

## Antiparasitic effect of Enterocins and Enterocin-producing strains on the host with experimental trichinellosis

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Protective effects of enterocins and enterocin-producing strains against zoonotic *Trichinella spiralis* infection were examined as a new therapeutic strategy. The chemotherapy of trichinellosis with anthelmintics (benzimidazoles) is active only against adult worms, but not against muscle larvae. Therefore, the development of new methods for controlling this disease is important. Probiotic bacteria play an important role in reducing the pathogenicity of many parasites. Enterococci as a part of lactic acid bacteria are ubiquitous, Gram-positive, facultative anaerobic bacteria, dominating in the digestive tract, especially in animals. Several strains of enterococci produce different types of bacteriocins (Enterocins) that may be used as food preservatives, pharmaceuticals, and veterinary additives. Bacteriocins (Enterocins) are antimicrobial substances of proteinaceous character synthesized on ribosomes; they can play a major role in prevention of some systemic infection, intestinal disorder and bacterial infection. This study was focused on the antiparasitic effect of Enterocins (Enterocin M and Durancin-like ED26E/7) and their producing, probiotic strains *Enterococcus faecium* AL41=CCM8558 and *E. durans* ED26E/7) in mice infected with *Trichinella spiralis*.

The strains *E. faecium* CCM8558 and *E. durans* ED26E/7 were administered in mice per os daily at the dose of 100 µl (109 CFU/ml) and their Enterocins (Enterocin M, Durancin-like) at the dose of 50 µl with activity 51 200 AU/ml and 25 600 AU/ml). Mice were infected with 400 *T. spiralis* larvae on day 7 of treatment. During the intestinal phase of trichinellosis, numbers of adult worms from mice treated with Enterocins/Enterocin-producing strains were decreased in comparison to the numbers from infected mice without treatment. A protective effect of probiotic treatment against parasite worm burden was significant on day 11 post infection (p.i.) with the highest 55 % reducing effect of *E. faecium* CCM8558, followed by Enterocin M (47%), *E. durans* ED26E/7 (36%), and Durancin-like (17%) reduction. In the muscle phase of the infection, the highest larval count reduction was detected on day 25 p.i. by *E. faecium* CCM8558 (67%), Enterocin M (52%), *E. durans* ED26E/7 (43%), and Durancin-like (32%). The total larval reduction rate (from both 25 and 32 days p.i.) also reached interesting values of 62% by *E. faecium* CCM8558, 40% by *E. durans* ED26E/7, 30% by Enterocin M, and 24% by Durancin-like. *T. spiralis* infectivity was evaluated as the index of reproductive capacity (RCI) – ratio of the total number of larvae recovered from an animal to the number of larvae administered to it. RCI in untreated mice

reached the mean value 117.3, that was above the values found in mice treated with Enterocins/Enterocin-producing strains, which were in range of 46.1–90.7.

Our study confirmed the anti-parasitic effect of selected probiotic strains and their Enterocins participating in the worm expulsion from the gut and larval reduction. These anti-parasitic mechanisms differed by used Enterocin or its producing strain. The highest anti-*Trichinella* effect was detected in mice treated with the strain *E. faecium* CCM8558; its Enterocin M was efficient only in the intestinal phase of trichinellosis. Both enterocins (Enterocin M, Durancin-like) had a short-time significant reducing effect on muscle larvae, what was attenuated at the end of the muscle phase of the infection.

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