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TRIMETHOPRIM EFFECT ON ASCORBATE CONTENT IN FRESHWATER BIVALVE LAMELLIDENS CORRIANUS (LEA)

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ABSTRACT

Ascorbate or ascorbic acid is nothing but vitamin C which plays various vital roles in invertebrates and vertebrates. It is one of the important tools to indicate the alterations induced by chemicals and pollutants. After a small surgery for implanting a bead in various tissues of bivalves, they are used to treat with water mixed with antibiotic. This leads towards the reduction in death of bivalves ultimately gives high yield of pearls. Thus has a commercial importance. The antibiotic treatment on bivalves may alter metabolic reactions occurring in the bivalve.In the present work freshwater bivalves, *Lamellidens corrianus* are exposed to a sulfa drug trimethoprim and its impact on the ascorbic acid content is studied in different tissues of *L. corrianus.* The $LC_{50/2}$ and $LC_{50/10}$ concentrations are used to give treatment to the bivalves are 174.80PPM and 34.96 PPM respectively for 4 days and 21 days. After the treatment their tissues are dried and dry powder used to estimate Ascorbic acid content. The estimation of ascorbic acid is done by hydrazine method given by Roe (1967). The results are expressed in mg per 100 mg of dry tissue.Ascorbate content is affected due to trimethoprim acute and chronic treatment. The level of ascorbic acid showed an overall decrease in all tissues. The maximum ascorbic acid content was observed in mantle and lowest in digestive gland. The maximum decrease was observed in gill(70.37% % 75 %) followed by ovary(68.18% & 40.71%), digestive gland (58.62% & 38.46%) and whole body (50% & 31.57%) after acute and chronic exposures of trimethoprim while foot showed increasein ascorbate content (50%) after chronic treatment of 21 days.

Keywords: Lamellidens corrianus, ascorbate content, trimethoprim

I. INTRODUCTION

Ascorbate or ascorbic acid is the water soluble vitamin. In some animals, it is formed inside the body while some animals have to take it from the external source through vitamin C rich diet. Though it is required in very less amount it is very essential for collagen synthesis, RBC maturation, detoxification of drugs which have aromatic ring, as an antioxidant etc. Trimethoprim acts as an inhibitor of dihydrofolate reductase. This enzyme catalyses reduction of dihdrofolate to tetrahydrofolate in the pathway of thymidine synthesis of DNA. As these products are deprived to form , the DNA synthesis is arrested. Due to this antimicrobial property trimethoprim is selected for this study to determine the change in ascorbic acid contents in different tissues of bivalves.Tajmihr-Riah (1991) studied a ascorbic acid protective role as metal chelator to remove the toxic effect of the chemicals

Ahmad *et al.*, (2012) showed in *Scorbicularia plana* the elevated level of ascorbic acid under mercury stress. As ascorbic acid plays dynamic roles to resist the changes due the pollutants, the content alteration of it becomes a prime reason to find out changes in it due to stress induced by trimethoprim treatment.

II. MATERIALS AND METHODS

The freshwater bivalves, *L. corrianus* were collected from Girna dam, Dist: Nasik, M.S. After acclimatization to laboratory conditions for 4 days *L. corrianus* (65 to 80 mm length) showing movements and in apparent good health, were used for present study investigation. *L. corrianus* were divided into two groups for experimental and one group was maintained as control.The healthy bivalves, *Lamellidens corrianus* were exposed to acute treatment ($LC_{50/2}$) of trimethoprim (174.80PPM) up to 96 hours. For chronic treatment they were exposed to ($LC_{50/10}$) concentration of trimethoprim upto 21 days. The concentration of trimethoprim used was 34.96 PPM. After 24 and 96 hours of exposure the animals were sacrificed to find out the effect of acute treatment and after every 7 days to find out the effect of chronic treatment. The mantle, gill, foot, testis, ovary, digestive gland and the whole body flesh was isolated, dried and powdered to estimate ascorbic acid contents. Ascorbic acid content was estimated by using Hydrazine reagent by the method as given by Roe (1967). The results were expressed in mg per 100 mg of dry tissue. The % variations were also calculated and the test of significance was applied.

