

CAPTAN – INDUCED CHANGES IN BIOCHEMICAL PARAMETERS OF EXPERIMENTAL FISH (*OREOCHROMIS MOSSAMBICUS*) AND ITS NEUTRALIZATION BY *PANICUM SUMATRENSE* (LITTLE MILLET)

A.Vedapuri. and N. Jothi Narendiran

P.G & Research Department of Advanced Zoology and Biotechnology, Government Arts College for Men (Autonomous), Nandanam, Chennai 600 035. India

Abstract

The general name pesticides classified in many types such as insecticide, herbicide, fungicide and ect.... Now present research studies Pesticide particularly Captan fungicide can enter non – target effects on the fresh water fish *Oreochromis mossambicus*. Now the present research study seems the important of sub lethal concentration level by captan fungicide 0.5, 1.0, 1.5, 2.0.mg/l (stock solutions of 10,000 mg/l each by dissolving 1 gm of the testing captan fungicide in 100 ml of distilled water) and the concentration level of protein and glucose. The present research study was two tissues taken such as liver and gills of fresh water fish *Oreochromis mossambicus*. Now the test results decreased in the both glucose, protein level was observed at the time of Captan fungicide induced in both tissues liver and gill. But there was observed millet induced interval time of Captan fungicide pre treated, protein and glucose level significantly increased compare both control and Captan fungicide induced intervals.

Fishes were randomly divided IX groups, each groups are present 12 fishes. First group were control, II-V group were Captan fungicide pre treated, VI-IX group were *Panicum sumatrense* millet treated (after pre treated of Captan fungicide). II-V group's fishes were treated and pre treated with captan fungicide LC50 level. Preparation of *Panicum sumatrense* were cleaned deionizer water, sundry at 37-40°C for optimum period and semi powdered with help of grinder. The *Panicum sumatrense* little millet 500 gm was choked with water 1500 ml/15 minutes using rice cooker apparatus and cook for 30 minutes at temperature not exceeding millet boiling point of solvents. The millet was filtered, filtered extract solvent and filtered millet was evaporated under reduced presser to max percentage yield from *Panicum sumatrense* with mixed fish food (1:1). fish food 10 mg supply for each 100 gm fishes two times per day for 24 - 96 hrs. The little millet protected against pesticide toxin induced biochemical analysis. The protein and glucose were significant decreased at the time of Captan fungicide pre treated. Next the protein and glucose were significant increased at the time of *Panicum sumatrense* little millet treat, Captan fungicide induced Values ($p < 0.01$). *PanicumSumatrense* induced Values ($p > 0.01$) increased and neutralized harmful effects of captan fungicide.

Key words: *Oreochromis mossambicus*, Captan fungicide, *Panicum sumatrense*, protein, glucose, sub lethal concentration (LC50).

INTRODUCTION:

The environmental pollution such as particularly water pollution made by pesticide in the effect and undesirable changes in our surrounding that have harmful effect on plants and mammals (Farid Sabra *et al*, 2015). Pesticides first became widely used in the beginning of the 20th century with the development of intensive agriculture. By the early 20th century, pesticides were primarily used. These included botanical and natural chemicals derived from plant material and inorganic salts which were widely used as fungicide. Now a days the increasing world population demands to increasing supply of food. So it is imperative to intensify agricultural production. Pesticide and fertilizers play a central role in agriculture and contribute to enhance food production worldwide. Since the 1940s, the use of pesticides has increase data rate of 11% annual, reaching 5Mt in 1995. Globally, about 2.5Mt of pesticide are applied yearly to control pest organisms (Souvanny Phommakone, 2004; Rainboth).

