International Journal of Research
Available at https://edupediapublications.org/journals
p-ISSN: 2348-6848
e-ISSN: 2348-795X
Volume 02 Issue 07
July 2015

Alteration in the Glucose Level the Blood of a Fresh Water Fish Labeo Rohita Induced By Azo-Dyes

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ABSTRACT

The present study is an attempt to find out the effects of two azodyes Metanil yellow (4- aniline azobenzene-m- sulfonic acid) and Bismark brown (2, 4- diamino 3' aminoazo benzene) on the level of Glucose in the blood of a fresh water fish *Labeo rohita.* The level of Glucose in the blood was found to be elevated at both acute and chronic exposures of both the dyes. The results were statistically highly significant (P< 0.01).

INTRODUCTION

Water is most abundant on our earth. Water pollution is a serious problem in world and in developing countries especially in India on account of huge population. The contaminant are entered in body of organisms via absorption and other routes , goes deep in tissues and affect physiology, biochemistry and metabolism of the organism.Ever since man has been attracted by varying beauty of different colors, the natural instinct of man has led to the use of colors in most of the spheres of life both azo and nonazo contains characteristic chromatic group such as Nitro- No_2 group (nitro dyes), azo N= N group (azodyes) and carbonyl = co group (carbonyl dyes) which confirm color to the molecules. This group is termed as chromatophore. These dyes find their most important application in the dying and printing of textiles but are also used to some extant for dying paper, leather, in preparation of ink, in photography and also in coloring a variety of food stuffs. From the industries they are thrown in the inland water with their discharge. Azodyes are known to produce toxic and even carcinogenic effects[1]. Azodyes in water beds render tremendous chemico azo

stress on inhabiting flora and fauna including fish and sometimes cause huge mortification among them[2]. The fishes, best indicator of water body pollution are the most sensitive of all the

aquatic animals, towards the pollutant poisoning through the river water from adjoining settlement and industries. The accumulation of effluents becomes hazardous to the aquatic organisms and to surrounding human population because the fishes are the most important factors of food chain, which have great nutritive value in the environment. Bio chemicals are the most assessable body contents for checking the toxicity of any chemicals. Any alteration in biochemical parameters can result in serious out comes in the form of various diseases in both the animals and its consumers.The present study deals with the toxic effects of metanil yellow and bismark brown. Bismark brown is a permitted textile dye and is used to dye cotton and silk fibers and finally drained out into the inland water as residual waste. Metanil yellow finds wide application in dying industries , soap, spirit, liquors, wax, polish and cosmetic industries, It is also used to color a wide variety of food stuffs as well.

MATERIAL AND METHOD

Living specimen of *Labeo rohita* were collected from local fresh water resources and acclimatized in laboratory conditions for a minimum period of seven days before experimentation. Visibly healthy fishes were selected and treated with 0.1% $Kmno_4$ solution and were divided into five batches. One batch was kept in water and was used as control. The remaining four batches were kept in acute and chronic concentrations of metanil yellow and bismark brown. Water was replaced periodically and black paper was used to prevent any possible photo-oxidation of dyes. The fishes of all batches were sacrified at 48 hrs and 96 hrs (acute exposure) and 15 days and 30 days (chronic exposure). The blood was collected from cut caudal vein and was allowed to clot at room temperature and then centrifuged at 2000rpm. The 't' test of Fisher[3] was used to calculate the significance of data.

RESULT

The present study shows prominent changes in the Glucose level in the blood of *Labeo rohita* under the

stress of metanil yellow and bismark brown intoxication (Table – 1).The elevation in the blood Glucose of *Labeo rohita* was +1.37%, + 3.43%, + 4.10% and + 5.49% under the stress of metanil yellow and + 1.89% , + .95%, +4.47% and + 6.02% under the stress of bismark brown at T_1 and T_2 (acute) and T_3 and T_4 (chronic) exposures respectively. All these elevations were statistically highly significant ($P < 0.01$).

DISCUSSION

Glucose is an organic compound which is naturally occurring and containing carbon, hydrogen and oxygen. It is called as suger of life and is required for giving

