

Recommendations for Vitamin B2 supplements in organic slow-growing broilers

Problem

In organic poultry farming, feed supplements, such as vitamin B2 (riboflavin) should be GMO-free. A supply shortage of GMO-free riboflavin in the past made a new product appear on the market (EcoVit R), which is more expensive than previous products.

Solution

An update of the requirements and recommendations for riboflavin in organic slow-growing broilers is needed to explore the potential of reducing the amount of riboflavin, thus reducing feed costs while ensuring animal health and welfare.

Outcome

Four different controlled feeding trials (Table 1) using two riboflavin products at different concentrations showed that 1) the newly available riboflavin product EcoVit R is equally suitable as the conventional one (Cuxavit); and 2) slow-growing broilers need less riboflavin than the currently recommended amounts for conventional broilers (Blum et al., 2015).

Applicability box

Input used

- | | |
|--------------------------------------|--|
| <input type="checkbox"/> Copper | <input type="checkbox"/> Anthelmintics |
| <input type="checkbox"/> Mineral oil | <input type="checkbox"/> Antibiotics |
| <input type="checkbox"/> Fertilisers | <input checked="" type="checkbox"/> Vitamins |

Geographical coverage

Europe

Application time

Any time of the year

Animal species / category

Fattening broilers (chicken)

Period of impact

Whole life cycle period

Application point

Production of premixes and chicken feed

Target

Feed safety; animal welfare and health

Practical recommendations

- Feed supplementation with 4.0 mg Vit B2/kg feed is safe for slow-growing fattening broilers.
- Too low riboflavin concentrations (only relying on native riboflavin content of feed components or addition of only 3.5 mg Vit B2/kg feed) should be avoided as may result in slightly lower performances and deficiency symptoms.
- An adequate supply of vitamin B2 is critical in the first phase of life.
- Phase-feeding results in more efficient riboflavin utilisation. A three-phase supplementation of 3.1; 2.3; 1.9 mg Vit B2/kg feed also generated good overall performance, feed conversion and efficiency.
- The alternative riboflavin product EcoVit R, produced by Agrano GmbH through a fermentation process, can be used as a GMO-free alternative for organic feed production given that it is equally suitable as the conventional Cuxavit B2.

Table 1: Overview of the feeding trials carried out with slow-growing broilers to determine the riboflavin requirement.

Trial	Animals/Genotype	Vit. B2 supplementation	Product	Results
Lambertz et al. 2020	1600 animals (two runs)/Ranger Gold™	N-C: Native B2 content, no supplementation P-C: 9.6 (Start) and 8.0 (Finish) mg Cuxavit B2/kg feed A-low: 3.5 (Start) and 3.5 (Finish) mg EcoVit R/kg feed A-high: 9.6 (Start) and 8.0 (Finish) mg EcoVit R/kg feed	¹ Cuxavit B2 vs. ² EcoVit R Powder	1. Both riboflavin sources suitable 2. Higher final body weight and average daily gain for "A-high" and "P-C"
Lambertz et al. 2021a	800 animals/ Ranger Gold™	Native: no supplementation Low: 1.55-1.90 mg/kg Medium: 3.60-4.30 mg/kg High: 5.80-7.10 mg/kg	EcoVit R	Second week only: symptoms of riboflavin deficiency for treatment "Native"
Lambertz et al. 2021b	800 animals/ Ranger Gold™	Three-phase feeding, different combinations of low and medium concentrations (see trial a)	EcoVit R	No deficiency symptoms, one combination proved to be most suitable
FiBL trial (not published yet)	40 animals/Hubbard JA 757	2.5 vs. 4 mg/kg feed	EcoVit R	Reduced growth performance with 2.5 mg



Pictures 1-3: Organic broilers (Photos: Florian Leiber & Nele Quander-Stoll, FiBL)

On-farm application

System approach

Providing animals with vitamins according to their needs is essential for their well-being and health. However, supplementing not more than the optimal level of vitamins is in line with the organic principles, aiming at using only the necessary minimum to be as independent as possible from external inputs.

Evaluation

- The recommended minimum riboflavin supplementation of 4.0 mg Vit B2/kg feed, which was determined based on the trials, should ensure sufficient riboflavin supply for the animals. Nevertheless, a slightly higher dosage in the first half of the fattening period may be beneficial.
- Regular evaluation of the animals must include constant monitoring of health and growth. Any difficulties in coordination of motion and paroxysms or morphological deviations of the animals' legs should be considered signs of riboflavin deficiency, indicating insufficient supply.

Further information

Further readings

- Blum, R. et al. (2015). Vitamins in Animal Nutrition. Available at https://fefana.org/wp-content/uploads/2017/08/2015-04-15_booklet_vitamins.pdf.
- Leiber, F. (2020). Vitamin B2 in organic poultry nutrition. Available at https://orgprints.org/id/eprint/38532/1/leiber-2020-organic_matters_Vol143-p24-25.pdf.
- Lambertz, C. et al. (2020). Effects of a riboflavin source suitable for use in organic broiler diets on performance traits and health indicators. *Animal*, 14(4), 716-724. Available at <https://www.sciencedirect.com/science/article/pii/S175173111900243X>.
- Lambertz, C. et al. (2021). Demand-oriented riboflavin supply of organic broiler using a feed material from fermentation of *Ashbya gossypii*. *Animal*, 15(1), 100003. Available at https://www.researchgate.net/publication/346978090_Demand-oriented_riboflavin_supply_of_organic_broiler_using_a_feed_material_from_fermentation_of_Ashbya_gossypii.

Weblinks

- [New European GMO-free Vitamin B2 product at the market](#)

About this practice abstract and RELACS

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RELACS: 'Replacement of Contentious Inputs in Organic Farming Systems' (RELACS) builds on results of previous research projects and takes far-advanced solutions forward. As a system approach to sustainable agriculture, organic farming aims to effectively manage ecological processes whilst lowering dependence on off-farm inputs. The RELACS partners will evaluate solutions to further reduce the use of external inputs and, if needed, develop and adopt cost-efficient and environmentally safe tools and technologies.

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