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Effect of body size on biochemical parameters in mucus of freshwater snail *Bellamya bengalensis* (Jousseau, 1886)

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Abstract : Among the freshwater edible snail *Bellamya bengalensis* has potential nutritional and medicinal importance. Especially people suffering with anaemia, malformation of bone structure, treatment of eye problems, consume its meat and soup with belief to restore their health. . In present work the concentration of total protein, glucose in mucus of *B. bengalensis* of different shell size (2-3.5cm and 1-2cm) was analysed. The investigation results have shown that the concentration of the protein in larger size shell (2-3.5cm) was 4.60 ± 0.023 g/dl and in smaller size shell (1-2cm) was 3.44 ± 0.04 g/dl and glucose in larger size shell (2-3.5cm) 15.22 ± 0.33 mg/dl and in smaller size shell (1-2cm) was 12.1 ± 0.15 mg/dl in the mucus of snails. Statistical analysis were calculated by using student's t test, it was observed that protein concentration was significantly higher in larger size snail group at 0.1% level ($p < 0.001$) and glucose concentration was also significantly higher in larger size group at 0.1% level ($p < 0.001$).

Keywords : *Bellamya bengalensis*, mucus biochemical parameters, glucose, protein, student's t test

INTRODUCTION

The freshwater edible snail *B. bengalensis* is abundantly found in all types of temporary and permanent water bodies of Jharkhand.

It belongs to family- viviparidae of class – Gastropoda, phylum – Mollusca. Ethno medicinal survey in these areas were done and was reported that since immemorial time , people are very conscious about the ethno-medicinal value of *B. bengalensis*. They strongly believe about the function of *B. bengalensis* which can cure several diseases such as controlling conjunctivitis , night blindness , diarrhoea , stomach disorder , arthritis , joint pain, rheumatism cardiac diseases controlling blood pressure , asthma , rickets (calcium metabolism) nervousness and giddiness etc .*B. bengalensis*, the common banded pond snail of India was described by¹ and also by² , who studied the ecology and growth rate

of snail. According to³ it breeds throughout year reaching its peak during April to July. These snails breed all the year round and lay the eggs on the lower surface of aquatic plants. Many works have been done on the reproduction and biochemical studies of some freshwater snail muscle such as *Lymnaea acuminata*. The effect of plant molluscides on reproduction of snail *Lymnaea acuminata* studied by⁴. Recently Ethnomedicinal importance of *B. bengalensis* was estimated in terms of analysis of its protein and amino acid composition by⁵ and also studied proximate fatty acid composition of *B. bengalensis* .

The bodies of snails are characterised by rich mucus which covers their surface. Apparently, the mucus may serve in preventing the moisture evaporation and it helps in smooth movements by⁶. It also protects the body from mechanical injuries. Mucus has antibacterial properties against many pathogenic bacteria. In addition sum unknown biochemical functions may be involved in the mucus, though nothing has been reported so far with this

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respect. Snails are are fairly resistant to infection by microorganisms. So, present studies have been done to estimate biochemical composition such as protein and glucose of mucus between two sized snails.

MATERIALS & METHODS

Collection of Sample and extraction of mucus:

Snail *B. bengalensis* were purchased from Ranchi market and brought to P.G.Department of Zoology lab, and collected sample were kept in aquarium under laboratory condition. They were thoroughly cleaned with cleaned napkin to remove all the sand and debris on the shell. The mucus was extracted from the snail by removing the shell with a sterile sharp metal rod, mucus aseptically squeezed out from the soft body was collected into a

beaker. The extracted mucus was considered 100% concentration by⁷ and was stored in the refrigerator at 4°C for biochemical analysis.

The protein content of mucus was done by Biuret method of ⁸, for analysis were used 10µl of mucus was added with 1ml Biuret reagent and left for 10 minutes at room temperature. Violet coloured appeared. Read absorbance in colorimeter at 540 nm wavelength against blank.

While glucose content was determined by the method of GOD-POD (Colorimetric) method by⁹, for analysis were used 10µl of mucus mix with 1ml reagent and left for 1 hour at room temperature. Cherry red coloured turned and read the extinction at 520 nm against blank.

RESULT & DISCUSSION

Table 1: Protein concentration of mucus in different size of *Bellamya bengalensis*

Size (cm)	Protein concentration (g/dl)	Average concentration (g/dl)	Value of t-test
2-3.5	4.62 4.60 4.57 4.62 4.52 4.60	4.60±.023	4.64***
1-2	3.42 3.40 3.50 3.46 3.45 3.43	3.44±.04	

***=P<0.001, significant at 0.1%

Table2: Glucose concentration of mucus in different size of *Bellamya bengalensis*.

Size (cm)	Glucose concentration (mg/dl)	Average concentration (mg/dl)	Value of t-test
2-3.5	15.0 15.0 15.7 15.2 15.1 15.6	15.22±.33	17.22***
1-2	12.0 12.3 12.0 12.2 12.2 12.1	12.1±.15	

***=P<.001, Significant at 0.1%

Table 1, showed the protein concentration of mucus in two sized snail(2-3.5cm and1-2cm).It was found that larger sized snail had more protein content (4.60 ± 0.023 g/dl) than smaller size snail (3.44 ± 0.04 g/dl) and value of t-test was 4.64. When these values were statistically analysed it was observed that larger size snail had more significant than lower size snail at 0.1% level ($P<0.001$). In table 2,Glucose concentration of mucus showed that in larger size snail had more glucose concentration (15.22 ± 0.33 mg/dl) than smaller size snail(12.1 ± 0.15 mg/dl) and value of t-test was 17.22.When these values were statistically analysed it was observed that larger size snail had more significant than lower size snail at 0.1% level ($P<0.001$). It indicate that protein and glucose of mucus of snail increase with increasing shell size. Larger shell snail and smaller shell snail has concentration of protein 4.60 ± 0.023 g/dl and 3.44 ± 0.04 g/dl respectively and concentration of glucose 15.22 ± 0.33 g/dl and 12.1 ± 15 g/dl respectively.

The result corroborates with the studies done by¹⁰, according to which hemolymph of snail *Archachatina marginata* content of protein 5.4g/dl and glucose 35.0mg/dl. According to¹¹ protein concentration in hemolymph of fresh water bivalve *Elliptio complanata* is 73.3 mg/dl. It was observed that the hemolymph of garden snail *Helix Pomotia L* has concentration of protein 4mg/dl and glucose 14.4mg/dl by ¹². It was also reported by ¹³ content of protein in hemolymph of crustaceans *Astacus leptodactylus* and *Carcinus aestuarii* had 3.32 ± 0.25 g/dl and 4.01 ± 0.07 g/dl respectively. Crab (*callinectes Amnicola*) showed 19 g/100 g protein content in tissue¹⁴.

So, specimen of the present study indicate that, *B. bengalensis* mucus has more protein and glucose concentration other than hemolymph of *Helix pomotia L* and freshwater bivalve *Elliptio complanata*..

CONCLUSION

Based on the obtained results, it is clear that larger size snail has rich in protein and glucose concentration than smaller size snail and it is beneficial for human being.

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