

Franz Rubel

In Europe only sporadic Foot-and-Mouth disease (FMD) outbreaks occur. Goal of the Veterinary authorities is to hold the disease free status and to avoid restrictions in animal trading. However, if an outbreak occurs the financial losses are enormous. The situation in Nepal is quite different. FMD is endemic throughout the year in all parts of the country. On average about 900 outbreaks per year were reported causing substantial economic losses in livestock industry. During the major outbreaks 2009, for example, more than 80,000 (1,600) animals were affected (dead).

In this presentation the dynamics of historical FMD outbreaks in Europe are presented and discussed. Further the role of epidemic models for decision-support of veterinary health authorities developed at the Institute for Veterinary Public Health in Vienna will be introduced. These comprise classical susceptible-infected-recovered (SIR) models for contact transmission, a simple Gaussian dispersion model as well as a more sophisticated Lagrangian dispersion model for the airborne spread of FMD virus.

Susceptible-infected-recovered model:
The application of epidemic models during the first days after the confirmation of a virus outbreak should significantly contribute to minimize its costs. Frequently, so-called susceptible-infected-recovered (SIR) models were applied to estimate the influence and costs of different control strategies such as culling, vaccination, quarantine as well as animal trading and movement restrictions.

Gaussian dispersion model:
It will be demonstrated how geographical maps depicting infection risk for various animal species may support National health authorities. The major tool of the decision-support system is a so-called Gaussian dispersion model to calculate virus plumes. Additional tools providing input data and visualizing the output comprise a veterinary database of geo-referenced premises and a geographical information system (GIS). The epidemic model is forced by data from numerical weather prediction and is designed to run in both, analysis and forecast mode.

Lagrangian dispersion model:
Airborne spread of bioaerosols (here FMD virus) above complex terrain is simulated using a Lagrangian particle model. Mountainous terrain as well as inhomogeneous and time varying meteorological conditions prevent from application of widely used Gaussian dispersion models, while the proposed model can handle these realistically. In the model, trajectories of several thousands of particles are computed and the distribution of virus concentration near the ground is calculated. It allows to assess risk of infection areas with respect to animal species of interest, such as cattle, swine or sheep. Case studies depict a significant influence of local wind systems on the spread of FMD virus. Higher virus concentrations at the upwind side of the hills and marginal concentrations in the lee are well observable, as well as canalization effects by valleys.

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Prof. Dr. Günther Schauberger is head of the WG Environmental Health at the Department of Biomedical Sciences. He is working in the field of environmental health with focal points on indoor climate of livestock buildings, air borne emissions with the emphasis on odour and biological-effective ultraviolet radiation. In the area of indoor climate he is dealing with balance models to simulate the indoor climate of mechanically ventilated buildings. Future aspects are the implementation of a dynamic animal growth models, the development of a model for naturally ventilated buildings, and the reduction of airborne emissions due to livestock. In the odour field he is dealing with the emission, dispersion modelling in the atmosphere, and odour sensation and annoyance. His photobiological interests are focused on biological-effective ultraviolet radiation of the sun, the forecast of the UV index (world wide domain), the epidemiological relevance of UV exposure of humans and animals, photo stability of sunscreens, and quality assurance of solar simulated radiation. Future aspects will be epidemiological studies on the UV exposure of humans and the incidence of skin cancer and the relation to climate change scenarios.

Impact of the environment on livestock production and vice versa

Günther Schauberger

The global livestock sector is growing faster than any other agricultural sub-sector. It provides livelihoods to about 1.3 billion people and contributes about 40 percent to global agricultural output. In the last decade, the livestock production in Asia was increasing dramatically. Beside the increase of livestock heads the production level (like annual milk production) is an important parameter for this growth process.

The production level of animals is based on the genotype and its environment, which is summarised as phenotype. This environment is defined by the thermal environment, the air quality, the feeding regime of the animals, the housing system and the management. It is well known that the indoor climate of the animals has an important impact on the production level e.g. if the ambient temperature is raised from 21°C to 32°C then the egg productivity is reduced by 6% and the egg weight by 14%, respectively. On the other hand the recommended stocking density should be reduced by about 30% to reduce the heat stress, which increases the cost of per bird also. Therefore measures have to be taken to improve the indoor climate of livestock buildings. For hot climates the reduction of heat stress is one of the major concerns. This can be done by evaporative cooling systems, by increasing air velocity inside the livestock building and by energy saving air preparation systems like underground storage systems. In moderate climate zones livestock are kept mainly in closed houses. These livestock buildings are confronted with low air quality during winter time to save energy as well as heat stress in summer. All these climate induced deviations from the optimum indoor climate can be limited to a certain extend by the application specific housing and ventilation systems.

But an optimum indoor climate doesn't guarantee that there is no impact of livestock production on the environment. The livestock sector accounts for 9% of CO_2 deriving from human-related activities, but produces a much larger share of even more harmful greenhouse gases. It generates 65% of human-related nitrous oxide, which has 296 times the Global Warming Potential (GWP) of CO_2. It accounts for 37% of all human-induced methane (GWP =23), which is largely produced by the digestive system of ruminants, and 64% of ammonia. Beside ammonia which is relevant on a regional scale which contributes significantly to acid rain all other airborne emission contribute to green house gases on a global scale. On a regional scale also biologically relevant emissions have to be taken into account which cause for concern for several reasons. First, microbial pathogens may cause directly infectious and allergic diseases in humans and farm animals (e.g. Foot-and-Mouth disease). Second, chronic exposure to some types of aerial pollutants may exacerbate multi-factorial environmental diseases, such as atrophic rhinitis in pigs. A third group of potentially hazardous effluents are drug residues, such as antibiotics, which may be present in the excreta of farm animals after medical treatment and which are passed to the environment during grazing or spreading of animal manure where they may conceivably contribute to the formation of antibiotic resistance in certain strains of bacteria. The last group of aerial pollutants are odourous substances. In Europe and the US odour emission of livestock buildings is one of the major concerns for neighbours. Especially in the transition area between residential and rural areas this is a major cause for complaints.