Chemical pesticides are well recognized as an economic approach to control pests. (Anees, 1975) so Pesticides are applied on agricultural land, up to 90% of this never reaches the intended targets (Sparling, *et al*, 2001). Most of pesticides find their way into rivers, lakes and pond, and have been found to be highly toxic not only to fishes but also to the organisms which contribute to the food chain of fishes (Anees, 1975). At the same time such chemicals are highly toxic to other species in the environment. (Anees, 1975). Many pesticides have been reported to produce a number of biochemical changes in fish at lethal and sub-lethal levels. The biochemical changes induced by toxicant stress may lead to disturbances in the metabolism. Alteration

in carbohydrate metabolism is prone to have deleterious effect on the survival of the animal (Latner, 1975); Harper, 1985). As organophosphate pesticide, it causes irreversible inhibition of the cholinesterase enzymes (Haddad and Winchester, 1983).

Effects of Captan fungicide on human health and the environment depend on how much captan is present of exposure. Effects also depend on the health of a person. But captan is highly toxic to fish (Krieger, *et al*, 1993)

Neem leaf extract, Millets extract, are using one of the ways of treatment to toxic affected birds, mammals and fishes (Mona hamed *et al* 2008, Mamodouh.A 2008) (DW.Gakuya *et al* (2011). And all the millets are also rich sources of phytochemicals and micronutrients,(Mal *et al.*, 2010). It high in quality protein, contains high fibred, B-complex vitamins and also the vitamins A and E (Devi *et al.*, 2014).It is non-glutinous and non- acid forming, smoothing and easy to digest. It is considered to be one of the least allergenic grains. The millets *Eleusine coracana* (Finger Millet), *Barnyard millet* (*Barnyard Millet*), *Foxtail millet* (*Foxtail Millet*), were different level high nutritional value, toxic level neutralized. But millets sealing low cost, time delay of production, croup heal during time long, farmers unlike of production. Therefore, millet and pesticides particularly Captan fungicide was selected to study its toxic neutralizing and toxic effects on biochemical changes in liver and gill, of fresh water fish *Oreochromis mossambicus*

MATERIALS AND METHOD:

❖ Collection of captan fungicide and *Panicum sumatrense* little millet:

Captan fungicide was collected from local Agro fertilizer shop of Hariharan& co No, 98-B, Kamarajar Street Kancheepuram – Tamilnadu. The collected sample fungicide was preserved in dark and dry place at optimum temperature, passive ventilation prior to extraction. *Panicum Sumatrense* (little millet) was collect from local market at Kancheepuram – Tamilnadu. The collected sample where sundry and preserved in dark and dry place at optimum temperature and protect against rat and insects etc.

❖ Collection of Experimental animal:

Oreochromis mossambicus fresh water fish commonly as tilapia (Tamil name – Jilaphy) and it's widely distributed in the freshwater of India. (Total average size 10 - 12 cm and average weight 100 – 150 g), it was brought from the Kolavai lack located at Chengalpattu, 56 km away from the Government arts college Nanthanam Chennai -35. Where Acclimatized in laboratory condition further experimental study protocol by (APHA, 1989 and 2012).

❖ Preparation of *Panicum sumatrense* extract:

Preparation of *Panicum sumatrense* were cleaned deionizer water, sundry at 37-40°C for optimum period and semi powdered with help of grinder. The *Panicum sumatrense* little millet (500 gm) was choked with water (1500 ml) using rice cooker apparatus and cook for 30 minutes at temperature not exceeding millet boiling point of solvents. The millet was filtered, filtered extract solvent and filtered millet was evaporated under reduced presser to max percentage yield from *Panicum sumatrense* with mixed fish food (1:1). Now the stock fish feed was ready for use experimental work.

❖ Preparation of stock solution of captan fungicide:

Stock solution captan fungicide 10000 mg/l was prepared by dissolving 1 gm/l of the captan fungicide test substance in 100 ml of distilled water. Now the captan fungicide stock solution was ready for use experimental work.

