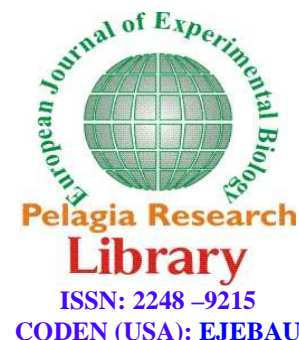




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European Journal of Experimental Biology, 2012, 2 (6):2022-2027



Effect of natrum muriaticum on protein and lipid content of selective tissues of *Poecilia latipinna*

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ABSTRACT

Poecilia latipinna were sampled to evaluate the effect of *Natrum muriaticum* of 30 centesimal potency of three different dilutions of 0.05%, 0.03% and 0.025% for a period of 4 days and 7 days. The amount of protein and lipid was determined in the ovary, liver and muscle of the treated fishes. There was an accretion of protein and lipid in the ovary compared to liver and muscle when the fishes were exposed to 4 days (96 hours) duration at a dilution of 0.025% of *natrum muriaticum* 30 centesimal potency.

Key words: *Poecilia latipinna*, *Natrum muriaticum*, Induced breeding, 30 Centesimal potency, 0.05%, 0.03% & 0.025% concentrations, Estimation of protein & lipid.

INTRODUCTION

In aquaculture industry rearing ornamental fishes gained attraction in domestic market and its demand hiked up to a market level in recent years. To promote production of ornamental fishes modern methods are used by the scientists. In many fresh water species, fishes mature or "ripen" to a certain point but need appropriate environmental and social signals to complete maturation and spawning. Forced reproduction at this stage is best described as "induced final maturation and ovulation", and a certain maturity must be reached before induction will work [Crim and Glebe, 1990]. Many salts and herbs were suggested in Indian medicine to improve fertility and reproductive ability in human beings. One such homeopathic medicine is *natrum muriaticum* [Satyaprakash, 1986]. It is effectively used in the treatment of cough, leucorrhea, cold etc. In the present study the effect of *n. muriaticum* on the biochemical constituents of the ovary of *Poecilia latipinna* (Silver molly) is studied. The amount of protein and lipid in liver and muscle tissue are also observed.

MATERIALS AND METHODS

Experimental animal:

Poecilia latipinna (Silver molly), an Omnivorous ornamental fish was chosen for the present study as the experimental animal. It inhabits freshwaters and successfully establishes in a variety of environmental conditions. Silver molly was selected for the present study for because of its commercial importance, easy availability and viviparous nature.

**Collection and maintenance:**

Poecilia latipinna (silver molly) were collected from Trichy Golden Aquarium. Healthy female fishes approximately ranging from 2.8 cm 3.2 cm in length were sorted out. Totally 64 female silver mollies were chosen for the present study. The fishes were housed in 16 troughs holding 4 female fishes in each trough to avoid crowding.

They were maintained under normal conditions of temperature and light so that they may get acclimatized to the prevailing laboratory condition. These fishes were fed with artificial fish feed 'Kijaro Basic'. The water was changed at 8 am and 4 pm and the feeding was carried out at the same time. The period of acclimatization was about 10 days prior to the commencement of the experiment.

Experimental protocol:-

Natrum muriaticum solution of dilution namely 30 centesimal (30c) were brought from "Trichy Homeo Medicals". The above mentioned dilutions were preferred as they are the typical potency with peculiar potentizing effect.

From natrum muriaticum 30 centesimal potency of three different dilutions were prepared (1) 0.1 ml of n. muriaticum 30c potency was diluted to 0.05% by adding 200 ml of water, (2) 0.1 ml of n.muriaticum 30 c potency was diluted to 0.03% by adding 300 ml of water, (3) 0.1 ml of n. muriaticum 30c potency was diluted to 0.025% by adding 400 ml of water.

