

How to deliver plant based compounds for maximum benefit

As phytogetic feed additives (PFAs) become increasingly accepted by the feed and livestock industries, there is greater scrutiny as to whether products can fulfil the expected benefits.

One key to success is product design that ensures the plant-based bioactive compounds are delivered where they are needed to be most effective – which requires the right formulation and encapsulation.

by Carina Schieder, and Pia Gottschalk, Biomin Holding GmbH, Austria. www.biomin.net

Biomin has developed a proprietary encapsulation technology for essential oils and phytogetic active compounds – the Biomin Duplex Capsule – and an advanced formulation of Digestarom DC, which represents a new approach to phytogetics that aims to provide a superior solution in animal feeds.

Why encapsulation matters

In the food and feed industry, encapsulation commonly serves to protect flavours from oxidation, to increase a product's shelf-life and to provide controlled release of substances over a period of time. While numerous phytogetic com-

pounds are known to have benefits for feed and livestock, various phytogetic compounds exert different properties. Essential oils and their active compounds in particular are highly volatile and heat sensitive – less than ideal characteristics in the context of modern feed production and pelleting.

The challenge is to make sure that substances that have an insufficient shelf-life, or are broken down in the digestive tract before they can exert their biological active properties, are instead delivered where they are needed to have a positive effect.

Breakthrough encapsulation technology

To improve the applicability of essential oils and their active compounds in feed, Biomin developed a unique method of microencapsulation (a term for particles with a diameter between 1 and 1000 microns). The Biomin Duplex Capsule combines two encapsulation techniques – matrix and core-shell encapsulation.

With core-shell encapsulation, a protective coat surrounds a core comprising essential oils and active compounds, providing better product stability and ensuring targeted release further along in the gastrointestinal tract. In Digestarom DC, the coat and core contain different essential oils for appetising and gut

modulation modules, respectively. Both layers are matrix encapsulated – meaning that the active compounds are finely dispersed in a solidified matrix – providing slow, controlled release.

Biomin proprietary encapsulation technology results in double capsules with a uniform and narrow size distribution ranging from 120-500 microns, allowing for more homogeneous distribution of active compounds in Digestarom DC and eventually in the feed, meaning continuous delivery of active substances in the animals.

In addition, the particles have a very high essential oil content compared to other commercially available products. Furthermore, the Biomin Duplex Capsule structure gives Digestarom DC enhanced pelleting stability over 90°C.

Triple action formulation

Digestarom DC is an advanced phytogetic feed additive that utilises extracts and herbs along with the Biomin Duplex Capsule.

Its triple action formulation leverages the advantages of the Biomin Duplex Capsule to optimise feed conversion. The following three modules are designed to optimise feed conversion (Fig. 1).

● Appetising and endogenous secretions.

Digestarom DC is designed for the

targeted, controlled release of active phytogetic compounds in the gastrointestinal tract. Starting in the mouth, the coat of the Duplex Capsule delivers flavouring substances, menthol, etc, that enhance palatability and support feed intake. These plant compounds stimulate endogenous secretions such as saliva, bile and mucus to support better digestibility – a key reason that many feed and livestock professionals use phytogetic feed additives.

● Gut microbiota modulation.

In the digestive tract, the core releases its gut microbiota modulating contents, derived from oregano, thyme and caraway oil. The application of these encapsulated essential oils has been shown to improve performance and apparent ileal digestibility.

Several studies have shown that Digestarom increases villi height in broilers, which is associated with better nutrient absorption.

Furthermore, the results of a scientific study suggest the establishment of beneficial gut microbiota in PFA-fed birds.

● Gut protection.

A scientifically selected mix of herbs and extracts makes up the third module that supports gut protection through antioxidative, anti-inflammatory and gut integrity supportive properties. Digestarom DC combines an advanced formulation with the incorporation of a proprietary encapsulation technology to optimise feed conversion and improve performance.

Benefits for the bird

Digestarom DC results in improved palatability, enhanced digestibility, reduced intestinal challenge, better animal product quality, improved animal welfare, and less environmental impact.

The next generation phytogetic solution is proven under scientific and field conditions, delivering:

- Improved feed intake.
- Better performance.
- Optimised feed conversion.
- Higher return on investment and profitability.

Fig. 1. The Biomin Duplex Capsule and triple action formulation of Digestarom DC.

