Effect Of Biopesticide (Azadirachta *Indica)* On Protein and Glycogen of Fresh Water Catfish *Heteropneustes Fossilis*

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***Abstract*—The side-effect of *Azadirachta indica* (A. Juss) on certain biochemical parameters of a freshwater catfish, *Heteropneustes fossilis* was studied for a period of 24, 48, 72, and 96 hr, at sublethal concentration. During the exposure period the protein and glycogen content in the liver, muscle and intestine of treated fish showed decreasing trend.The alterations of these biochemical parameters can be effectively used as nonspecific biomarkers against plant extract toxicity stress and also help safer usage of plant extracts in aquaculture farms.**

***Index Terms*—*Azadirachta indica*, *Heteropneustes fossilis*, Sub-lethal concentrations, Liver, Muscle and intestine.**

I. INTRODUCTION

Medicinal plants are part and parcel of human society to combat diseases, form the dawn of civilization. *Azadirachta indica*, A Juss (Syn. *Melia. Azadirachta*) is well known in India and its neighbouring countries for more than 2000 years as one of the most versatile medicinal plants having a wide spectrum of biological activity. *A Indica*. *A. Juss* and *M.azedarach* are two closely related species of Meliaceae. The former is popularly known as Indian *Neem* (Margosa tree) or Indian lilac, and the letter as the Persian lilac. *Neem* is hailed as a wonder tree "kalpavriksha" means miraculous tree for its versatile use. Products made from *Neem* trees have been used in India for over two millennia for their medicinal properties. *Neem* products are trusted by Ayurvedic practitioners to be anthelmintic, antifungal, antidiabetic, antibacterial, antiviral, contraceptive and sedative. It is considered a major component in Ayurvedic and Unani medicine and is particularly prescribed for skin diseases. *Neem* oil is also used for healthy hair, to improve liver function, detoxify the blood, and balance blood sugar levels. *Neem* leaves have also been used to treat skin diseases like eczema, psoriasis, etc. However, insufficient research has been done to assess the purported benefits of *Neem*.

II. MATERIALS AND METHODS-

For the experiment fresh water catfish *Heteropneustes fossilis* were selected and divided into two groups with 10 fishes in each aquarium. Each group was exposed to sublethal concentration of the *Azadirachta indica* similar set up was also maintained as control. During sublethal studies, fish were fed by locally available marketed food. The animals were scarifies for optimal concentration of biopesticide for different exposure of 24, 48, 72 and 96 Hrs. For biochemical studies, fishes were scarified during the exposure period of 24, 48, 72 and 96 Hrs respectively. The toxicant was renewed after fixed period.

Biochemical Studies

For biochemical studies liver, muscle and intestine were dissected out, washed in chilled fish saline, blotted, weighted and homogenized in pestle and mortar. Homogenization was performed in different media as per the requirement of the techniques involved. Protein estimation was done according to the method of Lowry *et al.* (1951). Estimation of glycogen was estimated by by procedure of Montgomery (1957).

Statistical analysis

Data for the different parameters were expressed as mean (±SE). Multivariate linear regression models were used to assess the differences in the different parameters in either control or test groups. The observed results between different groups were compared using the Analysis of Variance (ANOVA).

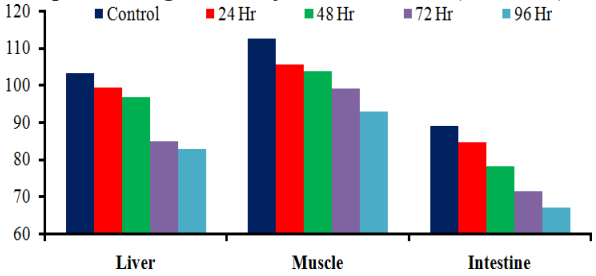

Fig.1. Effect of *Azadirachta indica* on tissues Protein of *H. fossilis*

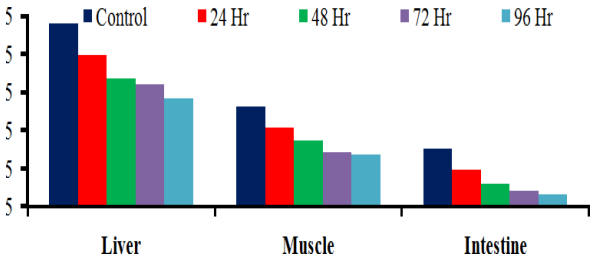

Fig.2. Effect of *Azadirachta indica* on tissue Glycogen of *H. fossilis*

III. DISCUSSION

In the present investigation, during treatment significant behavioural changes like increase in opercular movement, mucous secretion, erratic movement etc., were noticed. Tiwari and Singh (2003) also noticed similar behavioural changes in *Channa punctatus* exposed to *Nerium indicum* leaf extract.