PROCEDURE OF TEST METHOD:

Live animal of adult *Oreochromis mossambicus* fresh water fish (both sex, body weight 100 – 150 g, length 10 - 12 cm,) it was brought from the Kolavai lack located at Chengalpattu, 56 km away from the Government arts college Nanthanam Chennai -35. Without the least disturbance and transported in polythene bags using filled oxygen half with water half. About 12 fish's were put in each bag and fresh water was well aerated, using pressurized air from an oxygen cylinder. This method mode of long transit proved successful, since there was no mortality of fish *Oreochromis mossambicus* in all consignments throughout the course of this study. (APHA, 1989). Fishes was dividing randomly divide IX groups each groups are present 12 fishes. First group were control, II-V groups were captan fungicide pre treated doses of captan fungicide sub lethal concentration 0.5, 1.0, 1.5, 2.0.mg/l (10000mg/l)for 24,48,72,96 hrs induced, VI-IX groups were millet treated semi powder extract of *Panicum sumatrense* with fish food has mixed(1:1) feed 10g per day 2 times for 24,48,72,96 hrs. II-V and VI-IX each groups were 4 days static renevol, toxicity test performed to determine the LC 50 value of captan fungicide and *Panicum sumatrense* (little millet)



First group – control,

II-V groups – containing six fishes were subjected to captan fungicide sub lethal concentration of 0.50, 1.00, 1.50, 2.00 mg/l. (dilution factor 10000mg/L) for 24, and 48, 72 and 96 hrs

VI-IX groups - fishes was treated *Panicum sumatrense* extract after pre treated fungicide. Feed the millet extract mixing fish food 10g two times each per days different exposure interval (24, 48, 72 and 96 hrs). Fish biochemical changes observed.

Daily routinely water, oxygen, captan fungicide extract and millet extract newly supplied previous day preparation of water and fish excretion are removed. Biochemical changes protein, glucose of the fish subjected, calculate by the LC50.

RESULT AND DISCUSSION:

Table: I. Captan fungicide induced oreochromismossanbicus of Gills tissue and treated with *PanicumSumatrense*.

Time	Control glucose	Captan treated glucose	Millet treated glucose	Control protein	Captan treated protein	Millet treated protein
24hr	64.54±5.21	52.4±2.2	64.2±2.98	98.2±1.0	92.4±2.2	100.2±1.1
48hr	64.50±4.25	48.1±1.0	64.5±4.01	100.0±0.2	88.1±1.0	106.4±1.2
72hr	64.66±4.86	44.2±0.1	68.24±1.02	100.2±0.4	84.2±0.1	108.2±2.1
96hr	64.83±2.84	38.4±4.1	70.15±4.11	102.4±1.2	78.4±4.1	112.15±4.75

Captan fungicide induced Values are mean ± SD of six replicates Gill p < 0.01. *PanicumSumatrense* induced Values are mean ± SD of six replicates Gill p > 0.01