III. OBSERVATION AND RESULT

The level of ascorbic acid showed an overall decrease in most of the tissues tested due to trimethoprim exposure in *L. corrianus.* The maximum ascorbic acid content was observed in mantle and lowest in digestive gland. The maximum decrease was observed in gills (70.37% % 75 %) followed by ovary(68.18% & 40.71%), digestive gland (58.62% & 38.46%) and whole body (50% & 31.57%) after acute and chronic exposures of trimethoprim while foot showed increase in ascorbic acid contents (50%) after chronic treatment of 21 days. (Tables 1 & 2).

Table 1: Impact of Trimethoprim on ascorbic acid content (mg%) of *L. corrianus* after acute exposure

Tissues	**24 hrs**		**96 hrs**	
	Control	**Trimetho**	**Control**	**Trimetho**
Mantle	1.5644 ±0.2332	1.578 ±0.1716 +0.891NS	1.5822 ±0.0817	1.5644 ±0.1051 .-1.123**
Gills	0.7288 ±0.1166	0.5155 ±0.0290 -29.268NS	0.4800 ±0.0101	0.1422 ±0.048 -70.370***
Foot	0.4266 ±0.0817	0.3774 ±0.0872 -11.538*	0.9244 ±0.0220	0.5007 ±0.0 -45.833***

Ovary	0.3555 ±0.0101	0.1777 ±0.0503 -49.999**	0.3911 ±0.0148	0.6577 ±0.0267 -68.181***
Testis	0.3656 ±0.0872	0.3420 ±0.0767 -6.458NS	0.5155 ±0.0503	0.4622 ±0.0288 -10.344NS
Whole Body	0.3911 ±0.0817	0.3200 ±0.0101 -18.181NS	0.106 ±0.0059	0.0533 ±0.0 -50.000*
Digestive Gland	0.3555 ±0.0503	0.2488 ±0.0298 -30.00**	0.5155 ±0.0477	0.2133 ±0.0059 -58.620***

Values are expressed as mg/100mg dry weight of tissue.

± indicates standard deviation of three independent replications.

+ or - indicates % variation over control.

Significance: * P < 0.05; ** P < 0.01; *** P 0.001; NS = Non-significant.

Graph 1: Impact of Trimethoprim on ascorbic acid content (mg%) of *L. corrianus* after acute exposure