Poecilia latipinna measuring upto a length 2.8 - 3.2 cm approximately were selected for observation. They were grouped into three sets consisting of 16, 24 and 24. The first group consisting of 16 individuals were treated as control. The second group consisting of 24 fishes were taken for protein estimation. They were divided into 3 subgroups of 8 to be exposed to n. muriaticum of three different dilutions 0.05%, 0.03% and 0.025%. The third group consisting of 24 individuals were used for lipid estimation. They were grouped into 3 with 8 individuals in each, for the administration of n. muriaticum of three different dilutions of 0.05%, 0.03% and 0.025%.

Experimental fishes were left one in each trough of 1 litre capacity containing the solution prepared with n. muriaticum of different concentrations. The medium in which *P. latipinna* left with varying concentrations were changed at 8 a.m. and 4 p.m. every day. The individuals were fed with a "kijaro basic" diet at the same time. The experiment was carried out for 7 days. After the 4th day and 7th day 4 fishes from each concentration were sacrificed for protein and lipid estimation from control and treated groups. The tissues taken for estimation of protein and lipid are ovary, liver and muscle. After the 4th and 7th day of exposure of n.muriaticum the ovary of 4 fishes were pooled together and ground for biochemical analysis. The same procedure was carried out for liver and muscle.

RESULTS

The present study describes the effect of oral administration of natrum muriaticum at the physiological dosage 30 centesimal on *Poecilia latipinna*. The protein and lipid level were determined in the ovary, liver and muscle after exposure of the fish to three different dilutions of 0.025%, 0.03% and 0.05% of n. muriaticum 30 centesimal potency. The period of administration was four & seven days. The results are tabulated in table I to IV and Figures I to IV.

Amount of protein after 4 days & 7 days of exposure of N.muriaticum:

Table I & II and Fig 1 & 2 shows the amount of protein (mg%) present in the ovary, liver & muscle. There is an increase in the amount of protein content in the ovary, liver & muscle was observed in fishes treated for a period of 4 days at a concentration of 0.025% of natrum muriaticum of 30 centesimal potency.

Fishes exposed to n.muriaticum for 7 days duration showed gradual decrease in the amount of protein in ovary compared to the control. The result suggests that the effect of n. muriaticum on the protein content of ovary is time dependent. More the dilution of n. muriaticum lesser the duration of treatment greater is the amount of accretion of protein in the ovary compared to liver and muscle.

TABLE –I Amount of Protein (mg%) present in the tissues of *P. latipinna* (average of 4) after the treatment of n. muriaticum for a duration of 4 days .

Tissues Analysed	Control	Experimental		
		0.05%	0.03%	0.025%
Ovary	3.6	4.8	5.9	10.6
Liver	1.9	2.2	2.4	3.2
Muscle	1.4	1.5	2.0	3.7

