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Effects of the Shiitake Mushroom on Ontogenesis and Reproduction of the Social Vole *Microtus socialis*

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Many research papers have been published on chemical constituents of shiitake mushroom *Lentinus edodes* (Berk.) Sing. and their biostimulating properties. Nevertheless, the data on the effects of shiitake on animal fertility and individual development are insufficient.

The purpose of this study was to explore the effect of shiitake feeding on early postnatal ontogenesis and reproduction in the social vole (9-year breeding history in vivarium). The diet of experimental animals included wheat bran supplemented with hot water extract of dry fruiting bodies of mushrooms standardized at a constant content of reducing sugars and volume dosage of 40–50 mkl/g/day.

Two types of experiments were carried out:

1. The first experiment involved studying voles during the first 15 days of lactation. There were 5 shiitake-fed groups and 6 control groups, fed with saline-supplemented bran.
2. In the second experiment, animals were fed with shiitake extracts before mating and during pregnancy (total duration, 2 months); there were 12 experimental groups and 10 control groups. Births of pups were observed after day 32.7 ± 2.85 0 (lim 212–53).

In both types of experiment it was shown that:

- Vitality of vole pups was high—97.1%—in both experimental and control groups.
- Shiitake feeding facilitated the development of the major exterior morphological signs in the pups: ear formation, cutting of teeth, divergence of fingers on extremities, and opening of eyes ($p < 0.01$; 0.001).
- Sexual maturity of young voles in the case of mushroom feeding outstrips that of the controls. The male's testes, as measured by means of the *La-p* index, distance between anal and sex openings, from age 10–50 days developed earlier in comparison to control animals. For example, on day 50 it is 14.3 mm in experimental males and 12.3 mm in controls ($p < 0.05$). The first vagina opening is found earlier in experimental females (correspondingly 16.3 ± 0.67 and 19.44 ± 0.94; $p < 0.05$).

In the experiments with the animals during the period of mating and pregnancy it was shown that:

- The body mass of pups obtained from shiitake-fed animals during pregnancy was higher in comparison with control animals ($p < 0.01$).
- The fertility of experimental females increased 1.7 times in comparison with the control group: 1 litter per reproducing female in experimental groups and 0.6 in controls. The number of pups in a litter increased: 4.6 and 3.7 respectively, but these differences were not statistically significant.

Our data demonstrate that dietary shiitake mushrooms have significant effects on reproduction and early postnatal ontogenesis of the social voles.

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