

Table of Contents

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VETMED (63) 2018

VETMED (62) 2017

VETMED (61) 2016

VETMED (60) 2015

Issue No. 1 (1-61)

Issue No. 2 (63-119)

Issue No. 3 (121-173)

Issue No. 4 (175-226)

Issue No. 5 (227-291)

Issue No. 6 (293-344)

Issue No. 7 (345-402)

Issue No. 8 (403-467)

Issue No. 9 (469-531)

Issue No. 10 (533-587)

Issue No. 11 (589-661)

Issue No. 12 (663-711)

VETMED (59) 2014

VETMED (58) 2013

VETMED (57) 2012

VETMED (56) 2011

VETMED (55) 2010

VETMED (54) 2009

VETMED (53) 2008

VETMED (52) 2007

VETMED (51) 2006

VETMED (50) 2005

VETMED (49) 2004

VETMED (48) 2003

VETMED (47) 2002

VETMED (46) 2001

Editorial Board

Ethical Standards

Reviewers 2017

For Authors

Author Declaration

Instructions for Authors

Submission Templates

Authors' Guide

Fees

Login – submissions till 2017

Submission / Login 2018

## Effects of a cypermethrin-based pesticide on early life stages of common carp (*Cyprinus carpio* L.)

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The aim of this study was to assess the effects of Cyperkill 25 EC (a.i. cypermethrin 250 g/l) on cumulative mortality, growth indices, and ontogenetic development of embryos and larvae of common carp (*Cyprinus carpio* L.). An early-life stage toxicity test was used. Liver, intestine, kidneys, and gills of surviving larvae were examined, and the activity of the detoxifying and antioxidative enzymes glutathione reductase (GR), glutathione peroxidase (GPx), catalase (CAT), glutathione-S-transferase (GST), as well as lipid peroxidation (TBARS) was determined. Eggs of common carp 24 h post-fertilisation were exposed for 35 days to Cyperkill 25 EC at concentrations of 7.2, 36, 72, 144, and 360 µg/l containing the active ingredient cypermethrin at concentrations of 1.8, 9, 18, 36, and 90 µg/l, respectively. All larvae exposed to concentrations higher than 144 µg/l showed signs of damage after five days and died in the next two days; at concentrations of 72 and 36 µg/l total mortality was observed several days after hatching. Larvae exposed to 7.2 µg/l survived to the end of the test but showed significantly lower growth ( $P < 0.01$ ) and retarded ontogenetic development compared to controls. Examination of these larvae did not reveal histological changes. Activity of GST, GR, and GPx in the exposed group was significantly lower ( $P < 0.01$ ), while CAT and TBARS did not show significant differences from controls. Exposure to Cyperkill 25 EC affected hatching and survival at tested concentrations above 7.2 µg/l. Alterations in oxidative stress parameters and retarded growth and ontogenetic development were evident at 7.2 µg/l.

### Keywords:

embryo-larva toxicity test; Cyperkill 25 EC; oxidative stress; pyrethroid; mortality; ontogenesis

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