energy. Present study reveals an increase in blood glucose of *Labeo rohita* under the stress of metanil yellow and bismark brown. Bansal *et. al*. (1979)[4] reported hyperglycemia in *Labeo rohita* which is indicative of disruptive carbohydrate metabolism which may be due to enhanced break down of liver glycogen. Singhal *et. al*.[5] (1974) reported elevation in blood glucose associated with hepatic glycogen depletion in response to Mercury poisoning. Larson and Haux (1981)[6] reported depletion in hepatic glycogen with corresponding elevation in blood sugar in flounder *Platichthys flesus* and rainbow trout *S. gairdneri* in response to Cadmium poisoning. Sastry and Subhadra (1982)[7] reported hyperglycemic nature of Cadmium poisoning in *H. fossilis*. Tyagi (1984)[8]depletion of liver and kidney glucose, with corresponding elevation in blood glucose, in response toaminoazodyes Congo red and Bismark brown. Increase in glucose indicates disrupted carbohydrate metabolism due to enhanced breakdown of liver glycogen.Decrease in kidney glucose level is probably due to renal insufficiency , indicating either the decreased glucose reabsorption capacity of the nephrons or increased filteration of glucose through damaged glomerulus . Sastry, Malik and Sharma (1987)[9] reported decreased blood glucose level in *H. fossilis* exposed to lead nitrate. The decrease may be due to decrease in glycogenesis. Sastry and Shukla (1988)[10] reported decreased blood glucose level in H.fossilis exposed to Zinc, Chromium, Nickel, Mercury.K.C. Chitra, P. Nikhila and K. P. Asifa (2013)[11] observed increase in plasma glucose and total glucose content in tissues like liver muscles and gills

might have resulted from gluconeogenesis to provide energy for the increased metabolic demands imposed by Quinalphos stress in *Oreochromis mossambicus*. B.Padma Priya, Vijaya Rachel and Y. Avasn Maruthi (2012)[12] reported increase in serum glucose level in *Channa punctatus* exposed to Imidacloprid insecticide. Tahmina Hoq, Nazmul Haque (2014)[13] observed higher blood glucose level in *Heteropneustes fossilis* under the stress of Zinc sulphate heptahydrate. Kori- Siakpere *et. al.* (2007)[14] reported increased plasma glucose level in *Clarias gariepinus* exposed to Paraquat.

TABLE -1

ALTERATION IN THE LEVEL OF SERUM GLUCOSE INDUCED BY 4' AASA AND DAAB IN THE BLOOD OF LABEO ROHITA. VALUES ARE ± S.E. OF NINE OBSERVATIONS EACH.

		ACUTE EXPOSURE		CHRONIC EXPOSURE	
DYES	**C**	**T_1**	**T_2**	**T_3**	**T_4**
4'AASA	189.60 ± 0.242	192.21 ±0.215 (+1.37%)	196.11 ± 0.15 (+3.433%)	197.39 ± 0.25 (+4.10%)	200.02 ± 0.155 (+5.49%)
DAAB	189.60 ± 0.242	193.19 ± 0.219 (+1.89%)	195.21 ± 0.126 (+2.95%)	198.09 ± 0.161 (+4.47%)	201.03 ± 0.13 (+6.02%)

4'AASA - Metanil yellow **T_1** - 48 hrs **T_3** - 15 days

DAAB - Bismark brown **T_2** - 96hrs **T_4** - 30 days

C - Control.

REFERANCES

1. Goldenring, J. R., K. Batter and B. A. Shaywitz (1982): Neurobehav. Toxicol. Teratol. 4 (1): 43.
2. Goel, K. A. (1982): Textile dyes endangering life. ' The Times of India',
29th April, p. 3.
3. Fisher, R. A. (1963) : ' Statistical methods for research workers ' 13th *edn.*
Oliver and Boyed, London, p. 119.
4. Bansal, S.K., S.R. Verma, A.K. Gupta and R.C. Dalela (1979): *Bull. Environ*,
Contam. Toxicol. 22: 674.
5. Singhal, R.L., S.Kacew and D.J.B. Sutherland (1974):*Environ. Res*. 7:220
6. Larsson, A. and C. Haux (1981): Academic press, New York, 34- 342.
7. Sastry, K.V. and Km. Subhadra (1982): 4th *Natl. Conven. Ind. Soc*. Life
Sciences., 24.
8 Tyagi, S. K. (1984): Ph.D Thesis, Meerut University, Meerut.
9 Sastry, K.V., D.S. Malik and S.N. Sharma (1987*): Him. J. Env. Zool. Vol*. 1 pg
62 -69.
10. Sastry, K.V. and Vinneta Shukla (1988):*Threat. Hab*., 321-334.
11. Chitra, K.C., P. Nikhila and K.P. Asifa (2013*): J. Adv.Lab . Res. Biol. Vol*. 4
Issue 1.
12. B. Padma Priya, Vijaya Rachel and Y. Avasn Maruthi (2012*): Int. J. Intsci. Inn. Tech. Sec. A. Vol*. 1, Issue 2, pg 18-22.
13.Hoq, Tahmina, Nazmul Haque (2014): *Int. J. Sci. Tech. Res*. Vol.3 Issue 5.
14. Kori- Siakpere, Ovie Ovie, Adamu Adamu, Kabir Kabir, Achakpokri Achakpokri and Juliet Aghogho Aghogho (2007*): J. Fish. Aqua Sci*., 2: 243-
247.