

## **Effect of row garlic extract on common external parasites, *Ichthyophthirius multifiliis*, *Gyrodactylus* spp. and *Dactylogyrus* spp. on goldfish, *Carassius auratus***

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*Ichthyophthirius multifiliis* (a ciliate), *Gyrodactylus* spp. and *Dactylogyrus* spp. are common, external, harmful parasites of goldfish, *Carassius auratus*. Bath treatments with different chemicals that could be harmful to the environment as well as to the fish are used by Sri Lankan farmers to control these parasites. The present study was planned to investigate the efficacy of row garlic (*Allium sativum*) extract in controlling *I. multifiliis*, *Gyrodactylus* spp. and *Dactylogyrus* spp. on goldfish.

In vitro test was carried out with different concentrations of row garlic extract to find out the effective minimum concentration required to kill *I. multifiliis*; toxicity of the extract on healthy goldfish was tested at a range of concentrations closer to this effective minimum concentration. In vivo test was performed at different concentrations of garlic extract and random samples of fish were observed for the presence of parasites two times a day. Anti-parasitic efficacy of the plant extract on *I. multifiliis* and both flukes were calculated.

The effective minimum concentration of row garlic extract to kill *I. multifiliis* in vitro experiment was 250 mg l<sup>-1</sup> at exposure time of 3.5 hours. In vivo experiment revealed that garlic extract at concentration of 260 mg l<sup>-1</sup> and 270 mg l<sup>-1</sup> could kill/ remove all *I. multifiliis* and both monogenean flukes respectively from the body and gills of goldfish in 3 days of exposure at 24<sup>o</sup>C-27<sup>o</sup>C; antiparasitic efficacy (1.571±0.00) recorded for garlic extract at the respective concentrations on *I. multifiliis* and monogenean flukes were not significantly different (P>0.05) from the antiparasitic efficacy recorded for formalin at 200 mg l<sup>-1</sup> at 4 hours of exposure time, which was the positive control. Histopathology revealed that the effect of formalin treatment on gill tissues of treated fish was greater compared to the effect of treatment with garlic extract.