Building better knowledge on meat quality determination through integrated data mining and curation of proteomics studies

Mohammed Gagaoua

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reducing ruminal NH$_3$-N production and nitrogen excretion in urine as well as slowing dietary protein breakdown in the rumen and improving amino acid bioavailability in the small intestine. The production of ruminants and feed digestion in rumen can both be favorably influenced by feed additives such as probiotics and products derived from plants. These additives come in a variety of forms and work in several ways. Despite their diversity, they all eventually have an impact on the metabolic pathways for fermentation and/or the microbial community in the digestive tract. The kind of feed used, and the animal's physiological condition have an impact on its effectiveness. A fully comprehend complicated interactions that find and take place between hosts, feeds, and additives. This knowledge will allow us to identify the potential applications of a particular feed additive, hence minimizing inconsistent field responses.

KEYWORDS: Feed additives; ruminants; secondary metabolites; mode of action

Building better knowledge on meat quality determination through integrated data mining and curation of proteomics studies

Mohammed Gagaoua

PEGASE, INRAE, Saint-Gilles, France

Meat quality is very important for consumers, processors, and producers. The traditional methods for assessing meat quality are subjective and time-consuming, and they do not provide a comprehensive understanding of the factors that affect meat quality. Proteomics, a high-throughput technology for the analysis of entire proteins, has emerged as a powerful tool for investigating the molecular mechanisms underlying the conversion of muscle into meat, meat quality variability, and the discovery of biomarkers. However, the large amount of data generated by meat research proteomics experiments in the last two decades can be overwhelming, and the integration of published meat proteomics datasets through data mining approaches and bioinformatics is a promising way to expand our scientific knowledge. Furthermore, mining such data in their biological context may allow the extraction of novel and more robust biomarkers of meat quality traits. Data reuse is a leading, active, and evolving field suggested and very recently applied in the meat research field to rediscover and reshape the public proteomics data for a better understanding of the unknowns related to meat quality determination and refinement of the list of biomarkers so far proposed. In this talk, the application of integrated data mining and curation approaches to improve our understanding of the molecular basis of meat

quality will be presented. The focus will be on important meat quality traits and their defects such as tenderness, color and post-mortem processing treatments (e.g. electrical stimulation). The most updated databases, patterns, knowledge and relationships between different factors and meat quality gained thanks to the integromics studies will be presented. Overall, integrated data mining and proteomics studies curation allowed for providing a comprehensive view of the biochemical mechanisms and molecular signatures underlying meat quality, which all together allowed better insights of their affecting factors. These novel approaches further allowed proposing robust biomarkers for the development of more accurate and efficient methods/tools for assessing meat quality. Integrated data mining and curation of proteomics studies will have important implications for the meat industry, as they will provide new insights into the factors that affect meat quality.

Technologies applied in embryonated eggs

Katarzyna Stadnicka

Faculty of Health Sciences, Nicolaus Copernicus University in Toruń, Ludwik Rydygier Collegium Medicum in Bydgoszcz, Bydgoszcz, Poland

Implementation of precise solutions to develop natural and sustainable 'immunity' in the animal is an element of a systemic approach defined by World Health Organization, and referred to as the One Health. Stakeholders of poultry production seek solutions to eliminate and/or control the pathogens transmitted with food and animals. Intentional stimulation of embryonic development and determination of the future post-embryonic health of the organism is possible by *in ovo* application of natural antioxidants and prebiotics, gut stabilizers like probiotics and other immunological enhancements, including vaccines. In light of the above, advancements in biotechnology and robotization have led to a fast development of several break-through practices in poultry hatcheries: *in ovo* vaccination, *in ovo* feeding, stimulation of embryonic development using prebiotics, probiotics and synbiotics, thermal manipulations and embryo sex determination. The work flow of a modern hatchery is almost fully automatized, and as such serves as an excellent, controlled space for implementation of novel *in ovo* techniques with elimination of human error and potentially adverse environmental factors. A post-embryonic life of a broiler chicken is limited to about 42 days. Therefore, considering the complete period from egg fertilization to animal maturity, the embryonic development in egg (21 days) constitutes a one third of a total life span of the animal. This biological feature enables poultry production to be highly transformative and allows for a shift of some of certain treatments from post