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Antimicrobial agents: their combined effects on total protein content of the endoparasitoid  
*Pimpla turionellae* L. (Hymenoptera: Ichneumonidae)

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**Abstract:** The effects of some antibiotics and antifungal agents in combination on the total protein content of young pupae of the hymenopterous endoparasitoid, *Pimpla turionellae* L., were investigated by rearing the larvae aseptically on chemically defined synthetic diets. These effects varied with the kinds and levels of the combination of antimicrobial agents in the diets. The combinations of antibiotics generally increased the total protein content according to their individual levels in the diets. Antifungal agent combinations caused a slight but significant increase in the total protein content. However, some tested combinations of nystatin with methyl p-hydroxybenzoate or cycloheximide significantly decreased the total protein content of the insect. The addition of an antibiotic to the diet in combination with nystatin and methyl p-hydroxybenzoate increased the total protein content. When an antifungal agent was added to the combination of penicillin and streptomycin the protein content decreased. The combinations of antimicrobial agents had an effect on the wet weight of the pupae. It was demonstrated that the total protein content of these pupae varied inversely with changes in their wet weight. It also seems as if increased protein content does not correlate with higher survivorship and life expectancy of this parasitoid.

**Key Words:** *Pimpla turionellae*, Antimicrobial agents, Total protein, Nutrition

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