Article

The liver as a metabolic axis in poultry production: the importance of standardized phytogenics

1. Introduction

In modern poultry farming, the liver is a key metabolic axis for transforming nutrients into productive performance. Its role in energy and lipid metabolism, bile production, protein synthesis and stress response makes it an organ directly related to growth, feed conversion, egg production and economic efficiency.

2. Main challenges for liver function

Liver function in poultry farming is under constant pressure. In layers and breeders, hemorrhagic fatty liver syndrome continues to be a relevant challenge, especially in high-production birds fed high-energy diets. In broilers, rapid growth requires high metabolic activity to sustain protein synthesis, energy metabolism, lipid management and detoxification.

Added to this are mycotoxins, nutritional imbalances, inflammation and heat stress. The latter alters redox homeostasis and increases the generation of reactive oxygen and nitrogen species, favoring oxidative damage and increased metabolic pressure on key organs such as the liver [1].

3. Phytogenics: from plant extracts to measurable active compounds

Phytogenics have attracted a growing interest due to their ability to provide antioxidant, anti-inflammatory, digestive and metabolic support. However, their technical value does not depend only on the plant used, but also on the concentration, stability and bioavailability of their active compounds.

This point is critical: declaring a "plant extract" does not guarantee a reproducible physiological effect. Two extracts from the same botanical species can have very different profiles depending on the origin of the plant, the part used, the extraction method, the processing conditions and the stability during the manufacture of the feed. Therefore, phytogenic nutrition must move from the generic concept of "plant extract" to solutions characterized and formulated based on measurable active compounds.

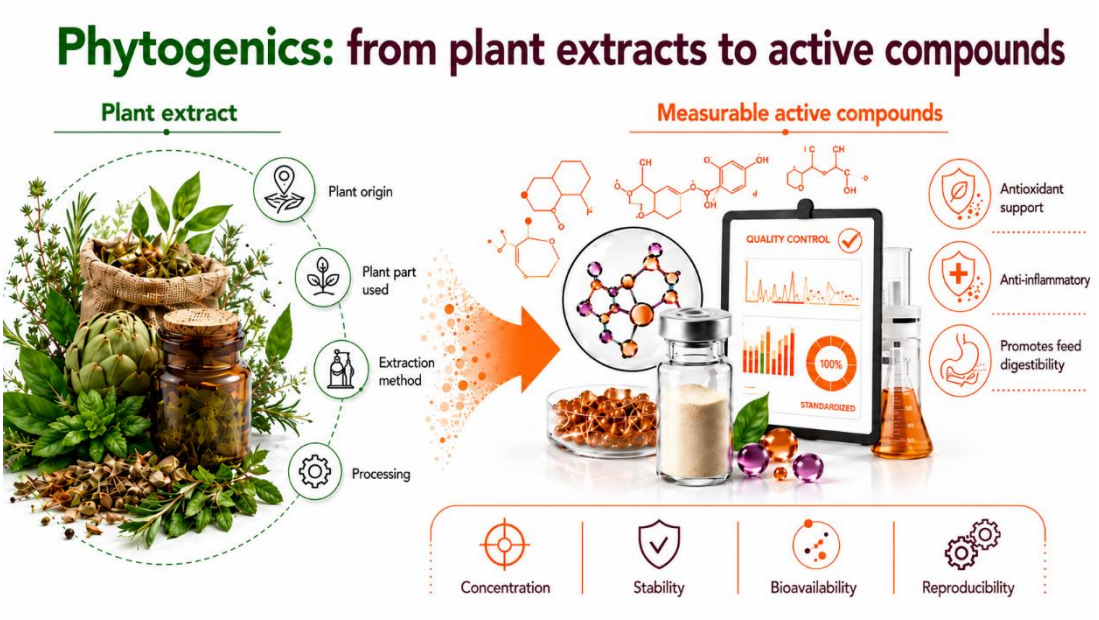

Figure 1. Evolution of phytogenics: from generic plant extracts to measurable and reproducible active compounds.

4. Artichoke extract and standardization

Artichoke extract (*Cynara scolymus*) is a good example of this approach. Its compounds of greatest interest are caffeoylquinic acids, among which chlorogenic acid and cynarin stand out. These compounds have been linked to antioxidant, anti-inflammatory, hepatoprotective, choleretic, cholagogue, and lipid metabolism modulatory activity [2].

From a technical point of view, it is not enough to talk about artichoke extract; it is necessary to know and control its content of chlorogenic compounds. This is the difference between using a generic plant raw material and working with a functional, measurable and reproducible nutritional tool.

To this end, **Igusol** has developed a specific analytical method that allows the identification and quantification of caffeoylquinic acids, especially chlorogenic acid and cynarin, in raw materials. This tool allows us to standardise the concentration of active ingredients in **IGUSAFE,** our hepato-modulator product, and ensure greater consistency between batches.

5. Evidence and applications in poultry farming

The evidence generated by **Igusol** with artichoke extract standardized for chlorogenic acid has shown relevant effects on markers associated with liver status and on production parameters in broilers. In a trial from 0 to 42 days, this phytogenic solution significantly reduced serum levels of **AST** and **ALP** compared with the control group, two enzymes related to liver status. In addition, **total protein** was significantly higher in the higher-dose supplemented group, which may reflect improved metabolic function and hepatic protein synthesis. These changes were accompanied by higher body weight and better feed conversion.

Table 1. Effect of standardized artichoke extract on serum markers associated with liver status in broilers at 42 days.

Serum parameter	Control	Standardised extract 80 g/t	Standardised extract 160 g/t	P-value
ALP, U/L	1,650[a]	1,401[b]	1,444[b]	0.048
AST, U/L	320.6[a]	275.6[b]	258.9[b]	0.013
Total protein, g/dL	3.43[b]	3.42[b]	3.78[a]	0.038

ALP: alkaline phosphatase; AST: aspartate aminotransferase. Different letters indicate significant differences between treatments.

Recent scientific literature also reinforces the interest of chlorogenic compounds in heat stress scenarios. Shaukat et al. observed that chlorogenic acid can modulate the immune response, antioxidant indicators, heat shock proteins, and gut barrier integrity in broilers subjected to chronic heat stress [3].

In practice, standardised artichoke extracts may be of interest in broilers during rapid growth phases, in layers and breeders during periods of high hepatic demand, in situations of heat stress and in programmes aimed at reinforcing the technical consistency of phytogenic solutions.

7. Conclusion

The liver is a strategic target for modern poultry nutrition. Phytogenics can support liver function, but their efficacy depends on the presence of measurable active compounds. In the case of artichoke extract, standardization for chlorogenic compounds makes it possible to move from nutrition based on generic plant extracts to nutrition based on functional molecules.

Bibliography

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