What IS A PHYTOGENIC FEED ADDITIVE?

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Phytogenic feed additives, known as PFAs or botanicals, are substances of plant origin added to animal diets at recommended levels with the aim of improving animal performance. Essential oils, herbs and spices all serve as sources for bioactive ingredients, e.g. phenols and flavonoids.

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Phytogenics include a broad range of plant materials, most of which have a long history in human nutrition, where they have been used as flavors, food preservatives and medicines since ancient times.

Table 1. Herbs and spices with known benefits for farm animals

Herb/spice	Latin name	Plant family	Main constituents	Key Benefits
Oregano	*Oreganum vulgare*	Labiateae	Carvacrol, thymol	Antimicrrobial, Antioxidant
Thyme	*Thymus vulgare*	Labiateae	Thymol, carvacrol	Antioxidant, Antimicrobial
Garlic	*Allium sativum L.*	Alliaceae, Liliaceae	Diallyldisulfide, alliin, alliciin	Lipid digestion, antimicrobial
Horseradish	*Armoracia rusticana*	Brassicaceae	Allyl-isothiocyanate	Immunity booster
Chili, Cayenne Pepper	*Capsicum frutescens*	Solanaceae	Capsaicin	Appetite, palatability
Peppermint	*Mentha piperita*	Labiateae	Menthol, carvacrol	Stomach, improving gut peristalsis
Cinnamon	*Cinnamomum cassia*	Lauraceae	Cinnamaldehyde	Antimicrobial, Appetising
Anise	*Pimpinella anisum*	Apiaceae, Umbelliferae	Anethol	Appetite, stomach peristalsis

Source: BIOMIN

Effects in animals

Phytogenics are known to have a range of biologically active properties that are beneficial in modern livestock production, including: antioxidative, anti-inflammatory, anti-microbial and digestion-enhancing effects.[1] For example, phenols such as thymol, carvacrol and eugenol (often derived from thyme, oregano and clove) and their methyl ethers have a very strong antiseptic and antimicrobial effect. Species of the families of *Apiaceae* such as caraway and fennel and *Lamiaceae* (e.g. rosemary and peppermint) have strong antioxidative properties. Other plant compounds support better digestibility by boosting digestive secretions such as bile, mucus and saliva as well as enhancing enzyme activity.

Achieving consistent and reliable results with plant-based substances in animal diets requires a well-defined formulation, standardized raw materials and effective quality control.

Main benefits

Nutritionists, growers, business owners, veterinarians and consultants located in over 100 countries provided their views on the use of plant-derived compounds in farm animal nutrition within the framework of the 2017 BIOMIN Phytogenic Feed Additives Survey.

The antimicrobial effect of PFAs was the most popular reason given for their use, cited by 50.1% of respondents (Figure 4). Digestibility enhancement was another important reason for PFA use cited by 49.6% of respondents. Respondents also used PFAs for growth promotion (46.3%), within an antibiotic-growth promoter (AGP) replacement strategy (38.9%), for their anti-inflammatory effects (38.9%) and for improving feed conversion ratio (FCR; 30.2%).

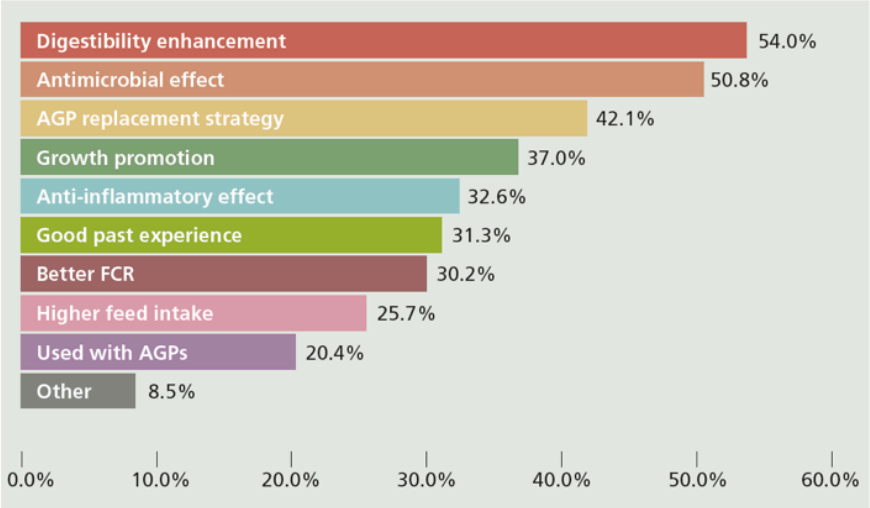
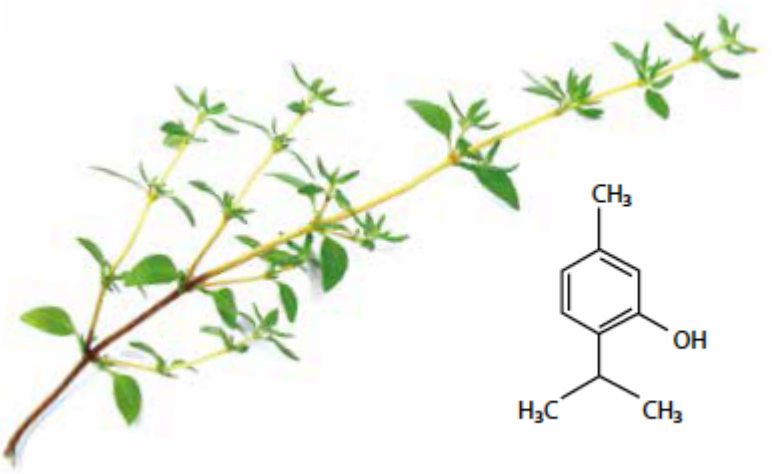