Figure 1

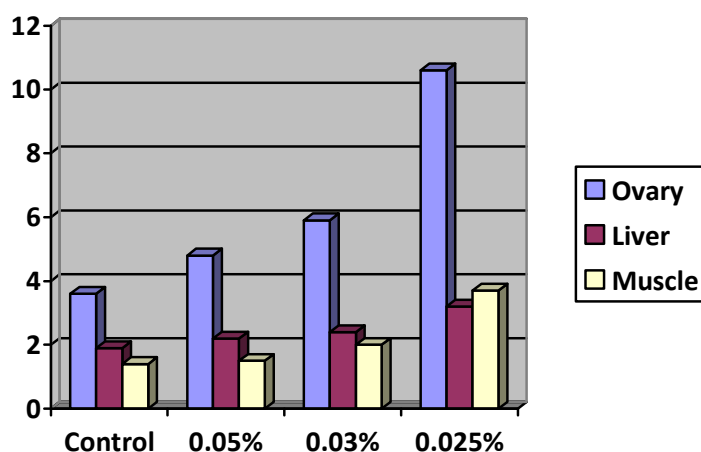


Figure 2

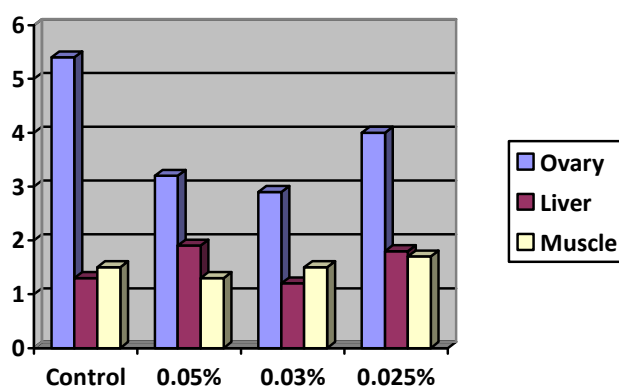


TABLE –II Amount of protein (mg%) present in the tissues of *P. latipinna* (average of 4) after the treatment of n. muriaticum for a duration of 7 days

Tissues Analysed	Control	Experimental		
		0.05%	0.03%	0.025%
Ovary	5.4	3.2	2.9	4.0
Liver	1.3	1.9	1.2	1.8
Muscle	1.5	1.3	1.5	1.7

Amount of lipid after 4 days & 7 days of exposure of N.muriaticum:

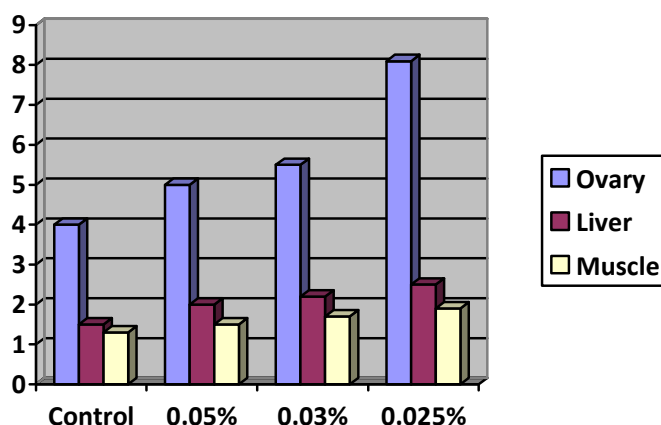
Table III & IV and Fig 3 & 4 shows the amount of lipid (mg%) present in the ovary, liver & muscle. There is an increase in the amount of lipid content in the ovary, liver & muscle was observed in fishes treated for a period of 4 days at a concentration of 0.025% of natrum muriaticum of 30 centesimal potency.

Fishes exposed to n.muriaticum for 7 days duration showed gradual decrease in the amount of lipid in ovary compared to the control. The result suggests that the effect of n. muriaticum on the lipid content of ovary is time dependent.

TABLE –III Amount of Lipid (mg%) present in the tissues of *P. latipinna* (average of 4) after the treatment of n. muriaticum for a duration of 4 days.

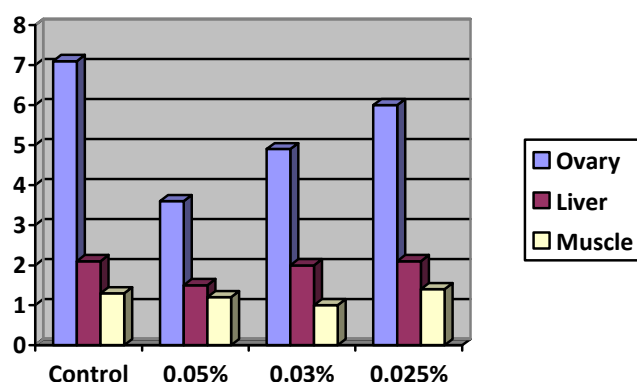
Tissues Analysed	Control	Experimental		
		0.05%	0.03%	0.025%
Ovary	4.0	5.0	5.5	8.1
Liver	1.5	2.0	2.2	2.5
Muscle	1.3	1.5	1.7	1.9