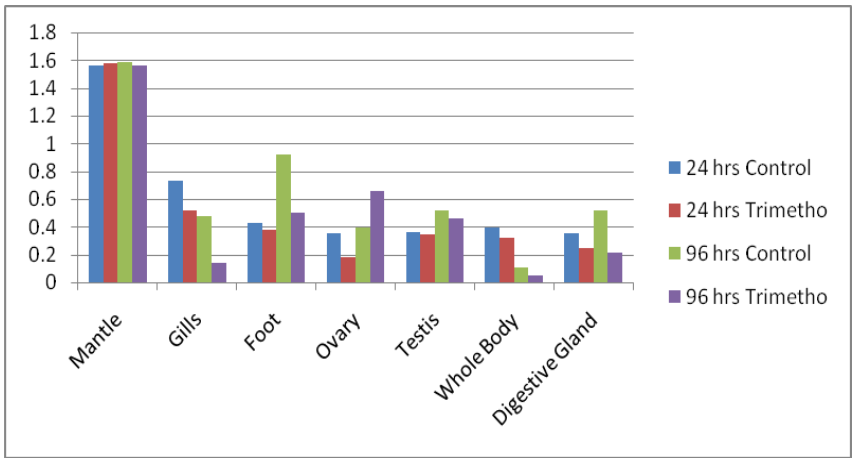


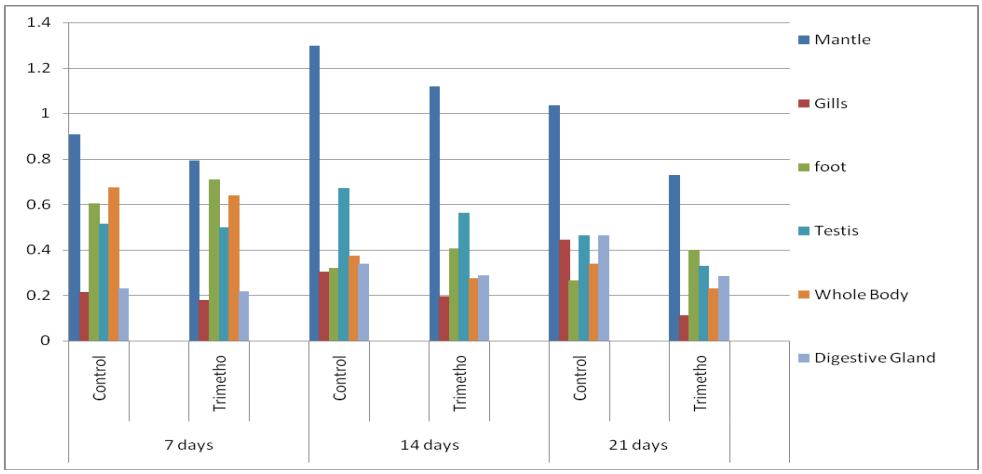
Table 2: Impact of Trimethoprim on ascorbic acid content (mg%) of *L. corrianus* after chronic exposure

Tissues	**7 d**	**14 d**	**21 d**

	Control	Trimetho	Control	Trimetho	Control	Trimetho
Mantle	0.9066 ±0.1111	0.7942 ±0.0817 -1.369*	1.2977 ±0.1332	1.1200 ± 0.0817 -13.698**	1.0341 ±0.0503	0.7300 ±0.0288 -29.411***
Gills	0.2133 ±0.0059	0.1792 ±0.0 -15.999***	0.3022 ±0.0817	0.1955 ±0.0288 -35.294*	0.4444 ±0.0503	0.1111 ±0.0059 -75.00**
Foot	0.6044 ±0.0288	0.7111 ±0.0290 +17.647***	0.3200 ±0.0089	0.4053 ±0.0377 +26.666*	0.2666 ±0.02908	0.4000 ±0.0014 +50.00*
Ovary	0.4266 ±0.0290	0.5320 ±0.0377 -24.691***	1.44 ±0.0886	0.900 ±0.0503 -37.499**	0.4800 ±0.0288	0.2844 ±0.059 -40.710**
Testis	0.5155 ±0.0101	0.4977 ±0.0290 -3.448***	0.6724 ±0.0133	0.5617 ±0.050 -16.45***	0.4622 ±0.0290	0.3307 ±0.0059 -28.444***
Whole Body	0.6755 ±0.0675	0.640 ±0.0731 -5.263NS	0.3733 ±0.0101	0.2737 ±0.0050 -26.66***	0.3377 ±0.0171	0.2311 ±0.02050 -31.578***
Digestive Gland	0.2311 ±0.0089	0.2186 ±0.0 -5.384*	0.3377 ±0.0290	0.2862 ±0.0148 -15.263*	0.4622 ±0.0220	0.2844 ±0.0503 -38.461*

Values are expressed as mg/100mg dry weight of tissue. ± indicates standard deviation of three independent replications. + or - indicates % variation over control. Significance: * P < 0.05; ** P < 0.01; *** P 0.001; NS = Non-significant.

Graph 2: Impact of Trimethoprim on ascorbic acid content (mg%) of *L. corrianus* after chronic exposure



IV. DISCUSSION

Sublethal concentration of mercuric chloride decreased ascorbic acid content from mantle, gill, hepatopancreas, gonad and foot of bivalve molluscs, *Lamellidens marginalis mantle* (Muley and Mane (1987) Waykar and Lomte 2004 studied alteration in ascorbic acid contents in various tissues of *Parreysia cylindrica* and reported that in mantle, gill, digestive gland and whole body tissues the level was decreased, but in foot was increased. Pardeshi and Zambare, (2005) showed elevation of ascorbic acid contents in the bivalve, *Parreysia cylindrica* during maturation stage of oocytes. Kamble 2011 studied organochlorine and organophosphorus impact on ascorbic acid content in Lamellidens corrianus and reported that there was significant decrease in ascorbic acid content. Mahajan *et al.,* (2015) studied cure action of ascorbic acid in arsenic induced alteration in protein contents of *Lamellidens marginalis*Tambe and Pulate (2015) studied ascorbic acid's recovery action against dichlorovos induced changes in protein contents of *Parreysia cylindrica.* Ahmad *et al.,* (2012) showed that in organs like foot and gill showed elevation in ascorbic acid due to inability of these organs to form thiol compounds being non enzymatic antioxidants role.

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