INTERVIEW: Adisseo Highlights 5 Years of Methionine Sources Research

12 November 2018 – Eager to share its technical knowhow and how the industry's knowledge of methionine has improved in recent years, Adisseo has launched a new edition of Methiopedia, a technical guide on methionine sources used in animal feeds.

Five years after the first edition, Methiopedia version 2, according to Adisseo, offers a complete description of the available forms of methionine with their characteristics and properties. It also compiles new trial results and analyses on nutritional and technological aspects.

Adisseo says Methiopedia is intended for nutritionists, purchasers, formulators, quality and technical managers within the premix and feed industries, as well as students, who want to enhance their knowledge of methionine and its use.

To find out why Adisseo considers Methiopedia the ultimate reference book for methionine supplementation, Feedinfo News Service spoke with Dr. Yves Mercier, Rhodimet Scientific & Technical Support Manager, and Dr. Dolores Batonon Alavo, Global Scientific Solutions Developer, at Adisseo.

[Feedinfo News Service] Dr. Mercier, what are the new topics tackled in the new edition?

[Yves Mercier] From a nutritional point of view, new efficacy data on various species are shared: in vivo methionine sources comparison trials, but also experiments and calculations on sources conversion or metabolism. These last years, the focus was put on the interest of OH-Methionine beyond protein synthesis, for example, its value as an organic acid, its interest in specific nutritional strategies from sows to finishing pigs (meat quality for example), etc. Apart from nutrition, technology is at the heart of this 2018 edition with new information on methionine distribution equipment (description, functioning, recommendations for monitoring, etc.), performance results of methionine products distribution in feed: homogeneity, energy savings during pelleting using OH-Methionine, etc. The methionine market and available products are also briefly developed, including new products.

Dr. Yves Mercier
Rhodimet Scientific & Technical Support Manager
Adisseo

[Feedinfo News Service] What are the main differences you noticed between methionine usage in 2013 and 2018?

[Yves Mercier] Methionine is seen more and more as an asset in a nutritional strategy than only to supply methionine to meet animals' requirement, as raw materials are not sufficient to cover the needs. On another hand, reducing protein in diets is of interest for many feed producers. This has for consequence an increase of synthetic amino acids incorporation rates and at first place for poultry feed: methionine. On a global level, methionine market is growing at a rate of 6% on a yearly basis. The concentration of feed mills and industrialization of feed production, especially in Asia Pacific in the last years are leading to bigger feed mills and as consequence an increase of liquid methionine penetration rate in these countries.

[Feedinfo News Service] A part is dedicated to the relative value of methionine sources. Did you gather content on methionine sources efficacy, which is a key point for end-users?

[Yves Mercier] Readers will find in the book new in vivo trials on methionine sources comparison: a trial comparing DL-Methionine and OH-Methionine in broilers published in Poultry Science in 2015, the results of a trial comparing broiler performance fed either L-Methionine, DL-Methionine or OH-Methionine during 42 days, a trial in Cherry Valley ducks published in late-May 2018 and also trials on swine at different rearing periods, also described in scientific publications. On top of this, a literature review on methionine sources comparison in fish (21 peer-reviewed publications) has been also introduced in this new edition. Whatever the species, all the trials concluded on the same efficacy of methionine sources to sustain animals' performance, when added on an equimolar basis.

[Feedinfo News Service] Dr. Dolores Batonon Alavo, a recent Schothorst Feed Research study confirmed in broiler trials that the bioavailability of methionine from liquid hydroxy analogue products is about 65%, compared to DL-methionine products. What is Adisseo's view of this study?

[Dolores Batonon Alavo] The study of Schothorst Feed Research, performed in collaboration with Evonik, is a comparison of a diluted DL-Methionine at 65% and liquid OH-methionine on product basis with standard DLM. This means that for each dose, the Total Sulfur Amino Acid (TSAA) content brought in diets is not the same for DLM and OH-methionine. Comparing methionine sources with this methodology results in visual differences in the response curves at the lowest dosages. This is linked with the methionine supply at each dose, which is 12% lower in the case of OH-Methionine on product basis, and not to a putative lower efficacy. As it is well explained in the Methiopedia book, differences in absorption, conversion and metabolism lead logically to some difference in response curves that are not taken into consideration in this model.

I would like to remind that Schothorst Feed Research also published in Poultry Science in 2016 (Agostini et al.) a comparison of DLM and liquid OH-Methionine on their efficacy to sustain broilers performance. The conclusion was that both sources lead to similar performance response when compared on an iso-molecular basis and at TSAA values around the broiler requirement level, which are more representative of nutritional practices. Moreover, I want also to point-out that the largest integrators in the world are mainly using OH-Methionine at full value, which is a pragmatic demonstration of the full efficacy of OH-Methionine.

Dr. Dolores Batonon Alavo
Global Scientific Solutions Developer
Adisseo

[Feedinfo News Service] We know that there are different approaches to compare methionine sources. From your point of view, what is the appropriate methodology?

[Dolores Batonon Alavo] Because DL-Methionine and OH-Methionine have different chemical structure, their absorptions, conversion, etc. by animals are not the same. The model used to determine efficacy has to be carefully selected. Actually, feed intake varies between animal replicates of the same treatment. Variations of feed intake lead to variations in sulfur amino acids intake, thus growth performance, even for the same treatment. Modeling the average weight gain as function of supplemental doses of methionine does not allow to take into account the variations in feed intake and weight gain, thus leading to a biased calculation of the relative bio-efficacy. Therefore, the key point is to use total sulfur amino acid intake instead of dose in the model. Indeed, total sulfur amino acid intake is calculated using the feed intake and the analyzed incorporation rate. Using this parameter instead of the theoretical

dosage allows strengthening the comparison between sources. We have applied this method in the trials reported in the Methiopedia and concluded from all of them that OH-Methionine is 100% as efficacious as DL-Methionine.

[Feedinfo News Service] Research has shown that OH-Methionine is more than a methionine precursor for protein deposition and it brings other values thanks to its characteristics. Dr. Mercier, can you comment on this?

[Yves Mercier] Previous studies back to 2006 have shown that the OH-Methionine molecule is a precursor of methionine and a better supplier of Cysteine and Taurine, which are downstream metabolites of Methionine. Cysteine is used for protein synthesis but is also the active component of the Glutathione tripeptide, which is well known, like Taurine, as important cellular antioxidants molecules that will improve animal redox status and performance under stressing conditions. As OH-Methionine allows to form more Cysteine and Taurine than DL-Methionine, this advantage demonstrates better performance under chronic heat stress. In addition to this effect on redox status, OH-Methionine has also a value as an organic acid or in specific feeding strategy for swine.

[Feedinfo News Service] Can you develop an example of OH-Methionine interest for swine?

[Dolores Batonon Alavo] We know that the sow's nutrient requirement and especially amino acids are increased during late gestation and lactation period to support maternal health, reproductive performance and milk production. Methionine level and/or sources were rarely considered during these specific physiological stages. Recent results showed that increasing dietary methionine supply above the current recommendations in sows using OH-Methionine allowed to better increase fat, protein and lactose content of the milk than DL-Methionine. Consequently, suckling piglets demonstrated a higher body weight and an enhanced antioxidant status to face with oxidative stresses at weaning.

Thanks to the better antioxidant status and higher cysteine supply, post-weaning piglets, better cope with inflammatory challenge using LPS model when fed with OH-Methionine beyond TSAA requirements. Inflammation significantly reduced all piglets' body weight, but post-weaning piglets fed with OH-Methionine exhibited a significant higher body weight one month after the inoculation of LPS, than those getting a diet with equivalent level of DL-Methionine.