INTERVIEW: Assessing Zootechnical Feed Additives More Precisely

Source: Feedinfo News Service
(dated 22/10/2013)

22 October 2013 - At the recent 64th Annual Meeting of the EAAP (European Federation of Animal Science) in Nantes, France, a satellite session on the impact of feed additives on health and performance in livestock was held.

Chaired by Eric Auclair, R&D Director of Lesaffre Feed Additives and member of the EPA (European Probiotic Association) board, the session gathered various industry experts, including Professor Jamie Newbold of Aberystwyth University in Wales and FEFANA's Secretary General Didier Jans.

Participants aimed to provide an overview of the situation of feed additives in the EU, based on the work done over the last fifteen years in terms of scientific assessment. The session mainly focused on the study of zootechnical additives that involve precise measurement of performance.

Shortly after the EAAP session, Feedinfo News Service spoke to Eric Auclair, Jamie Newbold, and Didier Jans to touch base on what was discussed and find out more about new molecular biology techniques in feed additive assessment.

Eric Auclair
R&D Director
Lesaffre Feed Additives &
Member of the European Probiotic Association Board

[Feedinfo News Service] Gentlemen, one of the main issues discussed during the session was the wide gap between zootechnical feed additive assessment methods and the biological evolutions and new technologies. Feed additive assessment methods need to reflect today's consumer concerns such as food safety, animal welfare, and sustainability. Can you expand on this issue?

[Eric Auclair] After 25 years in the field of animal nutrition, I am still surprised by the growing gap between the methods used at present for the assessment of additives, measures of production parameters essentially, and recent developments of biology in many field, and particularly molecular biology techniques. The existing standards in animal nutrition, such as measuring growth rates and digestibility for example, are excellent and will long remain the reference. They gave rise to very sophisticated and accurate nutritional value systems. However, the profession must also question and reflect on changes in the future in light of recent technological developments.

Most assessment tools, have been developed in a productivist aim, and should be reviewed in light of the problems to consumers at present, such as food security, welfare, protection of the environment and the need for sustainable agriculture. For this purpose, the pursuit of livestock performance should not be the only priority, even if it remains fundamental. The performance improvement is implicitly derived from the primary functionality of the additive, which will help to improve their health status or well-being of an animal, for example. Thus priority should be given to demonstrate the primary functionality of an ingredient or additive.

[Didier Jans] Such a gap around the assessment methods is probably more obvious at the level of the authorities assessing the additives in the context of their authorizations than at the level of industry and research. This is an area experiencing a quite fast evolution and it is just normal that regulatory procedures lay a bit behind scientific and technical developments. It is of course important that this is not considered as a fixed fact, and that the regulatory procedures evolve along these progresses. The focus on productivity/growth is still very prevalent amongst a number of experts who are assessing our products. Far from considering that productivity is unimportant, one has to realize that in today's breeding practices, animal growth is only one amongst several aspects. The contribution of a number of zootechnical additives, even from a productivity point of view, is much more subtle than a mere constant/statistically significant growth over a fixed period. Other aspects like for instance the predictability of the breeding process and/or the management of variability are as much important in today's practices. Just take the example of a gut flora stabilizer additive: it might sometimes be difficult to show a growth effect in standardized conditions, but the usefulness of such additives in breeding is not to be demonstrated anymore. In a context of resources scarcity and diversity of expectations (safety, animal welfare, product quality, etc.), the specialty feed ingredient industry is coming up with a number of creative solutions, and it is important that the regulatory authorities are not hindering such innovation.

[Feedinfo News Service] Given that zootechnical additives such as vegetable extracts, prebiotics and probiotics are not properly assessed with traditional assessment methods, what does this mean for the products' credibility?

Didier Jans
Secretary General
FEFANA

[Didier Jans] One should make a distinction between the Regulatory assessment and the technical one. There is sometimes a tendency for the market to watch the results of efficacy assessment released by regulatory-related agencies, losing sight of the rigid context in which this is carried out. Aspects like mode of actions and adapting to the high diversity of breeding situations are generally not part of this. Product credibility derives only marginally from these regulatory assessments. Today's breeders want to know what exactly a given additive can bring to them technically and financially.

[Eric Auclair] These additives have the most effects that are associated with animal health. Evaluate outside the presence of a challenge, whether nutritional or related health conditions for livestock can sometimes hide their true interest to the breeder.

[Feedinfo News Service] Which new molecular biology techniques are currently being considered to assess zootechnical additives?

[Jamie Newbold] Next generation sequencing technologies have allowed us to explore the diversity of microbes in the gut in ways that were not previously possible we can characterize and identify the microbes that are both stimulated and inhibited by our additives greatly facilitating our ability to explain their modes of action. In the near future this will be complemented with metagenomic techniques that allow us not only to describe which organisms are being stimulated but also to map the metabolic pathways within both the microbiota and host being regulated by the additives. This will allow as yet unimaginable advances in our knowledge as to how additives work and greatly advance the development of new products. Finally metabolomics analysis of plasma, milk and urine offers us the possibility, in the future of monitoring individual animals in real time delivering nutritional and supplement advice based on the individual animal or group of animals.