In the present study the decrease of glycogen in liver, muscle and intestine may be due to direct utilization of energy generation, a demand caused by aqueous extract induced hypoxia. The depletion of protein fraction in liver, muscle and intestine might have been due to their degradation and possible utilization for metabolic purposes. During chronic period of stress, proteins act as a source of energy. Bradbury *et al.* (1987) pointed out that the decreased protein content might also be attributed to the destruction or necrosis of cells and consequent impairment in protein synthesis machinery. Tiwari and Singh (2006) reported that the decreases in protein level in the liver and muscle of fish exposed to neem extract might have resulted from high protein hydrolytic activity due to elevation of protease enzyme activity in both the tissues. In the present study the depletion of protein level in liver, muscle and intestine tissues during sublethal treatment might have resulted from their degradation and possible utilization of degraded products for metabolic purpose

IV. CONCLUSION

The present study indicates that *A. indica* has caused significant alterations in protein and glycogen content of liver, muscle and intestine of fish *Heteropneustes fossilis.* So finally, it is doubtless that *Azadirachta indica* that is Neem is very beneficial plant because its products are believed to have several medicinal values. The Neem is one of the best pesticides which shows very less hazards to environment. But the present study on *Heteropneustes fossilis* and previous research made on the aquatic organisms especially fresh water fishes proved the hazardous effects of *Azadirachta indica* on stress management, behaviour, survival along with biochemistry, enzymology, structural and reproductive biology. So, in future there is need of more research to assess the purported benefits of Neem which is a *Kalpavriksha* for all the mankind.

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REFERENCES

[1] O. Agbon and I. Omoniyi, “Acute toxicity of tobacco (Nicotiana tabacum) leaf dust on Oreochromis niloticus and haematological changes resulting from sublethal exposure,” Journal of Aquatic Sciences, vol. 17, no. 1, pp. 3–8, 2002.

[2] American Public Health Association (APHA), Standard Methods for the Examination of Water and Wastewater, Washington, DC, USA, 1998.

[3] K. Biswas, I. Chattopadhyay, R. K. Banerjee, and P. C. Bandyopadhyay, “Biological activities and

medicinal properties of neem (Azadirachta indica)," Current Science, vol. 82, pp. 1336–1345, 2002.

[4] B. K. Das, S. C. Mukherjee, and O. Murjani, "Acute toxicity of neem (Azadirachta indica) in Indian major carps," Journal of Aquaculture in the Tropics, vol. 17, pp. 23–33, 1999.

[5] U. U. Gabriel and A. D. George, "Plasma enzymes in Clarias gariepinus exposed to chronic levels of Roundup (glyphosate)," Environment and Ecology, vol. 23, no. 2, pp. 271–276, 2005.

[6] U. U. Gabriel and S. O. Kparobo, "Acute toxicity of cypermethrin to African catfish (Clarias gariepinus)," Journal of Aquatic Sciences, 2003.

[7] T. K. Ghosh, "Effect of dimethoate on tissue glycogen content of some freshwater fish," Environment and Ecology, vol. 4, pp. 554–557, 1986.

[8] A. Gupta, V. Rai, and S. Agrawal, "Effect of starvation on total protein and free amino acid in some organs of the fish Channa punctatus," Geobios, vol. 14, pp. 108–110, 1987.

[9] R. James and K. Sampath, "Sublethal effects of mixtures of copper and ammonia on selected biochemical and physiological parameters in the catfish Heteropneustes fossilis," Bulletin of Environmental Contamination and Toxicology, vol. 52, no. 2, pp. 187–194, 1995.

[10] A. Kajare, S. Singh, and K. Shrivastava, "Malathion induced biochemical changes in the kidney of freshwater fish Clarias batrachus," Journal of Ecotoxicology and Environmental Monitoring, vol. 10, pp. 11–14, 2000.

[11] E. A. Khan, M. P. Sinha, N. Saxena, and P. N. Mehrotra, "Biochemical effect of cadmium toxicity on hill stream teleost Garra mullya during egg maturation: Cholesterol and glycogen," Pollution Research, vol. 11, no. 3, pp. 163–167, 1992.

[12] A. Khare and S. Singh, "Impact of malathion on protein content in the freshwater fish Clarias batrachus," Journal of Ecotoxicology and Environmental Monitoring, vol. 12, no. 2, pp. 129–132, 2002.