

Nitrite Content of Mixed Fodder Used in Laying Hens' Feeding in Different Systems of Production (Conventional and Organic)

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Abstract. Animal ration contain nitrite that is naturally in vegetable feeds or less commonly, which has been added as a preservative e.g in the production of silage. Additionally, water can be an important source of nitrite via the reduction of nitrate (2).

Environmentally, the most significant source of nitrate and the cause for much of the higher levels noted in forages and groundwater is from the nitrogen in animal manure and fertilizer (2).

Based on a large amount of data, the nitrate content of organic and conventional mixed fodder has been compared. On average, the nitrate content of conventional mixed fodder was higher than organic mixed fodder. The method for the determination of nitrite (using spectrophotocolorimetry) was performed in compliance with the rules in force in Romania and standards harmonized with EU legislation (3).

Statistical analysis revealed significant differences ($p \leq 0.001$) between the mean values calculated for mixed fodder samples derived from conventional system compared with the ecological ones for nitrite.

The results show that the nitrite values expressed in mg/kg (ppm) are below the maximum limits allowed by the legislation in force (4). Studied nitrite concentrations have different values varying by area and type of farm.

Keywords: nitrite, mixed fodder, organic, conventional, laying hens

Introduction. Nitrite is formed naturally by the nitrogen cycle during the process of nitrogen fixation. It is subsequently converted to nitrate, a major nutrient assimilated by plants. Animal feed can contain nitrite from its natural plant constituents (generally very low levels), from microbial action in moist feeds/stored plant materials (EFSA, 2009). The nitrate present in the feed may be converted to nitrites by the microbial action that causes heating. Nitrites in a feed are ten times more toxic than nitrates (Barry, 1991).

Aims and Objectives. The aim of this study was to identify the nitrite content and the comparative analysis of nitrite content (NO_2^-) determined for samples of mixed fodder collected from two units from Romania with different systems in hens' egg production (conventional and organic), activity which ensure the safety and the innocuity of mixed fodder.

Materials and Methods. Were taken 10 samples of mixed fodder from these two units. The working techniques (harvesting, training and preparation of laboratory samples) and the method for the determination of nitrite (using spectrophotocolorimetry) were performed in compliance with the rules in force in Romania and standards harmonized with EU legislation (SR 13175:1993).

Results and Discussions. Statistical analysis revealed significant differences ($p \leq 0.001$) between the mean values calculated for mixed fodder samples derived from conventional system (7.60 ± 0.43) compared with the ecological ones (5.44 ± 0.61) for nitrite.

The results show that the nitrite values expressed in mg/kg (ppm) are below to the maximum limits (maximum content in 15 mg/kg (ppm) relative to a feed with a moisture content of 12% allowed by the legislation in force (European Commission Regulation No 574, 2011). Studied nitrite concentrations have different values varying by area and type of farm.

Conclusion. The obtained results are a quantitative database and relevant for a certain period and important for the area from which samples were taken. They can be used to support some recommendations and measures to protect the animal health and the production. It is recommended to continue monitoring the area and the fodders obtained to keep under control the accumulation of heavy metals by applying the necessary measures.

REFERENCES

1. Barry, Yaremicio (1991). Nitrate Poisoning and Feeding. Nitrate Feeds to Livestock. Agri-Facts, Agdex 400/60-1.
2. ***EFSA (2009). Nitrite as undesirable substance in animal feed- scientific opinion of the panel on contaminants in the food chain. European Food Safety Authority. EFSA J. 1017, 1-47.
3. ***European Commission Regulation No 574, (2011), Maximum content in mg/kg (ppm) relative to a feed with a moisture content of 12%.
4. ***SR 13175:1993 Fodder. Determination of nitrite and nitrate.