



## The use of inositol for poultry

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Myo-inositol (cis-1,2,3,5-trans-4,6-cyclohexanehexol, vitamin B<sub>8</sub>) contained in a phytic acid of plant feeds plays an important role in metabolism. Monogastric animals poorly assimilate inositol phosphorus from phytic acid, so their diets are usually supplemented with enzyme phytase, which breaks down phytic acid into myo-inositol, inositol phosphates, and inorganic phosphate.

Myo-inositol is involved to maintaining of the intracellular calcium level, regulation of insulin receptor activity, takes part in the catabolism of triacylglycerols, lowering blood cholesterol levels, modulating the activity of neurotransmitters. The metabolite of myo-inositol, inositol triphosphate, regulate the synthesis of some hormones such as thyroid-stimulating hormone, follicle-stimulating hormone, insulin, and elevate production of cytokines TNF- $\alpha$  and interleukin-6. In addition, inositol is an important component of cell membranes as a structural lipid. In the absence of inositol, inflammation of the intestinal mucosa, apoptosis and inhibition of cell proliferation, decreased antioxidant capacity are observed. Myo-inositol is important for lipid metabolism, bone formation, reproductive function, skeletal muscle contraction, and nervous system function. Inositols are polyols that act as modulators of oxidative metabolism, helping to decrease the oxidative stress. Inositol stimulates IGF/Akt/mTOR signaling pathway in the myocytes. Since this signaling pathway are responsible for protein synthesis and increased glucose absorption in the tissues, it may be possible to use inositol to improve the growth of animals. Supplementation of chicken diet with inositol increases feed intake, daily weight gain, gain-feed ratio, DM intake and digestibility; elevate concentration of total protein and calcium, and alkaline phosphatase activity in the blood. An important aspect is the effect of inositol on the nervous system. Chickens that receive inositol are less susceptibility to stress.

Despite the rather extensive information on the metabolism, biochemical and physiological effects of inositol in general, information on the results of its use in poultry remains insufficiently studied. In particular, the effects of inositol on the metabolism and productivity of chickens depend on age, physiological condition, type of productivity, composition of the diet.

Phytase is used in the diet of chickens currently; it is added to the feed in the amount of 500 units per kilogram of dry matter. The content of inositol is not normalized yet. However, there is a significant amount of scientific information on the effectiveness of inositol supplements and the positive effect of increasing the amount of phytase additives in poultry diet.

Up to 75% of the inositol necessary for bird is formed from glucose in many tissues and organs, for example, in the heart, liver, and kidneys, however, the introduction of additional amounts into the diet improves the metabolism and promotes higher productivity. There is information on the addition to the diet of chickens myo-inositol in the amount of 0.1 to 7% of dry matter of feed. The optimal amount is about 1%. The positive effect is achieved by increasing the amount of phytase in a fairly significant range. Thus, many experiments have shown that increasing the content of phytase in feed to 5–15 thousand units per kilogram of dry matter has a positive effect on the physiological state and productivity of chickens. This effect is caused by inositol, because the addition of excess phosphorus to the diet does not have such effect.

**Key words:** poultry, inositol, phytase, metabolism, production