The hormones play an important role in the physiology of bioenergetics of almost all the vertebrates including fishes. A systematic investigation on the effect of hormone and pharmacological drugs on the physiology of Indian freshwater teleosts have not been undertaken in detail. The present work is an endeavour to study the effect of hormones and drugs on oxygen uptake and equivalent energy utilization (E.E.U) in freshwater teleost, *Mystus vittatus* (Bloch).

**MATERIALS AND METHODS**

Live specimens (*Mystus vittatus*) of almost same body weight (45.0±1.5g) were procured from local fish dealer at Siwan, transported to the laboratory in a plastic bucket and kept in glass aquaria for a week for acclimatization. In the laboratory they were fed daily with pieces of goat liver. The fishes were kept starved prior to any experiment. The details of the methods employed in the determination of routine oxygen uptake were those of Pandey et al. (2002) and Kumari and Rauf, (2015). The concentration of dissolved oxygen content in the water was established by Winkler's volumetric method (Welch, 1948). The equivalent energy utilization (E.E.U) was estimated by applying an oxy-caloric equivalent of 4.8K.Cal/liter of Oxygen (Winberg, 1956). The hormones or drugs were injected intraperitoneally slightly anterior to pelvic fins on the abdominal side of the fish. The animals of control group got the treatment of normal saline. Prior to every experiment the effective doses of different hormones were standardised and oxygen uptake was measured every 24 hours after the last injection (except adrenaline). The difference of significance, if any, was calculated by student’s t-test at the level of 5%.

**RESULTS AND DISCUSSION**

The data showing the effect of hormones and pharmacological drugs on oxygen uptake and E.E.U in *Mystus vittatus* are presented in Table 1. The value of oxygen uptake (mlo$_2$/h) and E.E.U (K.Cal/h) were respectively 4.512 and 0.0216 K.Cal/h. Treatment of hydrocortisone, adrenaline, progesterone and thiouracil bring about significant decrease while the treatment of testosterone and L-thyroxine bring about significant increase in Oxygen uptake and E.E.U. in a fresh water fish, *Mystus vittatus* (Bloch). The details have been discussed in this paper.

Key words : O$_2$ uptake, E.E.U, Hormones, *Mystus vittatus* (Bl.).
other hand calorigenic effect of thyroid has been reported in gold fish. (Chavin and Rosmore, 1956), Carps (Gabos et al., 1973) and H. fossilis (Pandey et al. 1976). A significant decrease in Oxygen consumption following thiouracil treatment has been observed in Compostoma (Osborn, 1951) & H. fossilis (Pandey et al., 1976) and in Acquidens latifrons after radiothyrodectomy (Ruhland, 1971). From the above discussion it appears that investigations are not unanimous so far, the role of thyroid gland on Oxygen consumption in teleosts is concerned. On the basis of the work presented in this report, it appears that thyroxine increases oxygen consumption and E.E.U while, thiouracil (Table 1) causes decrease in Oxygen Uptake in the species under investigation. Thus, thyroxine in physiological doses seem to elevate the Oxygen uptake and E.E.U to a significant level in the present investigation. Our present findings are consistent with the earlier reports (Chavin and Rosmoore, 1958; Gabos et al., 1971; Pandey et al. 1976; Ruhland, 1971).

TABLE 1: Effect of hormones and pharmacological drugs on oxygen uptake and equivalent energy utilization (E.E.U) in Mystus vittatus (Bloch) at 29.0±10.0°C; Body weight = 45±1.0g; N=6.

Table 1: Effect of hormones and pharmacological drugs on oxygen uptake and equivalent energy utilization (E.E.U) in Mystus vittatus (Bloch) at 29.0±10.0°C; Body weight = 45±1.0g; N=6.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Condition</th>
<th>Injection in no. of days</th>
<th>Total dose mg/100g</th>
<th>Oxygen uptake (ml/h)</th>
<th>E.E.U (k.cal/h)</th>
<th>E.E.U (k.cal/day)</th>
<th>E.E.U (k.cal/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control</td>
<td>2</td>
<td>1.0</td>
<td>4.512±0.21</td>
<td>0.0216</td>
<td>0.5197</td>
<td>15.5394</td>
</tr>
<tr>
<td>2</td>
<td>Hydrocortisone</td>
<td>2</td>
<td>1.0</td>
<td>2.139±0.15</td>
<td>0.0102</td>
<td>0.2464</td>
<td>7.3923</td>
</tr>
<tr>
<td>3</td>
<td>Adrenaline</td>
<td>2</td>
<td>0.000006 (IU)</td>
<td>1.462±0.09</td>
<td>0.0070</td>
<td>0.1684</td>
<td>5.0526</td>
</tr>
<tr>
<td>4</td>
<td>Testosterone</td>
<td>2</td>
<td>1.0</td>
<td>5.891±0.16</td>
<td>0.0279</td>
<td>0.6696</td>
<td>20.0897</td>
</tr>
<tr>
<td>5</td>
<td>Progesterone</td>
<td>3</td>
<td>1.5</td>
<td>3.215±0.13</td>
<td>0.0154</td>
<td>0.3703</td>
<td>11.110</td>
</tr>
<tr>
<td>6</td>
<td>L-Thyroxine</td>
<td>2</td>
<td>1.5</td>
<td>5.714±0.20</td>
<td>0.0274</td>
<td>0.6582</td>
<td>19.7475</td>
</tr>
<tr>
<td>7</td>
<td>Thiouracil</td>
<td>6</td>
<td>1.5</td>
<td>2.345±0.14</td>
<td>0.0112</td>
<td>0.2701</td>
<td>8.1043</td>
</tr>
</tbody>
</table>

So far, the effect of adrenocortical hormones on the homeostasis of oxidative metabolism in fishes is concerned, we have very little information regarding it. Merinescu (1971) in Gobius melanostomus and Pandey et al. (1985), in M. aculeatum found sharp and substantial decrease in Oxygen consumption after the treatment with adrenaline. These findings are consistent with our finding in Mystus vittatus after the treatment of both the adrenaline and hydrocortisone. The exact reason of the effect of adrenaline on the respiration is not clearly understood but Krantz and Carr (1958) has stated that it results from carotid sinus response to the increase in blood pressure, and prompt relaxation of respiratory muscle is evoked by epinephrine causing slow heart rate.

REFERENCES

EFFECT OF SOME HORMONES ON METABOLIC RATES IN MYSTUS VITTATUS


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