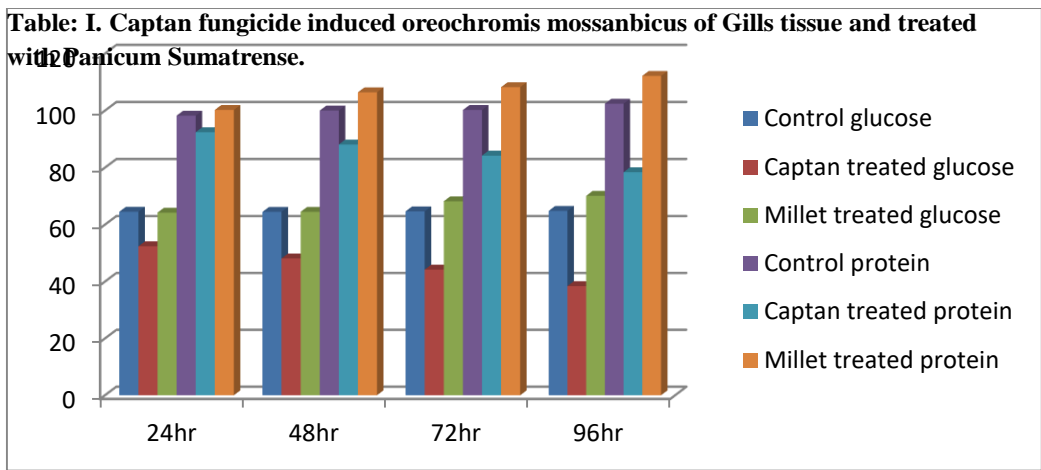
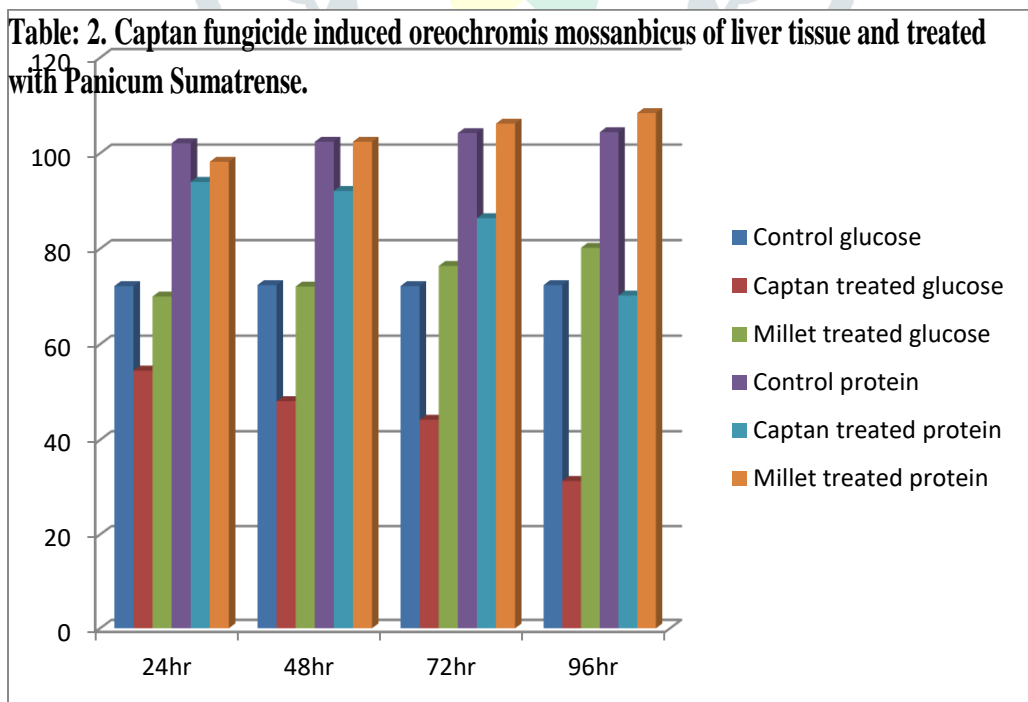


Table: 2. Captan fungicide induced oreochromis mossambicus of liver tissue and treated with Panicum Sumatrense.

Time	Control glucose	Captan treated glucose	Millet treated glucose	Control protein	Captan treated protein	Millet treated protein
24hr	72.2±1.0	54.50±2.8	70.0±0.12	102.1±2.8	94.0±0.12	98.2±1.0
48hr	72.4±0.1	48.10±2.	72.1±0.10	102.4±2.1	92.1±0.10	102.4±0.1
72hr	72.2±0.0	44.21±0.1	76.4±1.2	104.2±0.1	86.4±1.2	106.2±0.0
96hr	72.4±1.2	31.4±2.4	80.2±2.2	104.4±2.4	70.2±2.2	108.4±1.2

Captan fungicide induced Values are mean ± SD of six replicates Gill $p < 0.01$. *Panicum Sumatrense* induced Values are mean ± SD of six replicates Gill $p > 0.01$



Significant when student's t test was applied between control and experimental groups.

DISCUSSION:

The medicinal value of *Panicum sumatrense* (little millet) chemical, micro and macro nutritional level and other substances that produce physiological effect on the human anatomy organs, this millet most important of bioactive constituent of plant where alcoholated phenolic compound and flavonoids. In the present study we are focused on two different type assay that are protein and glucose using extract from there carried out *Panicum sumatrense* and the captan fungicide toxicity affected fresh water fish *Oreochromis mossambicus* toxicity value LC50 organic phosphate is less than other reported fresh water fish species.

