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STUDY ON FREE AMINO ACID LEVELS IN *RAILLIETINA TETRAGONA* (MOLIN, 1858)

Achaiah N*

Department of Zoology, Kakatiya University, Warangal-506 009. (A.P), India

E-mail: achaiahsai@gmail.com

ABSTRACT

Free amino acid levels in different regions of the worm *Raillietina tetragona* (Molin, 1858) infecting domestic fowl (*Gallus domesticus*) were estimated. Amino acid variation was observed in immature, mature and gravid regions of the worm and the results were statistically analysed. The results are discussed in relation to their metabolic transition.

Key words : *Raillietina tetragona*, free amino acids, *Gallus domesticus*, proglottids, metabolic transition.

INTRODUCTION

Amino acids are building blocks of proteins. They are the precursors of enzymes, hormones, purines, pyrimidines etc. Apart from naturally occurring standard amino acids, there are some amino acids which are never found as constituents of proteins but play an important role in metabolic activities. Free amino acid levels in tissues are lower than the levels of protein as they cannot be stored. They are either incorporated into proteins or used for energy production by transdeamination. Cestodes have limited ability to metabolize amino acids (Read and Simmon, 1963).

It has been reported that the protein content is relatively lower in helminths than that of other invertebrates (Cheng, 1986; Smyth and McManus, 2007). Goodchild (1961) reported 32% protein content in *Hymenolepis diminuta*. Soo *et al* (1964) studied it form some parasitic helminths. Von Brand (1952) reported amino acids from nematodes and some cestodes. Aldrich *et al* (1954) reported from *H.diminuta*. Goodchild (1966) studied amino acid distribution in seven species of helminths. Amino acids of host internal environment are freely incorporated into proteins by cestodes (Harris and Read 1968). Studies on the amino acid composition of the cestodes have shown that they are closely similar to that of hosts with a few exceptions (Smyth and McManus, 2007).

No work has been carried out on free amino acid distribution in different regions of the worm. In the present study, distribution of free amino acids in different regions of the worm *Raillietina tetragona* (Molin, 1858) i.e. immature, mature and gravid has been carried out to understand the correlation between their distribution and their metabolic transition.

MATERIAL AND METHODS

Raillietina tetragona is a poultry cestode, parasitizes domestic fowl *Gallus domesticus*. The viscera were brought to the laboratory from local commercial chicken abattoirs of Warangal (A.P). The intestines were dissected and

parasites were collected and washed with 0.9% normal saline and washed in several changes to remove debris, mucus and sticky food material. Worms were kept on blotting paper to remove excess of water; and weighed on Schimadzu balance for biochemical estimations.

Total free amino acids were determined by the method of Moore and Stein (1954).The free amino acids were expressed as µmoles of tyrosine equivalents/ gram wet tissue. The data obtained was statistically anlysed by ANOVA.
selected and biochemically analysed for ALAT and AAT levels. The results were analysed statistically by ANOVA.
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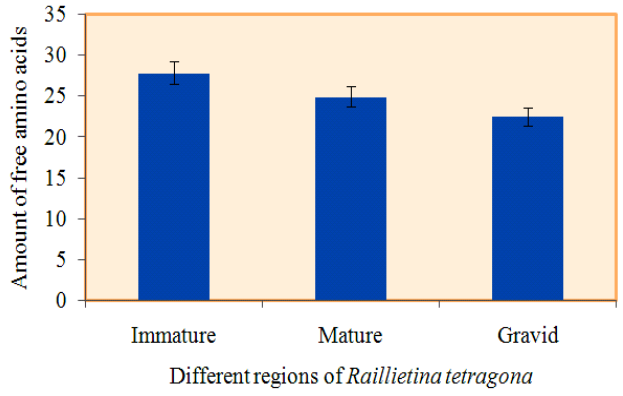
RESULTS AND DISCUSSION

The levels of free amino acids in different regions are presented in Figure-1. The amounts of free amino acids recorded from immature, mature and gravid regions were 27.84 ± 2.39, 24.96 ± 2.03 and 22.49 ± 2.49 µ gm/of tyrosine equivalents/100 mg wet weight of parasite respectively.

Figure-1. **Regional distribution of free amino acids in *R. tetragona* (**Values are expressed in µ gm/of tyrosine equivalents/100 mg wet weight of parasite)



The total free amino acid levels are more in immature region followed by mature and gravid regions. The quantitative amino acid levels obtained in the present investigation are comparable with the values obtained by Goodchild and Dennis (1966), Chappel and Read (1973), Pathak *et al*. (1980) and Reddy (1981) and Raghavendra Rao (1982). The differential distribution of amino acids in different regions is in correspondence with the total proteins in the tapeworms. Protein metabolism may be concerned with synthesis of proteins for reproductive activity and proliferation.

14 amino acids were recovered in protein hydrolysis of *Taenia solium* and *Moniezia expansa* and no significant difference was noted among anterior, middle and posterior portion of worm bodies by Soon Hung Lee *et al* (1964). Possible role of amino acids in metabolism of tapeworms was discussed by Campbell (1960). Free amino acids are distributed in cytoplasm and serve as precursors for protein synthesis. Cestodes have limited ability to metabolise amino acids (Read and Simmon1963). Amino acid uptake has been studied in many cestodes like *Taenia crassiceps* (Pappas *et al.,* 1973, Daugherty 1976, Haynes 1968, Roy and Srivastava 1981).

Regional differentiation in amino acid levels of three different regions is due to its differential metabolic rate. Anterior region contains more amino acid pool to synthesize protein for the formation of proglottids when compared to other regions viz., mature and gravid. The amino acids present in mature region may get incorporated into formation of eggs and reproductive organs. The lower levels in gravid region indicate its degenerated activities. The flux of amino acids depends on nutrient availability in intestinal lumen of the host.

CONCLUSION

Amino acids are utilized in protein synthesis rather than generation of energy. This is also supported by the higher levels of glycogen which is an energy resource in helminths.

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