RESEARCH PAPER:

Effect of temperature on the oxygen consumption of freshwater female crab, *Barytelphusa guerini*

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SUMMARY

Metabolic response to thermal stress and its relation to size were studied in the crab by determining the temperature characteristics of oxygen consumption in the temperature range of 10º C to 37 ºC. The fresh water female crab, *Barytelphusa guerini* was selected for present investigation. It is abundantly available in the paddy fields of Nanded district. The crustaceans were collected from their natural habitat and brought to the laboratory to acclimatize them with laboratory condition. The animals were acclimated to different temperatures in the temperature bath. The total oxygen consumption and rate of oxygen consumption per unit body weight was studied by modified Winkler's Method. In the present work, total oxygen consumption and rate of oxygen consumption showed gradual increased trend at higher temperature and at lower temperature decreased as compared to control.

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Key Words : Temperature, Acclimation, Oxygen consumption, *Barytelphusa guerini*

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Temperature limits the distribution of animals, it affects the metabolic activities (Mc Whinn; 1967). In general, life activities occur within a range of about 0 ºC to 45 ºC. However, most animals live within much narrower limits. The effects of temperature on the metabolism of poikilotherms are elucidated through studies on oxygen consumption in relation to thermal stress, seasonal variations, temperature acclimation in the laboratory and natural adaptation of animals to wide geographical areas occurring at different latitudes.

The metabolic rate of crustaceans is generally related to temperature as in other poikilotherms (Precht *et al.*, 1955; Wolvekamp and Waterman; 1960). In cold blooded animals, the oxygen consumption rises with increasing temperatures but rise does not proceed at uniform rate for all ranges of temperature. The temperature limits the rates of chemical reactions which depends upon the effect of temperature on the previous thermal history of the animal (Prosser and Brown,1961), the manner in which the animal is exposed to a temperature stress which is an important factor for the determination of respiratory rate in animals.

On several investigations, it is concluded that the rate of physiological processes, determined at various temperatures with the velocity of chemical reactions occurs *in vitro*.

The chief aim of the present study was to investigate the oxygen consumption in the freshwater female crab, *Barytelphusa guerini* under different temperature conditions. The metabolism of poikilothermic animals is a complex physiological process which shows the effect of temperature on the oxygen consumption of freshwater female crab, *Barytelphusa guerini*. The factor i.e. temperature influences the respiratory metabolism of animals.

The investigation shows that the physiological activities involving respiratory exchanges tend to fall within a certain definite order of temperature characteristics (Crozier, 1924).

EXPERIMENTAL METHODOLOGY

The freshwater female crabs, *Barytelphusa guerini*, used in the present investigation were collected from the paddy