Now we are conclusion, final result indicate the captan exposure to the fish caused toxic effect further proceeding such fish (having accumulated captan in their body) may affect human being internal organ metabolism after consuming the fish as food. But we take food *Panicum sumatrense* (Little millet) seed per day minimum 100mg to 500 mg, or weekly 500mg to 1000 mg, definitely neutralized captan fungicide toxin and other more pesticide toxin effects etc.,

Acknowledgment:

I am very much thankful to the principal and Head of the department, P.G & Research Department of Advance Zoology and Biotechnology, Government Arts College for Men (Autonomous), Nandanam, Chennai 600 035,

My special thanks to Dr.K. Elumalai M. Sc., M. Phil., Ph. D., Assistant Professor For providing 24 hrs UGC research laboratory using facility

Mr.G.Vinayagamoorthi. GV Institute of paramedical science and technology – kanchipuram 631502. For providing 24 hrs laboratory chemical using, sample testing facility, chemical providing facility ect... to do my research work.

REFERENCES:

- ❖ ANEES. M. A., (1975). Acute toxicity of four organophosphorus insecticides for a freshwater teleost *Channa punctatus*(Bloch) *Pakistan Journal of Zoology*,7(2)135-141.
- ❖ APHA. (1989) In standard method for examination of water and waste water. 14th Eds. American public Health Association, Washington, USA.
- ❖ DEVI. P. B., VIJAYABHARATHI. R., SATHYABAMA. S., MALLESHI. N. G, PRIYADARISINI. V.B., *et al.*(2014). Health benefits of finger millet (*Eleusine coracana L.*) polyphenols and dietary fiber: a review. *J Food Sci Technol* 51: 1021-1040.
- ❖ DW.GAKUYA,CM.MULEI , S.B.WEKESA (2011) *Afr J Tradit Complement Altern Med* vol.8(2)2011
- ❖ FARID SABRA and E. L. SAYED., E. L. DEEB MEHANA (2015). *Asian journal of agriculture and food sciences*.
- ❖ GIJARE SHRUTI S *et al*: Protein and amino acid modulation in fresh water fish *Ophiocephalus orientalis*
- ❖ JIPSA.J.R *et al.*, 2014 *International Journal of Fisheries and Aquatic Studies* 2014; 1(5):93-97.
- ❖ KRIEGER. R. I., THONGSINTHUSAK, T., (1993). Captan metabolism in humans yields two biomarker, tetrahydrophthalimide(THPI) and Thiazolidine-2-thione-4- carboxylic acid (TTCA) in urine . *Drug Chem. Toxicology*.16(2), pp.207-25.
- ❖ M.V. MARTINEZ – TOLEDO, V. SALMERON, B. RODELAS, *et al.*, *Applied Soil Ecology* 7 (1998) 245 -255.
- ❖ MAGAR R.A*. AND AFSAR SHAIKH** Vol. 1 No. 3 (2012) *DAMA International Trends in Life Sciences*.
- ❖ MAL. B., PADULOSI. S., RAVI. S. B., (2010). Minor millets in South Asia: Learnings from IFAD-NUS project in India and Nepal. *MS Swaminathan Research Foundation* 1-185
- ❖ MAMDOUH.A *et al* (2008) Central Lab for Aquaculture Research, Abbassa Abou-Hammad, Sharkia, Egypt, 8th international symposium on tilapia in aquaculture - 2008
- ❖ MONA HAMED *et al* (2008) agricultural research center published jan-2008
- ❖ NAZNI P., SHOBANA DEVI R *J Food process tech* 2016.7:3JFPT, an open access journal
- ❖ PALLAVI SRIVASTAVA AND AJAY SINGH* *JAquac Res Development* 2013.4:4.
- ❖ SPARLING, D. W., FELLERS, G. M., and MCCONNELL. L. S. (2001). Pesticides and amphibian population declines in California USA. *Environ. Toxicol.Chem.*20:1581-1595.
- ❖ WAGHMARE SAVITA YADVRAO *et al.* *Int. Res. J. Pharm.* 2014, 5 (10)