Tropentag, September 17-19, 2018, Ghent

"Global food security and food safety:
The role of universities"

Alga and Insect Meal and their Effect on Monogastric Animal Meat Quality

Brianne A. Altmann, Carmen Neumann, Susanne Velten, Frank Liebert, Daniel Mörlein

University of Goettingen, Department of Animal Sciences, Germany

Abstract

Access to appropriate feedstuffs improves the production efficiency of meat products; therefore increasing access to protein and vitamin rich food, globally. In most Western countries, soybean is the customary protein source in chicken and swine diets. However, the soybean market remains dominated by strong demanding (e.g. China, EU) and supplying (e.g. Argentina, USA) countries; therefore this feedstuff is not as secure for more decentralised producing regions, as exist throughout the (sub-)tropics. Currently, Spirulina (Arthrospira platensis) is being reincorporated into livestock diets in Southeast Asia and black soldier flies (*Hermetia illucens*) are considered an acceptable livestock protein source as they can be produced on-farm with manure as a substrate. Using Ross 308 broilers and Pietrain × (Large White × Landrace) barrows we ascertained the effects of Spirulina or partially defatted black soldier fly larval meal on chicken meat and pork quality, compared to the Western standard soybean diet. In order to achieve industry acceptable growth, the diets were supplemented with amino acids, where Spirulina animals needed to be supplemented to a higher level than the insect-fed animals, and chickens required more supplementation than swine. When diets achieved amino acid requirements, multiple meat quality differences existed for chicken. Live weight, carcass weight, thigh weight, pH20min, pH24h, drip loss, and lean colour of skinless breast and thigh cuts were significantly different between groups. Spirulina-fed meat had a stronger umami and chicken taste, as well as it smelled less 'animal-y' when cooked and insect-fed samples had a reduced adhesive texture while being chewed, as determined by a trained sensory panel. Few differences were observed in pork – differences included carcass weight, cooking loss (%), and pH45min, where insect-fed animals produced heavier carcasses than the Spirulina-fed, had a higher pH45min, and exhibited reduced cooking losses. Both protein alternatives resulted in meat with a stronger odour when cooked and Spirulina-fed samples tasted more astringent, whereas insect-fed samples were juicier. These results suggest that both alternatives could be integrated into monogastric animal diets, but further research should focus on the acceptance, especially poultry product colour, of these alternative products in local markets.

Keywords: Animal nutrition, black soldier fly, broiler, *Hermetia illucens*, meat-type chicken, pork, Spirulina

Contact Address: Brianne A. Altmann, University of Goettingen, Department of Animal Sciences, Albrecht-Thaer-Weg 3, 37075 Göttingen, Germany, e-mail: blovstr@uni-goettingen.de