

EFFECT OF HERBAL DETERGENT BASED DABUR VATIKA SHAMPOO ON GUPPY *POECILIA RETICULATA* (PETERS)

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KEY WORDS

Herbal detergent based
Vatika shampoo
Poecilia (Lebistes)
reticulata (Peters)
Mortality

Received on :

30.01.2010

Accepted on :

19.05.2010

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ABSTRACT

The fish *Poecilia reticulata* (Peters) is well known natural biological control agent for mosquito larvae. *Poecilia reticulata* is released by Municipal Corporations in order to control of mosquito larvae, in different water bodies. Indiscriminate use of shampoos and detergents cause water pollution. The present investigation is discuss the effect of herbal detergent based Vatika shampoo on the mortality and behavioural changes of guppy fish; *Poecilia reticulata* (Peters).

INTRODUCTION

Use of shampoos are indiscreetly increased day by day by human as hair cleaning agents, washing of vehicles and pet animals most of the shampoo does not degrading easily or they degrade very slowly in the water body, it means, they remain in the aquatic system for a longer time. They enter in the food chain of aquatic animals or absorbed through the gills or through the skin of the aquatic animals. Generally shampoos are anionic or cationic and non-ionic detergent based surfactants. These shampoo which discharged in the water they may change pH, total alkalinity, free CO₂, DO, and also affect the rate of photosynthesis and leads to eutrophication. Thus it has toxic effects on aquatic animals like fishes, crabs, etc. Some times toxic agent has so severe affects causes mortality of animals. Shampoo also effect on biochemical aspects of the animals and also change the concentrations of protein, fats and carbohydrates. Abel (2006) reported synthetic detergents are acutely toxic to fish in concentrations between 0.4 and 40 mg/L. The interactions between detergents and proteins, and their influence on membrane permeability may be the basis of the biological action of detergents. Saxena *et al.*, (2005) reported the toxic effects of four commercial detergents (two washing powders and two cakes) were reported on behaviour, mortality and RBC counts of a freshwater fish *Gambusia affinis*, Guppy fishes *Poecilia reticulata* (Peters) are exotic fishes used to keep check on the mosquito population. These fishes are now-a-day used in all water bodies to kill the mosquito larvae. Present investigation deals with the study of toxic effect of detergent based shampoo on mortality of Guppy fishes and respiration.

MATERIALS AND METHODS

The guppy fishes were collected from rearing pond of Science College, Nanded. The fishes were selected irrespective of sex for experiment based on size or lengthwise range from 3-4 cm long and weighed ranging to 400-600 mg. The fishes were acclimatized in glass aquaria in laboratory for 7 days as per APHA. The fishes were checked for any pathological diseases and change in color before using them for experiment. The crowding was avoided, pH, DO, and temperature were frequently checked and water was replaced daily after feeding the fishes. They were divided into different groups containing 10 fishes for the experiment. The shampoo weighed accurately and dissolved in water before the transfer of fishes into the aquaria and simultaneously a set of control animals were arranged.

The 100 percent mortality of guppy fish due to herbal detergent based Vatika shampoo was calculated as per APHA (1985). Observations on survival were made after 24hr, mortality was also observed if any in control groups. Change in behavior pattern such as surfacing, gulping, mucus secretion from skin, omitting and increase in the rate of gill opercular movement, loss of body balance and change in body colour were observed.

RESULTS AND DISCUSSION

The present investigation was discussed the effect of herbal detergent based Vatika shampoo on the mortality of *Poecilia reticulata* (Peters). The Table 1 showing in the dilutions of 0.00001 mL/L and 0.00002 mL/L the rate of mortality was

Table 1: Percent mortality of Guppy fishes *Poecilia reticulata* (Peters) in different dilutions of Vatika shampoo

Shampoo mL/L	No. of Fishes Exposed	Control	Repl - 1	Repl -2	Repl -3	% mortality within 24 hrs.
0.00001	10	0	0	0	0	0
0.00002	10	0	0	0	0	0
0.00003	10	0	1	2	2	16.66
0.00004	10	0	4	5	5	46.66
0.00005	10	0	10	10	10	100

shown nil. The 0.00003 mL/L was shown 16.66% mortality, The 0.00004 mL/L was shown 46.66% mortality, where as in the 0.00005 mL/L was shown 100% mortality of Guppy fishes *Poecilia reticulata* (Peters).

Prakash (1996) observed 80% mortality of Tilapia sp. in 50ppm detergent water while 100 % mortality in 51ppm of detergent water. Maruthanayagam (1997) reported 24hrs LC₅₀ value of detergent to *Macrobranchium lamarrei* was 0.5%. Shingadia and Veena Sakthivel (2003) reported 96 hours LC₅₀ value of wheel detergent for *Lamellidens marginalis* (Lamarck) was 400ppm. Where as study showed that the gill damage is the most obvious acute toxic effect; the immediate cause of death may be asphyxiation, but detergents may also be toxic internally. Sublethal effects include retardation of growth, alteration of feeding behaviour and inhibition of chemoreceptor organs (Abel, 2006).

Change in behavior pattern such as surfacing, gulping, mucus secretion from skin, omitting and increase in the rate of gill opercular movement, loss of body balance and change in body colour were observed.

It is known that the respiratory roles alter under the influence of a several biotic and abiotic factors (Prosser *et al.*, 1973) pollutant acts as physiological stress or for exposed organisms as do the environmental parameters (Newell, 1973). The relationships between respiratory activity of animals and pollution have been reviewed by some workers (Roberts 1972, Satyavely Ready *et al.*, 1982). The O₂ and CO₂ was also determined at 0.00004 mL /L of shampoo, the O₂ content of water in control before experiment was 5.74 mg /L and after experiment was 3.29 mg /L while in experimental sets O₂ content of water before experiment was 5.712 mg /L and after

experiment was 3.64 mg/L. When fishes were exposed to detergent based Vatika shampoo the rate of oxygen consumption was decreased. The free CO₂ was found to be nil in all experimental as well as in all control sets.

ACKNOWLEDGEMENTS

The authors are sincerely thanking to the Principal, N.E.S. Science College, Nanded, for providing Laboratory and Library facilities. The authors are also thankful to Prof. Dr. P. M. Patil and Prof. Dr. A. N. Sirsikar for there suggestions.

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