# EFFECT OF FUNGICIDE PROPICONAZOLE ON OXYGEN CONSUMPTION RATES OF SNAIL LYMNAEA ACCUMINATA (LAMARCK)

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**Abstract:**

Snails Lymnaea accuminata, were exposed to 0.6 mg/l (1/10th of 96 hrLC50) and 1.2 mg/l(1/5th of 96hr LC50) of fungicide Propiconazole. Initially at 24 hours, at both the concentrations decrease in oxygen consumption rate is noted. At 48 hours stage, an increase in oxygen consumption rate is noticed at both the sublethal concentrations. At 72 hours stage in both the sublethal concentrations reduction in oxygen consumption is noted. At the end of 96 hours, again in both the concentration decrease in oxygen consumption prevailed. These experimental snails upon transfer to fresh water for 24 hours, showed recovery in oxygen consumption rate. Oxygen consumption rate are discussed with respect to sublethal concentration and time of exposure to toxicant Propiconazole.

**Keywords:**

Propiconazole, oxygen consumption Lymnaea accuminata

## Introduction:

Introduction Change in the oxygen consumption rates serves as the one of the indicators of environmental stress. Effect of insecticides on the oxygen consumption of mollusc has been studied by Agarwal (1978) he observed effects of Endrin on certain fresh water gastropods, Rao and Mane ( 1978) noted effects of Malathion on survival and respiration of Mytilus gallanoprovincialis. Moorthy et. al. (1984) reported changes in the respiration and ionic constituents in tissues of fresh waater mussel exposed to Methyl parathion ,Thosar and Lonkar (1994) studied effect of Metasystox on the oxygen consumption of Vivipara bengalensis. and Rohankar and Kulkarni ( 2005) reported alteration in oxygen consumption in freshwater snail Bellamya bengalensis during pesticide exposure. Lonkar (2012) reported changes in

oxygen consumption rates of mollusk Indoplanorbis exustus exposed to sublethal concentrations of insecticide Phytofos. Less information is available on oxygen consumption of snail Lymnaea accuminata exposed to fungicide. Therefore the present investigation is attempted.

**Material and Method:**

The specimens of snail, Lymnaea accuminata were collected locally and were acclimated to the laboratory condition for 7 days in the glass aquaria filled with chlorine free tap water. Physicochemical parameters of chlorine free tap water showed following ranges, pH 7.1 to 7.4, dissolved oxygen 7.2 to 7.6 mg/l, free CO2 Nil, Total hardness (as CaCO3) 161-173 ppm. Alkalanity 142-160 mg/l, Temperature 27 to 29 oC. For finding 96 hr LC 50, static bioassay experiments were set by using the toxicant Propiconazole ( Quash, Propiconazole 25% E.C. Manufactured by Cheminova India Limited Panoli Gujrat India) fungicticide compound . Initially. bioassay experiments were set with a wide range of toxicant and finally with closer ranges. Various concentrations were prepared by dilution method. Cleaned similar sized and preweighed Snails were exposed to 0.6 mg/l (1/10th of 96 hrLC50) and 1.2 mg/l (1/5th of 96 hrLC50) concentration for 24, 48, 72 and 96 hours. The toxicant solutions were renewed after every 24 hours. “A closed chamber” method was used for the measurement of oxygen consumption of snails. The oxygen content was determined by Winkler method at the end of 24, 48, 72 and 96 hours. The recovery rates were determined by transferring the experimental animals in toxicant free water. Oxygen consumption was calculated in terms of mg/hr/gram body weight of snail. Respiratory response values were found after calculating the percent normal oxygen consumption. In each experiment about 10-15 animal were used.