The link between the impact of the livestock on the environment and the optimum indoor climate to increase the performance of the livestock, are specific housing and ventilation systems. The relationship between the three components animals – building – ventilation system can be described by simulation models. By coupling such models with adaptive growth models for animals, livestock performance as a function of the indoor climate can be assessed. Such models can be used to optimise the housing system. The cost function for the optimization of the system can be the energy amount for the ventilation system, the performance of the animal production, the feed intake or environmental related variables like emission of gases, dust or other substances. On a long scale such model calculations are the basis to estimate the impact of climatic change scenarios on livestock production.

CURRICULUM VITAE

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Dagmar Schoder is Assistant professor at the Institute of Milk Hygiene at the Department of Veterinary Public Health and Food Science, the University of Veterinary Medicine, Vienna, Austria. She began her career studying veterinary medicine in Vienna and conducted post-doctoral research there at the Institute of Milk Hygiene. Since 2001 Schoder has been lead researcher in the laboratory for the Austrian Listeria monitoring. Since 2008 she has been head of the department's Global Food Safety research group.

Schoder's research focuses on global food safety. Above all this concerns the control and prevention of *Listeria monocytogenes* in the food processing environment. Simultaneously, an interest in risk assessment regarding food safety in less and least developed countries has led her to ethnological research. This has involved traditional methods of food processing by indigenous people in East Africa and tracing illegal food trade and intentional food contamination.

Schoder's awards include the Heinrich Stockmeyer Science Award in 2011, the Vienna-Future Award in 2007 for the category of most creative researcher, the AWD Award in 2007 for the most successful junior researcher in the acquisition of funding, the Hermann Zittmayr Award of the Austrian Milk Science Board in 2006 and the Alfred Kleibel Award of the Austrian Society of Veterinary Medicine in 2002.

Since 2007 Schoder has been president of Veterinarians Without Borders Austria. She is also a board member for Veterinarians Without Borders Europe.

Multinational listeriosis outbreak due to acid curd cheese: The challenges of outbreak clarification

Dagmar Schoder

Clarification of an outbreak of food contamination is never an easy task. It is not made easier today by the ease with which contaminated material can be transported and the extent of international distribution. Large scale modern food production, combined with complex transnational retailing systems and consumer expectations for food items with extended shelf-lives, add to the impediments to outbreak investigation. However, this was the extent of the challenge when an outbreak of invasive listeriosis occurred in Central Europe between June 2009 and February 2010. Thirty-four people became ill. Eight of these people died.

The source of this particular outbreak was identified solely from epidemiological findings. Consumption of acid curd cheese was identified as the only significant risk factor that was highly associated with the illness. For the first time it was possible to determine the contamination level and the genotype diversity of *Listeria monocytogenes* in the very cheese lots that caused this multinational outbreak.

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Funded by a "Hertha- Firnberg" fellowship from the Austrian Science Fund (FWF), Dr. Valencak is currently running a project which addresses questions related to the relationship between energy metabolism and lifespan. More specifically, her current project relates to the physiological costs of high reproduction in terms of increased rates of senescence and aging. Coming from a strong animal physiology background she is also very interested in physiological limits which animals reach when reproducing at most. She cooperates with two groups at the Veterinary University Vienna and with two labs abroad (in the UK and in Poland). Apart from her interest in mechanisms that link energy metabolism to aging, she is interested in comparative studies on membrane fatty acid composition in mammals and their nutritional importance.
Dr. Valencak is a member of the SEB (Society of Experimental Biology) and the SICB (Society of Integrative and Comparative Biology).

Lipids in tissues of wild game: overall excellent fatty acid composition, even better in free-ranging individuals

Teresa Valencak and Lisa Gamsjäger

Intensive farming of livestock associated with the use of polluted animal feed and consumer deception has increased awareness about risks for human nutrition. In parallel, the demand for meat obtained under more natural conditions from animals that can freely forage has largely increased. Moreover, the consumer sets a high value on sustainability of consumed products and thus, organic farming has experienced a proper boom in the last few years. Interestingly, the consumption of game meat has not become more common despite its excellent quality and content of polyunsaturated fatty acids. Is there a bottleneck in accessibility? Or, rather, does the consumer avoid game meat? Polyunsaturated fatty acids are long-chain carbohydrate chains that constitute membranes. Due to a lack of the necessary enzymes most mammals need to ingest them through their diet. Polyunsaturated fatty acids positively affect health in several ways so regular consumption is highly recommended and vital both for humans and most mammals. Particularly the n-3 group among the polyunsaturated fatty acids is considered to act against cardiovascular problems as well as to improve eyesight, lower the risk of developing cancer or neurological disorder. Over the past years, we examined fatty acid composition of game meat from the most common animals hunted in Austria. We found out that game meat has got a very favourable fatty acid composition for human consumption, particularly due to its high proportion of n-3 polyunsaturated fatty acids. To find out more about the influence of body condition we separated polar lipids and neutral lipids. We present our data on both mammals and birds and conclude that game meat represents a high quality meat source that however is mostly overlooked by consumers.