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Toxicity and behavioural changes in *Tilapia mossambica* exposed to neemta 2100

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ABSTRACT

The present study was aimed to determine the lethal concentrations for neemta 2100 to fish *Tilapia mossambica* for prolonged periods. The LC_{50} values were determined as 0.007 ppm for 15 days and 0.005 ppm for 30 days. At this concentration gradual decline in opercular movement, lethargic behaviour and thick mucous secretion were observed during experiment. It is observed that neemta 2100 has toxic properties even in small amount. Active principle, *Azadirachta indica*, Pesticide

Key words: Chronic toxicity, LC_{50}, neemta 2100, *Tilapia mossambica, Azadirachta indica*.

Neem (*Azadirachta indica* A. Juss.) is an important tree from economic and biological point of view. It is well known in the country and abroad for production of biologically active compounds. Besides many medicinal uses, it has notable importance in antiseptic and diuretic functions. *Neem* based insecticides are likely to show a large increase in use in the near future. From the first commercial neem insecticide margosam-o (Jacobson[4]) registered by the EPA for non crop use in the United States in July 1985 many significant neem based pesticides have been produced and found effective world wide. Among the various azadirachtin based pesticides from the neem tree neemta 2100 is a potential pesticide.

The chronic toxicity[7] based studies of several azadirachtin based pesticides have been reported extensively[2,3,5,7,10]. There are less reports on the chronic toxicity of neemta 2100 in fishes. Thus, the present study is designed to determine the LC_{50} values of the neem based pesticide neemta 2100.

For LC_{50} determination and toxicity exposure the glass aquaria were filled with 10 litres of water. The temperature of water in aquarium was 28°C, pH was 7.1 and D.O. was 6-90. Feeding was kept continued during pesticide exposure. The LC_{50} values were determined for 48 hours. Each concentration

Table-1.

S.No.	Concentration (ppm)	Cumulative mortality (%) 15 days	Cumulative mortality (%) 30 days
1.	Control	00	00
2.	0.003ppm	10	20
3.	0.005ppm	30	50
4.	0.007ppm	50	70
5.	0.009ppm	80	90

was given to a group of six fishes. The control was maintained with each group simultaneously.

The cumulative mortality percentage of *T. mossambica* fishes exposed to different concentrations of neemta 2100 has been presented in Table-1. The percentage of mortality clearly indicates the toxicity level of neemta 2100 towards the fish. In all the conditions the fishes showed breathing trouble, lethargic behaviour and sluggish locomotion. The LC_{50} value was found as 0.007 ppm for 15 days and 0.005 ppm for 30 days.

The pesticides are causing serious hazards to the aquatic environment as the industrial effluents and agricultural wastes are disposed off to the aquatic bodies. The results show that there are behavioral changes in aquatic animals including fishes in various concentrations. The toxicity of neem extracts to *T. mossambica* was related to concentration of azadirachtin. These effects are similar to the results of Parveen *et al*.[8], Mondal *et al.*,[6] and Pathan *et al.*,[9]. They also found that the toxic effects of azadirachtin are concentration based. It has also been reported that the toxicity of neem did not increase remarkably with increase in exposure period[1]. It could be concluded that the pesticide neemta 2100 like other several neem based pesticides show deteriorating effect in fishes. Such toxicity tests are helpful in comparing the toxicity levels in various species and hence significant for knowing the tolerance level. It is also helpful in evaluating the behavior changes of the fish during chronic toxicity. The intensity of behavioral deterioration show less increase with the increase in concentration of pesticide. This indicates that irrespective of the treatment period the neemta 2100 shows similar changes in behavior.

References :

1. Anjaneyulu, G.S.V.R. and K. D. Mishra (1999). *Pollution Res. 18(4):* 391-394.
2. Das, B.K., S.C. Mukherji and G. Murjani (2002) *J. Aqua.Trop. 17(1):* 23-33.
3. Gandhi, M.R., A. Lal,, Sankaranarayanan, C.K. Banerjee and P. L. Sharma (1988).

J. Ethnopharmacol. 23: 39-51.

4. Jacobson M.ed. (1989) Focus on phytochemical pesticides volume 1: The neem tree. CRC Press, Boca Raton FL. pp. 178.
5. Mahboob, M.M., K.J. Siddiqui and K. Jamil (1998). *J. Environ. Sci. Hlth. 33:* 425-438.
6. Mondal D., S. Bharat and M.K. Mukhopalhyay (2007). *J of Env. Biol. 28(1):* 119-122.
7. Osuala, F.O.U. and V.N. Okwuosa (1993). *App. Parasitology. 34:* 63-68.
8. Parveen, M., R. Sharma and S. Kumar, (2004). *Asian J. Microl. Biot. Env. Sci. 6(4):* 567-569.
9. Pathan,T.S., D.L. Sonawane and Y.K. Khillare (2009). *Botany Res. Int. 2(4):* 263-266.
10. Wan, M.T., R.G. Watts, M.B. Isman and R. Strub (1996). *Bull. Environ. Contam. Toxicol. 56:* 432-439.