**Result and Discussion:**

Discussion In the present investigation at 24 hours stage decrease in oxygen consumption rate is noticed in the snail Lymnaea accuminata exposed to both sublethal concentration. At 48 hours an increase in oxygen consumption was noted at lower and higher concentration , at 72 hours stage the decrease in oxygen consumption is found at both the concentration. At 96 hours exposure at both the concentration decrease in oxygen consumption is noted. Rao and Mane 1978) noticed an initial stimulation in oxygen consumption rate of Mytilus gallanoprovincialis exposed to low sublathal concentration of Malathion. Hanumante et.al. (1980) noticed an increase in respiratory rate for 96 hours in the pulmonate, Onchidium vessiculatum exposed to sublathal concentration of DDT. Moorthy et.al. (1984) noticed an initial elavation in oxygen consumption of freshwater mussel Lamellidens marginalis followed by decrease in oxygen consumption.( MANE et. al 1984) studied the effect of Cythion - Malathion (0.081 ppm)on oxygen consumption in three freshwater bivalve for 96 hours and reported that, the rate of oxygen consumption increased initially in Lamellidens carianus (Lea) and L. marginalis (Lamarck), whereas mortality occured in Indonia caeruleus. But when I. caeruleus were exposed to lower concentration (0.004 ppm and 0.012 ppm) of Cythion - Malathion, the rate of oxygen consumption increased as compared to control. They have attributed this increase in oxygen consumption in all three bivalves to their behavior resulting in excessive muscular activity. Thosar et.al. ( 2001) noticed an increased in the oxygen consumption of snail L. accuminata at 24, 72 and 96 hours exposed to 3.4 mg/l concentration of Metasystox. They also found that when these snail were exposed to higher sublathal concentration (6.8 mg/l), the Oxygen consumption rate is increased at all exposure periods i.e. 24, 48, 72 and 96 hours. Rohankar and Kulkarni (2005) reported the alteration in oxygen consumption of freshwater snail Bellamya bengalensis. exposed to Phosphomidon. The snails was exposed to lethal concentration(0.135mg/l) and two sublethal concentrations (0.045mg/l

and0.0675mg/l) of Phosphamidon an acute and chronic treatment at normal room temperature. They reported significantly rise in oxygen consumption of snail by 1.14% at lethal concentration, 7.6% at higher sublethal concentration,10.88% at higher sublethal concentration at the end of 24 hours exposure. Lonkar (2012) reported initial increase in oxygen consumption at 24 hours exposure in Indoplanorbis exustus exposed to sublethal concentrations 1.4 mg/l and 2.8 mg/l of insecticide Tricel. Agrawal,.( 1978) reported decrease in oxygen consumption of snail L. accuminata, L.luteola and V.bengalensis exposed to sublathal concentration of organ chlorine insecticide Endrine. He inferred that, the death of snail is due to great reduction in the oxygen consumption. Mahendra and Agrawal( 1981) also noticed reduction in the oxygen consumption of snail Lymnea acuminate exposed to 10 mg/l and 20 mg/l of Trichlorphon for 24 and 48 hours. Thosar and Lonkar( 1994) noted reduction in oxygen consumption rate in snail V. bengalensis exposed to two sublathal concentration (1.30 mg/l and 2.60 mg/l) of organophosphorus insecticide Metasystox. Thosar et. al (2000) studied respiratory response of the snail Vivipara bengalensis exposed to sublethal concentration of the insecticide Fenval (1.85mg/l and 3.70mg/l). Fall in oxygen consumption rate was noted at 3.7mg/l concentration. Thosar et.al. (2001) exposed the snail Lymnaea accuminata to Metasystox and reported decrease in oxygen consumption rate at 48 hours exposure at lower sublethal concentration. Experimental snails Lymnaea accuminata after transfer to toxicant free, chlorine free tap water for 24 hour, showed recovery this may be due to observation that the 24 hours time is sufficient for the gills to heal up or recovery in gills.

**Conclusion:**

Snails Lymnaea accuminata exposed to toxicant Propiconazole (Fungicide) showes the changes in oxygen consumption. After transferred to toxicant free fresh water shows the recovery in oxygen consumption.

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**Table -1** Changes in oxygen consumption rate of *Lymnaea accuminata* exposed to different concentration of Propiconazole

| Concentration of Propiconazole in mg/l | Exposure period in hours | | | | Recovery in tap water | Oxygen consumption |
|---|---|---|---|---|---|---|
| | 24 | 48 | 72 | 96 | | |
| Normal snail | 0.04396 | 0.03017 | 0.04286 | 0.03362 | 0.03420 | Rate mg/hr/gm body weight |
| | 100% | 100% | 100% | 100% | 100% | Taken as 100% |
| 0.6 mg/l Propiconazole | 0.03994 | 0.03357 | 0.03786 | 0.02502 | 0.03766 | Rate mg/hr/gm body weight |
| | 90.86% | 111.30% | 88.34% | 74.43% | 110.14% | Percent of normal |
| 1.2 mg/l Propiconazole | 0.03818 | 0.03087 | 0.03616 | 0.02449 | 0.03424 | Rate mg/hr/gm body weight |
| | 86.87% | 102.34% | 84.37% | 72.87% | 100.12% | Percent of normal |