At the current stage of development advances in next generation sequencing mean that, assuming we can collect the samples, we can report back on the changes in the microbial population within the gut resulting from use of an additive without resorting to expensive and time consuming culture techniques. Indeed, because samples can be stored frozen (under appropriate conditions), it should be possible to store samples from a series of trial comparing, at a later date, changes in the microbiotia in trials with both large and small effects on production. On a longer time scale it is possible to envisage a form of individualized nutrition for our animals in which based on metabolomics analysis of milk, feaces or urine nutritionists can recommend with confidence that additives to be feed to all or part of the herd.

[Eric Auclair] In the field of probiotics, Lesaffre Feed Additives was involved early in these techniques because they allow to precisely show the impact of our products on the microflora of the host. 80 % of the flora of the digestive tract is strictly anaerobic and difficult to enumerate without the help of these modern techniques, which showed us a giant leap in the knowledge of our products. The progresses made in recent years by molecular biology techniques are fascinating in every respect, so much so that even experts struggle to follow their evolution.

To me the greatest danger is that of being overwhelmed by the tool, and not to keep a clear head. We do not need 454 sequencer to understand that change the type of fiber ingested will affect the digestibility of nutrients in pig or poultry. However, these methods can sometimes make us reflect on the evaluation of our products.

For example, live yeast significantly impacts the microflora of rainbow trout, even if it does not induce any significant gain in performance obtained under non challenged conditions. This suggests that the microbiological variations have no effect or even negative effects on the animal. However, now we know, in the light of the experience of recent years, that in this case, a pathogenic challenge is very likely to induce a significant positive effect between control and treated fishes.

Prof. Jamie Newbold
Aberystwyth University, Wales

[Feedinfo News Service] Do you think that some 'omics' techniques can replace in the future more traditional methods?

[Eric Auclair] No, I do not think so, unless one is able to establish perfect correlations between molecular markers and animal performance. However, these methods can provide rapid markers of the physiological state of an animal, which is interesting when you see their costs, contrary to popular belief, continues to decline.

[Jamie Newbold] I believe that “omics” technology will work in parallel with more traditional methods of feed and additive analysis rather than replace them.

[Feedinfo News Service] When it comes to pathogen measurement and antibiotic resistance, it is necessary to try and reproduce realistic field/farm conditions in experimental stations to avoid disparities between observations. Additive assessment models must evolve but without losing sight of the reality of what it is like on the farm. What are your thoughts?

[Eric Auclair] Taking the example of probiotics, for years we have heard that these additives resulted in inconsistent effects. But these products can be of great service to the profession, especially in farms where pathogens encountered are resistant to antibiotics. However, the evaluation of these additives in excellent sanitary conditions often leads to variable results. In these conditions, we must try to more closely replicate field conditions where animals are significantly challenged. It is important to target the test period. We know that live yeast is particularly effective against sub-ruminal acidosis, but the benefits are more difficult to observe when ruminal acidosis is less marked. This has led us to achieve most of our tests in early lactation period during which almost all the cows suffer from acidosis. The search for efficient markers of ruminal acidosis remains an important research field for us as well as for most ruminant nutrition specialists.

[Feedinfo News Service] Mr. Jans, what are the differences in term of assessment between feed additives and feed materials? How are claims for feed materials assessed?

[Didier Jans] In Europe, the difference is very significant since feed additives are subject to a pre-market approval including both safety and efficacy aspects, while feed materials are placed on the market under the responsibility of the feed business operator, without any official assessment. As far as the efficacy aspects are concerned, the additives are subject to tight requirements, under EFSA scrutiny. The possibility to make claims on feed materials was introduced by Regulation 767/2009, which is generally a good move. However, this Regulation left the game very open, limiting itself to require the operator to be able to provide scientific substantiation of the claims made at control’s authority request, without any further qualification or reference. This is creating a wide legal uncertainty, certainly for the operators, but even for the control authorities who have no real basis on which to evaluate the adequacy of this substantiation. Furthermore, while the legislator invited the industry to produce a code for the labeling of compound feed, including the way to substantiate claims, there is no such basis for the feed materials. FEFANA is currently trying to develop tools to help operators placing functional feed ingredients (feed materials with additive-type functionality) on the market.

Furthermore FEFANA has developed the “Classification Tool” aiming at helping the feed business operators and the competent control authorities of EU Member States to have a consistent approach for the classification of substances, with regard to the differentiation between feed additives and feed materials. This tool is freely available in several languages on FEFANA’s website.

[Feedinfo News Service] So, is Regulation (EC) 767/2009 more an opportunity or a challenge for producers of feed materials?

[Didier Jans] Regulation 767/2009 is a fact that operators have to cope with. One of its positive aspects is to have settled some labeling aspects. It also opened a number of interesting concepts, like the “labeling concept” but might have missed to fully embrace the consequences of these and the tools needed for a smooth implementation. The first challenge for an operator is to determine if a given product is an additive or a feed material. The apparent freedom left might be seen as an opportunity, but in practice the legal uncertainty that surrounds it is also a challenge. The legal recognition of the claim concept is clearly an opportunity for operators, but if this is done in a context where one never knows up to where one can go and under which conditions, this can quickly become a challenge as well. All this might also create delicate competitive situations between companies that have a different time-scale perspective.