Figure 3

TABLE –IV Amount of Lipid (mg%) present in the tissues of *P. latipinna* (average of 4) after the treatment of n. muriaticum for a duration of 7days

Tissues Analysed	Control	Experimental		
		0.05%	0.03%	0.025%
Ovary	7.1	3.6	4.9	6.0
Liver	2.1	1.5	2.0	2.1
Muscle	1.3	1.2	1.0	1.4

Figure 4



DISCUSSION

In the present study natrum muriaticum 30 centesimal potency of dilution 0.025 % has accelerated the accretion of protein and lipid in the ovary of *P. latipinna* when treated for 4 days. The increase must probably be due to the uptake of vitellogenin the precursor of egg yolk protein which is taken up by oocytes during maturation [Love, 1974]. A similar finding states that vitellogenin which is released into the blood and then transported to ovary [Wallace 1978]. Gupta and Yamamota [1972] have demonstrated the incorporation of protein yolk precursor in the oocyte by ultrastructural evidence. Chan et al. [1991] also has reported a selective uptake of VTG by follicular receptor of VTG. Much of the yolk material of eggs in fishes is synthesized by the liver under the influence of estrogen, as a complex lipophospho-protein precursor known as vitellogenin [Emmersen and Emmersen, 1978]

It is a well known fact that biochemical changes in various cellular organelles of the oocytes occur during oogenesis in number of vertebrates [Florkin and Scheer, 1974]. Among the biochemical components analysed, lipid and carbohydrate contents showed significant variations in the different tissues of *Haliotis varia* during the progress of gonad maturation [Najmudeen, 2007]. Lipid concentration increased from stage 1 through 3 and decreased in stage 4 (previtellogenesis, vitellogenesis, final maturation and post ovulation) in female cobia, *Rachycentron canadum* [Biesiot et al., 1994].

It has been demonstrated that vitellogenin which is synthesized by liver in response to estradiol is released into the blood and then transported to ovary [Wallace, 1978]. The biochemical analysis revealed the fluctuating trend of proteins and carbohydrates during different stages of maturity. However, total lipid percentage of the ovary showed a gradual increase from stage I to stage IV [Ghulam Nabi hajam, 2012]. The protein titre increased with maturity in ovary, muscle and haemolymph whereas in hepatopancreas it registered a decrease. The lipid values of all the tissues and the haemolymph showed an increasing trend with maturation in *Portunus pelagicus* [Raghunath Ravi, 2010]. The total lipid in the ovary *Liza tade* increased during pre-spawning and it remain increased level up to just before spawning starts, it decreases during late period of spawning remains and low during post-spawning period [kadiyani, 2012]. Proteins are of vital utility for fish growth and other metabolic activity. Protein content of the ovary of *Epinephelus diacanthus* increased with the maturation [Chandrasekhara Rao and Krishnan, 2011]. According to Roobards et al. [1999] protein percentage of gonads increased in the pacific sand lance (*Ammodytes hexapterus*) in relation to maturity.

The above evidences support the reason for the increase of protein & lipid in ovary, liver & muscle of *P. latipinna*. *N. muriaticum* may also causes changes in the biochemical constituents of the ovary, thereby influencing fast ovulation. Fishes exposed to *n. muriaticum* 30 centesimal potency of dilutions 0.05 %, 0.03 % and 0.025 % to 7 days showed a general decrease in the protein and lipid accretion in all the tissues compared to the control suggesting that *n. muriaticum* 30 centesimal potency is time dependent. *N. muriaticum* is cheap and easily available. The breeder in the ornamental fish culture industry can apply the technique of oral administration of the drug to induce precocious maturation of the ovary and there by multiply more number of fishes in shorter duration making rearing a more profitable one.

Acknowledgement

I wish to express my sincere thanks to the Principal & the Head of the Zoology Department, Holy Cross College (Autonomous), Tiruchirappalli for providing the privileged facilities for carrying out this project work.

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