



## Tackle the problem at the root: EMISSION REDUCTION IN POULTRY BY PFAs

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As the global population and its prosperity are steadily rising, the animal protein demand will further increase in the near future, with poultry being under the most consumed meat sources worldwide. Though this substantial rise in meat consumption is challenged, meat production in intensive farming is accompanied by considerable environmental pollution with nitrogen (N) and greenhouse gases.

**I**t goes without saying that we urgently need to counteract this development with responsible and efficient animal production. And it's not just about (re)acting sustainably now; much more, it's about making sustainable steps in the long run.

Next to optimized management measures, feeding represents a powerful tool to mitigate emissions. Over the last decades, many feed additives have been developed and evaluated to support emission reduction, within which phytogenic (plant-based) substances have attracted more and more attention for a good reason.

### PROMISING ADDITIVES OF PLANT ORIGIN

Plants have been used in human culinary and medicine for many centuries as flavor enhancers, preservatives, and healing properties. Phytogenic feed additives (PFAs), also called "phytogenics," are standardized, specific, and science-based combinations of bioactive compounds found in plants with proven efficacy and a sustainable impact on animals, people, and the environment.

As such, PFAs are promising ingredients in a natural strategy to face today's and future livestock production challenges. At the same time, their benefits resonate positively with consumers, who show increasing interest in natural, healthy, and sustainable food, in the production of which also animal welfare is taken into account.

PFAs comprise many active substances, distinguishing them among the other, nature-identical products available. They contain precious bioactive substances, including the entire repertoire of secondary plant metabolites.

Different substance classes, such as essential oils, saponins, flavonoids, mucilages, tannins, spices, and bitter substances, offer a broad spectrum of beneficial effects, such as improved feed intake, regulating the secretion of digestive juices, antioxidant effects, quorum sensing inhibition, protection of the intestinal wall, as well as emission reduction, to name a few.

The latter can be explained by increased nutrient utilization in animals due to PFAs, reducing nutrient excretion, and lowering the environmental pollution.

### AMMONIA - DO NOT LET IT ARISE AT ALL

Ammonia, a chemical compound of nitrogen and hydrogen with the molecular formula  $\text{NH}_3$ , is a gaseous compound of nitrogen. Released ammonia spreads in the air, reacts with other air pollutants, and produces particulate matter.

Ammonia is formed in livestock farming through bacterial and enzymatic decomposition of nitrogen compounds - mainly urea- in the slurry. The enzyme urease catalyzes the decomposition of urea into carbon dioxide and underwater ammonia use.

Suppose aerial ammonia gets in contact with mucous membranes in the respiratory system of animals or humans. In that case, it destroys the mucosal surface, and the intrinsic mucosal barrier against infectious agents in the affected areas drops. Therefore, animals become more prone to respiratory diseases, increasing medical costs and animal performance losses. Besides, high aerial ammonia concentrations adversely affect the animal's well-being.

### PFAs MITIGATE EMISSIONS

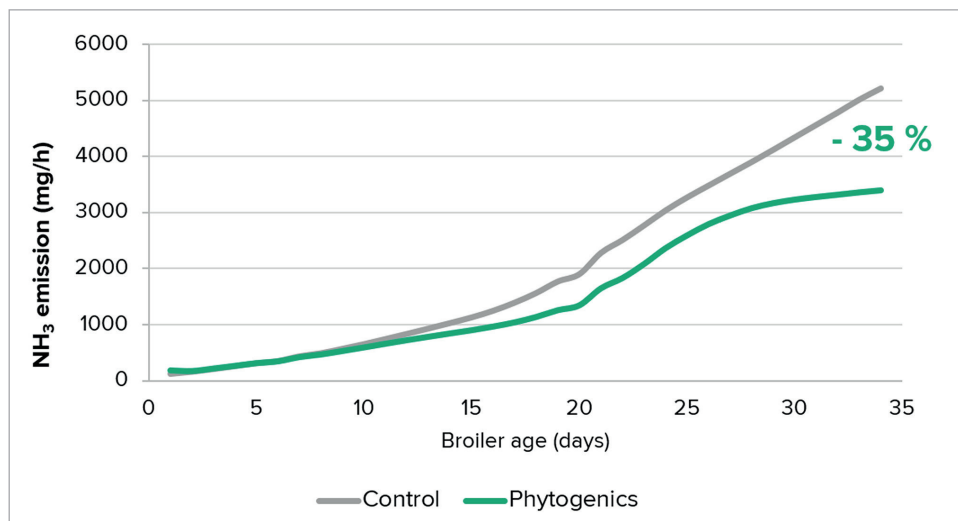
The emission problems must be tackled by their roots; in other words, they should not even arise.

Delacon has performed many trials in its own Performing Nature Research Center (PNRC, Znojmo, Czech Republic) to determine the effect of PFAs on ammonia emission in broilers, and results were quite promising. The emission section at PNRC with its hermetically sealed chambers allows precise analysis of the influence on phytogetic feed additives on ammonia (and greenhouse gases) production. To prove the effectiveness of phytoGENICS and to generate new data in terms of reducing gas emissions, various *in vivo* and *in vitro* trials are carried out consistently.

"Phytogetic feed additives have shown many beneficial effects on animal nutrition. Especially their proven impact on emission reduction is gaining interest, as high aerial ammonia concentrations in barns are harmful to humans, animals, and the environment and impair production hence profitability."



**Picture 1:** Phytogetic feed additives show many beneficial effects in animal nutrition (© Delacon)



**Figure 1:** Effect of a well-formulated PFA on NH<sub>3</sub> emissions in broilers compared to control (Source: Delacon, P044)

In a long-term study, broilers were housed in 12 identical chambers, each providing its climate system. The study aimed to determine the effectiveness of a well-formulated phytogenic feed additive on the ammonia emissions compared to the control animals. In the grower phase, the ammonia emissions increased rather quickly in both the phytogenic and the control groups. Though PFAs then showed their ability to counteract this development, resulting in an ammonia reduction of 35% on day 35 (*see figure 1*) and 24% over the whole trial duration, while not affecting broilers' performance.

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Regarding the proven beneficial characteristics, phytogenic feed additives are promising new generations of additives for innovative animal nutrition—a crucial tool for keeping pace with current and upcoming trends and meeting today and tomorrow's challenges.

## NATURAL POWER PAYS OFF

The substantial rise in meat consumption is challenged, as meat production in intensive farming is accompanied by considerable environmental pollution through undesired emissions that arise in animal production.

Phytogenic feed additives have shown many beneficial effects on animal nutrition. Especially their proven impact on emission reduction



### About Roberto Montanhini Neto

Veterinary doctor, with master science and Ph.D. in veterinary sciences, and with relevant experience in leading integrations, premix and feed additives companies. With more than 18 years of experience in the Brazilian and international markets, always focused on developing animal nutrition and feed production projects, especially poultry, swine and aquaculture. Has been working for Delacon since 2018, and currently holds the position of Global Unit Lead, Monogastric.