

Melatonin Rescue Fungicide Induced Behavioral and Reproductive Abnormalities through Changes of Dopaminergic Activity in the Brain of Catfish, *Mystus cavasius*

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Abstract : Propiconazole is a triazole fungicide extensively used in agriculture which can harm to non-target organisms in aquatic environment through runoff. Chronic exposure to environmental pesticides turn to behavioral impairment in vertebrates including teleosts. However, the potential effect of this fungicide on neurobehavioral impairment and release from it in vertebrates has not been fully explored. In this work, we examined the role of melatonin to rescue fungicide induced neurobehavioral and reproductive alternation and its connection with changes in dopaminergic activity in the brain of *Mystus cavasius*. After fish were exposed to water containing propiconazole at 0, 0.1, 5, and 250 µg/L for 3 days, significant increases of DA, 3,4-dihydroxyphenylacetic acid (DOPAC; a DA metabolite), and their ratio (DOPAC/DA) were observed in whole brain at 250 µg/L concentration. When fish were treated with propiconazole at 250 µg/L for 3 days, there was a significant elevation of DA, DOPAC and DOPAC/DA in diencephalon and pituitary, and only DA in the telencephalon, compared with control fish. Besides, it induced a reduction in extracellular serotonin and had an anxiolytic-like effect, supported by a decrease in cortisol production. Increased locomotor activity, anxiety and aggressiveness, decreased gonadosomatic index with few vitellogenic oocytes in ovaries after propiconazole treatment. When fish were treated with melatonin, D1 (SCH-23390) or D2 (Haloperidol) dopamine receptor antagonists and combined of melatonin and D1/D2 receptor antagonist and was observed melatonin + D2 receptor antagonist rescued fungicide induced all behavioral changes in fish. These results indicate that propiconazole increases locomotor activity, anxiety and aggressiveness and decreases reproductive activity, which was rescued by combined treatment of melatonin and dopamine receptor antagonist.

Keywords : behavior, catfish, dopamine, fungicide, melatonin

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