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Nitrogen Fixation in Hare Gastrointestinal Tract

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Abstract : One of the main problems of nutrition of phytophagous animals is the insufficiency of protein in their forage. Usually, symbiotic microorganisms highly contribute both to carbohydrates and nitrogen compounds of the food. But it is not easy to utilize microbial biomass in the large intestine and caecum for the animals with hindgut fermentation. So that, some animals, as well hares, developed special mechanism of contribution of such biomass - obligate autocoprophagy, or reingestion. Hares have two types of feces - the hard and the soft. Hard feces are excreted at night, while hares are vigilance ("foraging period"), and the soft ones (caecotrophs) are produced and reingested in the day-time during hares "resting-period". We examine the role of microbial digestion in providing nitrogen nutrition of hare (Lepus europaeus). We determine the ability of nitrogen fixation in fornix and stomach body, small intestine, caecum and colon of hares' gastro-intestinal tract in two main period of hares activity - "resting-period" (day time) and "foraging period" (late-evening and very-early-morning). We use gas chromatography to measure levels of nitrogen fixing activity (acetylene reduction). Nitrogen fixing activity was detected in the contents of all analyzed parts of the gastrointestinal tract. Maximum values were recorded in the large intestine. Also daily dynamics of the process was detected. Thus, during hare “resting-period” (caecotrophs formation) N2-fixing activity was significantly higher than during “foraging period”, reaching 0,3 nmol C2H4/g*h. N2-fixing activity in the gastrointestinal tract can allocate to significant contribution of nitrogen fixers to microbial digestion in hare and confirms the importance of coprophagy as a nitrogen source in lagomorphs.

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