The nutritional benefits of insects in animal feed

Insect larvae are considered as the new ingredients in animal feed. They can substitute for soybean meal, fish meal, and other feed ingredients, thereby providing a sustainable and safe protein source. Insects offer a potential solution to the growing protein demand and the need for sustainable food production. They can help reduce the environmental impact of traditional feed ingredients and improve the nutritional value of animal feed products. Insects are also an alternative source of protein that can improve the circularity of the agri-food system.

The European Commission promotes the development of alternative feed ingredients

The European Commission is promoting the development of alternative feed ingredients, including insects. The insect sector is growing rapidly, and there is a potential for significant production increases in the future. The Commission is working to develop new feed formulations that incorporate insects and their derived products, and to promote the use of insects as feed ingredients.

Insects are leaders in terms of land-use efficiency

Insects are among the most efficient sources of proteins in terms of output per area of land. Their fast development and growth, with several cycles of insects farmed per year, make insects up to 70 times more efficient than commonly-used materials of vegetal origin.

Market outlook

A wide range of factors will impact consumers' preference with regards to meat consumption during the coming decades - with the growing population and increasing resource scarcity being the leading ones. The annual EU meat consumption is expected to decline by 1 kg per capita by 2030 (reaching 68.6 kg - source: EU Outlook 2019-2030), an opposite trend is noticeable on a global level. According to the FAO, the meat consumption will exceed 45 kg per capita by 2030 - a 10% increase in contrast to the value from 2015. Considering the growing demand on a global level, it is very likely that the decline in pork and beef products in the EU will be compensated by an increase in exports. Thus, competition for high-quality feed ingredients will intensify in the future, confirming the necessity to improve EU's self-sufficiency with regards to feed materials.

Nutritional benefits of insects in animal feed: a ‘future-proof’ solution

Insects can contain up to 82% protein and have a diverse amino acid profile. The high content of digestible protein in insect larvae (in dry form) makes them a potent solution to improving protein self-sufficiency in animal feed. According to IPIFF members, the European insect sector could produce up to 5 million tonnes of insect protein by 2030 (source: IPIFF Vision Paper).

Moreover, their amino acid profile corresponds to the dietary needs of fish, poultry or swine animals, with adequate levels of amino acids which are seen as limiting factors (lysine, threonine, methionine, and tryptophan). Insects offer tailor-made solutions for feed manufacturers, contributing to the development of highly formulated feed and personalised feeding strategies.

Insects are leaders in terms of land-use efficiency

Known for their reduced overall footprint, insects are among the most efficient sources of proteins in terms of output per area of land. Their fast development and growth, with several cycles of insects farmed per year, as well as the incorporation of vertical farming principles in insect farming, make insects up to 70 times more efficient than commonly-used materials of vegetal origin.

The forecasted population growth, coupled with the increasing demand for animal proteins worldwide are two key indicators that reflect the urgency to further optimise our food-producing sectors. New sources of feed, such as insects and their derived products, represent an alternative which is rapidly developing across the EU. By reintroducing valuable nutrients in the agri-food chains, insects can provide a locally-produced source of nutrients for the aquaculture, poultry or swine sectors. Moreover, added in animal feed, such novel ingredients have also shown positive results in terms of growth rates, development as well as animal health and welfare.

Thus, the inclusion of insects in the diets of such animals will not only improve the circularity of the agri-food nexus, but will also complement the diet of farmed animals with products that respond to their nutritional needs.
Insects are highly efficient in converting lower value by-products into higher-value protein materials. In addition, insects could also boost the feed conversion ratio of farmed animals. Numerous trials and studies on the impact of insects and their derived ingredients on the Feed Conversion Ratio (FCR) of animals reflect the positive outcomes associated with their inclusion in fish, poultry, or swine animals diets. For example, H. illucens led to a 54.9% increase in the average daily weight gain of the giant freshwater prawn, while also contributing to a 32% decrease in its FCR. Similar results were observed when T. molitor was included in the diet of juvenile rainbow trout (FCR decreased by 25%, while a 33.7% in weight gain was noted).

In poultry animals - among the most efficient in converting animal feed into protein - the addition of insect meal further improves the FCR, most probably due to the presence of highly digestible protein in insects. Average daily gain and total live weight were also increased.

Aquaculture - among the fastest-growing food sectors in the world - dedicates great attention to the development of alternative raw materials as compound feed ingredients. In line with the nutritional requirements of aquatic species and the increased ecological footprint awareness, the inclusion of low-trophic sources of feed, such as insects, represent a promising opportunity for the fish farming sector. We are confident that our collaboration with the insect sector will provide valuable opportunities to the ‘Farm to Fork’ Strategy, primarily in the development of local, healthy and safe feed ingredients.

Insects are more than protein...

In addition to the inclusion of insect-based protein ingredients for feed applications, their use in functional feed remains equally relevant. The research around the capacity of insects to modulate animal gut health is developing at a faster pace, providing promising results.

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