Figure 1. Top reasons that respondents use phytogenic feed additives

Antimicrobial effect

Phytogenic ingredients are known for their antimicrobial properties, particularly against Gram-positive bacteria. Respondents in South America were most strongly convinced by the antimicrobial

properties of PFAs at 53.8%, followed by Europe, the Middle East and Africa (50.6%), North and Central America (48.7%) and Asia Pacific (44.8%).



Digestibility enhancement

Specific plant compounds can improve digestibility by supporting digestive secretion of bile, mucus and saliva, as well as enhancing enzyme activity. Respondents from North and Central America and those from Europe, the Middle East and Africa, said they used PFAs for the digestibility enhancement effects, with 56.4% and 56.8% of respondents in each region respectively. Those in Asia Pacific and South America selected digestibility improvement at an equal rate of 44.8%.

Growth promotion

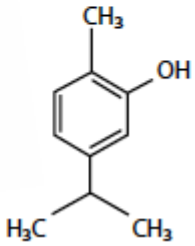
The growth promoting effects of PFAs stem from a combination of antiseptic, anti-inflammatory, anti-oxidative and digestion-enhancing properties. The growth promoting effects of PFAs received the highest recognition from professionals in Europe, the Middle East and Africa, at 55.6%, followed by North and Central America (48.7%), Asia Pacific (44.8%) and South America (40.7%).

AGP replacement strategy

PFAs can play a role in a holistic approach to antibiotic reduction that incorporates biosecurity, vaccination, farm management and nutrition improvements. A full 62% of survey respondents indicated that they expected to decrease the use of antibiotics in farm animals over the next 12 months. Respondents in Asia Pacific cited the use of PFAs in AGP replacement more than any other region, at 51.7%, followed by Latin America (43.4%), North and Central America (32.1%) and finally Europe, the Middle East and Africa (23.5%).

Improvement in FCR

Application of a properly formulated PFA may deliver an FCR improvement of up to 5 points. Overall, an improved FCR found moderate support across all regions. An improvement in FCR was chosen as the main reason for PFA use by professionals in North and Central America (33.3%), followed by Europe, the Middle East and Africa (32.1%), South America (29%) and Asia Pacific (27.6%).



Anti-inflammatory effects

Considerable energy may be wasted because of inflammation: energy that would otherwise be used for growth and performance. Application of plant-derived substances such as PFAs that counter inflammation are therefore a viable, nonantibiotic method to promote growth in farm animals. The anti-inflammatory effects of PFAs were cited much more frequently by respondents in Europe, the Middle East and Africa (55.6%) compared to other regions. Respondents in North and Central America cited anti-inflammatory effects 38.5% of the time, followed by those in Asia Pacific (33.3%) and South America (33.1%).

Higher feed intake

Phytogenics can improve the palatability of feed and thereby improve feed intake, which is particularly desirable in young animals or when feeding less palatable or medicated feed. Improving feed intake was more highly appreciated by respondents in Europe, the Middle East and Africa (27.2%) and North and Central America (23.1%) compared to those in Asia Pacific (19.5%) and South America (15.2%).

Environmental emission reduction

As PFAs improve feed efficiency and digestibility, less feed is needed per unit of output (meat, eggs or milk), meaning that the environmental footprint of farm animals is lower. Interestingly, this factor was most appreciated by respondents in Asia Pacific (28.7%), followed by North and Central America (23.1%), South America (18.6%) and Europe, the Middle East and Africa (9.9%).

Meat quality and carcass improvements

PFA application can be beneficial in terms of meat quality characteristics that are additional to the digestibility and feed efficiency improvements.
The use of PFAs to improve meat or carcass quality found the greatest favor among respondents in Asia Pacific (26.4%) and Europe, the Middle East and Africa (24.7%), followed by South America (15.2%) and North and Central America (14.1%).