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Histochemical Alterations in the Gills of Fingerlings of Tilapia Mossambica Caused by Herbicide 'Pursuit'

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Abstract: Histochemical reaction of PAS-Test for carbohydrate accumulation on the gills of fingerlings of T. Mossambica under control and treated condition gave different responses. Rich amount of carbohydrate content was present in the gill lamellae where as gradual reduction of carbohydrate content were noticed in Pilastor and epithelia cells when 63.7 PPM Pursuit given for 15 days. When dose were continued for 30 days period much decreases of carbohydrate content was observed in different part of gills.
Keywords: Histochemical, PAS-Test, Gill, Pursuit, Toxicity, Fingerlings, Alterations.

Introduction - Any changes in water component of an ecosystem adversely affects the entire ecosystem resulting many organisms to death or extinction. The pollution of aquatic environment by pesticide adversely affect the survival of aquatic organisms including cummercially important fish species (Johnson Pesticides which have been classified in 1973). Various ways amongst which herbicides are a class which specifically targeted to destroy weed is a very familiar economical poison used in agricultural fields. However the uses of such pesticides in excess of the recommended dose. Ultimately entering the water bodies have a fatal effect on fish (Metelev et.al. 1983).

The test herbicide pursuit falls in the category of carbamate extensively used for the control of weeds in Soyabean and groundnut crops. In early investigation it was established that the developmental stages of fish viz fries and fingerlings are more susceptible to the toxicants. Early life stages are more susceptible to toxicant exposure (Richen Back, 1972; Mckim, et.al. 1977; Rozik et.al. 1983; Nakano, et.al. 1995). As they are immature adult forms in its outward appearance having undeveloped repreoductive organ and delicate organ system.

Hence an attempt was made to study the chronic histochemical alterations of pursuit induced gills of T. Mossambica fingerlings.

Material and Method : Living fingerlings of fresh water teleost Tilapia mossambica were collected from the local fish form and kept in glass aquaria for acclimatization. After determining LC50 (0.51 ml/g) fingerlings were exposed to 63.7 PPM concentration of Pursuit for 15 and 30 days respectively. The LC50 value were read to 50% survival (Duodroff, et.al. 1951).

After specific interval like 15 and 30 days specimen of aquaria were taken out and dissect the tissue - washed in saline water and fixed in 10% neutral formaline and processed for histochemical evaluation using periodic Acid Schiff's (PAS) staining for carbohydrate (Manus, 1948).

Result and Discussion : Histochemical stain viz. PAS Test gave good result for estimating the distribution and accumulation of biochemical components in the tissue. These aspects on gills are studied by few researchers only viz. Neeraja & Rao (1988), Kothari & Saxena (1989), Singh (1993), Gnathy et.al. (1994), Tilanthe (2000), Kasotiya et.al. (2004).

Gills of untreated (control) fingerlings show strong positive reaction towards PA/S Test in the cartilagenous part of gill arch and primary gill lamellae. Epithelial and acidophilic cells exhibited moderate positive reaction with PAS test (Fig.-1).

After 15 days exposure of 63.7 PPM Pursuit caused reduction in carbohydrate content of gill tissue. Weak positive reaction was observed in cartilagenous part of primary gill lamellae. Acidophilic and epithelial cells were also exhibited weak positive reaction (Neethirajan K. and Mathavam S. 2004) (Fig. 2). Long term exposure of 63.7 PPM Pursuit decrease the carbohydrate content in different part of gill when his exposure was continued for 30 days. Heavy reduction observed in the carbohydrate content in comparison to the controlled gill in which pilaster cells, blood capillaries were shown weak positive reaction, feeble reactions were noticed in primary and secondary gill lamellae (Fig. 3). These results were inconformity with the findings of Anita et.al. (1997), Mehrotra et.al. (2004); Kasotiya and Vyas (2004)

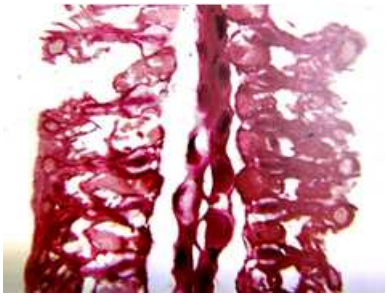

Fig.-1 - Photomicrograph of T.S. of gills of control Tilapia mossambica fingerlings stained with PA/S - Test x 400.

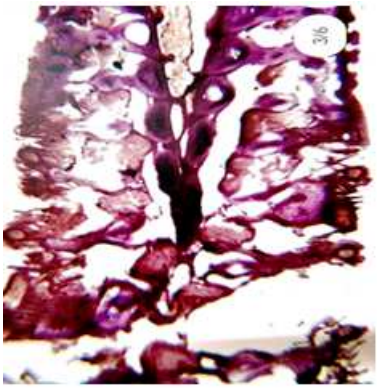

Fig.-2 - Photomicrograph of T.S. of gills of Tilapia mossambica fingerlings after 15 days exposure to 63.7 PPM Pursuit. Stained with PA/S - Test x 400.

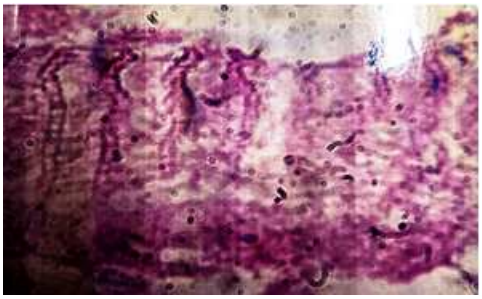

Fig.-3 - Photomicrograph of T.S. of gills of Tilapia mossambica fingerlings after 30 days exposure to 63.7 PPM Pursuit. Stained with PA/S - Test x 400.

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