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Duddingtonia flagrans: a promising biocontrol agent for gastrointestinal nematodes

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Controlling gastrointestinal nematodes (GIN) challenges owners of small ruminants with access to pastures. Biocontrol using the nematophagous fungus Duddingtonia flagrans is expected to complement existing alternatives for controlling GIN in grazing animals in the future. Animals receive spores of D. flagrans, which pass through the gastrointestinal tract. Fungal mycelium grows out of the surviving spores, spreads through the deposited faeces and forms structures with which it traps, colonizes and destroys the GIN larvae. This leads to reduced pasture contamination with GIN larvae and lower infection of grazing animals. An experiment with lactating goats, which were naturally infected with GIN, was carried out on an organic farm. Ten animals each received either a feed additive without D. flagrans spores (control), a feed additive with D. flagrans spores at recommended sheep/cattle dosage (normal) or a feed additive with D. flagrans spores at a10 times higher concentration than the normal dosage (high). Spores were administered daily to each animal individually during three days. Faecal samples were taken from all animals on the day before and on the last day of feeding spores. For each sample, faecal egg counts were determined by a modified McMaster technique. Samples were cultured for 14 days and larvae were subsequently obtained. Biocontrol efficacy of D. flagrans was calculated for each animal individually as a percentage reduction of developed larvae after treatment compared to the number obtained before treatment. As compared to the control, in the group with the normal D. flagrans dose infective larvae were reduced by about 20%, whereas reduction was almost 70% in the high D. flagrans dose group. In the H2020 project RELACS a similar setup was carried out with artificially infected sheep, using the normal and a 10 times lower dosage of D. flagrans spores. Infective GIN larvae were reduced by over 95% in faeces of both D. flagrans groups as compared to the control. Compared to goats, lower doses were required to substantially reduce GIN larval development in faecal cultures of sheep. Funded by EU H2020 No 773431 - RELACS.

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Poster 14

Requirement recommendations for riboflavin in organic broilers

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GMO-free riboflavin is required for organic broiler diets. Currently it is produced by only one German manufacturer at high price. The recommended dosages are based on outdated studies, and current studies are rare. Due to high costs of GMO-free produced riboflavin, an accurate assessment of the requirement in poultry is of economic relevance. Furthermore, specific requirement recommendations for organic poultry do not exist. In the organic sector, slowgrowing genotypes are used and diet composition partly differs from conventional systems. Both may influence riboflavin requirements. Four trials with riboflavin supplementations between 3.3 and 9.6 mg/kg feed DM in one- to three-phase feeding were conducted to identify the essential minimum amount of riboflavin supplements. The riboflavin source used was a GMO-free yeast strain (Ashbya gossypii). Across all experiments, the lowest dosages (2.5; 3.3; 3.5 mg/kg) resulted in lower performances and partly deficiency symptoms. Supplementation of 4.5 mg/kg feed DM was found to be a safe lower threshold. It was shown that an adequate supply is particularly important in the first phase of life, as certain early performance deficits cannot be compensated subsequently. A three-phase dosage gradation of 6.37; 5.28; 4.22 mg/kg for starter, grower and finisher diets, respectively, proved to be particularly suitable for generating best performance (feed conversion and efficiency). In conclusion, a general minimal supplementation of 4.5 mg/kg feed DM (as compared to 8-10 mg/kg starter feed and 6-8 mg/kg finisher feed currently used in the EU) is recommended for slow-growing broiler chicken in organic agriculture. Phase grading can improve efficient riboflavin use. Furthermore, the use of riboflavin-rich feed components such as yeast, whey and milk powder, alfalfa meal and grass meal or silages is recommended for on-farm feed mixtures.