



## CHANGES ON BLOOD ASCORBIC ACID LEVELS OF FISH CLARIAS BATRACHUS DUE TO THE EFFECT OF FERTILIZER NPK MIXTURE

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**ABSTRACT** Fertilizer NPK increased blood Ascorbic acid levels in the fresh water fish *Clarias batrachus* Maximum rise of 190.90% was found after 72 hours at 22.85g/L concentration while minimum 9.09% was found at 14.40g/L 48 hours of exposure. The fertilizer NPK mixture caused disturbances in vitamin-C levels of the fish and both hyper. and hypovitaminosis were observed at different concentrations and time intervals.

**KEYWORDS :** Fertilizer, NPK, Blood Ascorbic acid, Fish.

### INTRODUCTION

Ascorbic acid acts as an enzyme catalyst, antioxidant and fatigue retardant (1). Adrenal pituitary glands and intestinal walls are rich in ascorbic acid. Liver is the main site of storage in animals which synthesize it. Very high levels of vitamin C have been observed in the brains as compared to other tissues (2), muscles of marine fish than in fresh water fish (3). In this study, the effect of six concentrations of the fertilizer NPK mixture was observed on blood ascorbic acid levels of fish *Clarias batrachus*, exposed for 24 to 144 hours.

### MATERIALS AND METHODS

Live and healthy specimens of fish *Clarias batrachus* were obtained from the river Gomti at Lucknow through fish catchers. Fishes were brought to laboratory in wide mouthed pots in natural water and washed three times in tap water, and treated with 2% KMnO<sub>4</sub> to remove external parasites. Normal and healthy fishes were selected for the experiment and transferred to large glass aquaria. Fishes were acclimatized for 96 hours. Earlier, the lethal concentrations of this fertilizer for 24 to 144 hours were recorded (4,5).

Fishes were taken out after definite hours of treatment. Blood was collected from the live fish (by puncturing the caudal vein) in vials and mixed with Potassium oxalate. The method of Roe was followed for ascorbic acid estimation. (6).

### OBSERVATIONS AND RESULTS

Blood ascorbic acid levels had generally increased. Maximum rise of 190.90% was found after 72 hours at 22.85 g/L concentration, while minimum 9.09% was found at 14.40 g/L concentration after 48 hours of exposure. The detail results obtained on blood ascorbic acid levels of fish *Clarias batrachus*, exposed to six varied concentrations of fertilizer, for 24 to 144 hours are given in Table-1.

**TABLE-I**

**Effect of NPK mixture on blood ascorbic acid levels of fish *Clarias batrachus*.**

Fertilizer Concentration g/L	Blood Ascorbic Acid mg/100 ml Mean $\pm$ S.D. Range in Parentheses Exposure Times in Hours					
	24	48	72	96	120	141
			Control value 0.11 $\pm$ 0.03 (0.08-0.14)			
14.40	0.21 $\pm$ 0.03 (0.17-0.250)	0.12 $\pm$ 0.01 (0.11-0.14)	0.09 $\pm$ 0.03 (0.05-0.14)	0.24 $\pm$ 0.01 (0.22-0.25)	0.15 $\pm$ 0.02 (0.14-0.18)	0.07 $\pm$ 0.02 (0.02-0.08)
17.70	0.71 $\pm$ 0.04 (0.14-0.220)	0.28 $\pm$ 0.04 (0.25-0.34)	0.18 $\pm$ 0.01 (0.17-0.20)	0.24 $\pm$ 0.01 (0.22-0.25)	0.13 $\pm$ 0.02 (0.11-0.16)	
19.70	0.24 $\pm$ 0.02 (0.22-0.280)	0.17 $\pm$ 0.04 (0.14-0.22)	0.30 $\pm$ 0.04 (0.25-0.37)	0.17 $\pm$ 0.03 (0.14-0.22)		
22.85	0.21 $\pm$ 0.05 (0.14-0.25)	0.15 $\pm$ 0.02 (0.14-0.20)	0.32 $\pm$ 0.04 (0.28-0.37)			

23.60	0.29 $\pm$ 0.03 (0.25-0.340)	0.19 $\pm$ 0.04 (0.14-0.25)			
27.30	0.27 $\pm$ 0.01 (0.25-0.08)	No. of observation 16 in each case			

The vitamin values obtained after 48, 72 and 144 hours at 14.40 g/L, after 120 hours at 17.70 g/L. after 48 hours at 22.85 g/L concentrations, were statistically not significant ( $P > 0.05$ ). while the rest of the values were significant ( $< 0.05$ )

### DISCUSSION :

Long term administration of Sodium nitrate to rats inhibited the hepatic vitamin - A levels and blood haemoglobin, but methaemoglobin levels increased. Liver vitamin - E levels remained unaltered (7). varying amounts of nitrates showed alterations in ascorbic acid and methionine in guinea pigs (7). Nitrate ingestion resulted in disturbances in energy conversions, ascorbic acid system etc. in humans and animals (8,9).

Vitamin- D regulates intestinal phosphate absorption. A correlation was established in the alteration of biosynthesis of Vitamin-D and in vivo regulation of phosphate absorption (10). Ascorbate induced lipid Peroxidation in mitochondria was inhibited by phosphate, which also interacts with lipid peroxidation of hepatoma cells (11). Thus, it was clearly seen that fertilizer NPK mixture caused disturbances in vitamin-C levels of the fish and both hyper and hypovitaminosis were observed at different concentrations and time intervals.

Hypervitaminosis in rats caused, reduced lipid peroxidation of serum, liver, kidney and heart, and depressed catalysis. Thus, the altered vitamin-C levels found in fertilizer intoxication may also be the result of disturbed lipid metabolism. Under different stress conditions different hepatotoxicity was observed (12-22).

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