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Research Article

BIOCHEMICAL STUDIES ON PROTEIN CONTENTS IN PROTEOCEPHALIDEAN CESTODE *GANGESIA* SP. AND ITS HOST *WALLAGO ATTU*

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ABSTRACT
Present investigation deals with quantitative study of protein content in Proteocephalidean cestode *Gangesia sp.* and its normal and infected intestinal host tissue of *Wallago attu*. Obtained result indicate that amount of protein present in *Gangesia sp.* is lower (2.0 mg/gm) as compared to protein present in infected intestinal tissue of *Wallago attu* (2.44 mg/gm) as well as in normal host intestinal tissue of *Wallago attu* (3.66 mg/gm).

Keywords: *Gangesia sp., Protein Content, Proteocephaliean Cestode, Wallago Attu*

INTRODUCTION
Main sources of energy reserves in fish are protein and lipid, in contrast to mammals in which carbohydrate and lipid are more important. This is perhaps due to the following factors: (I) the diet of fish generally consists of high protein, and the fish metabolism is well adapted to deal with such a diet; (II) unlike mammals, fish have the ability to eliminate nitrogenous waste rapidly and continuously; (III) specific activities of lysosomal enzymes which are involved in protein breakdown are greater in fish than in mammals (Chellappa, 1988).

Proteins are the most abundant organic molecules in cells constituting 50 percent or more of their dry body weight. The main significance of the proteins is their role in structural make up of the body rather than in the yield of the energy. Proteins are the most abundant organic molecules in cells constituting 50 percent or more of their dry body weight. They are found in every part cell; since they are fundamental in all aspects of cell structure and function. The proteins are absorbed by the parasites by diffusion and transfusion. Proteins serve a physiological system in many ways with their ubiquitous nature. They build up new tissue and maintain the structure of every cell/ tissue including its content of protein-containing enzyme systems. They are hydrolyzed by the digestive enzymes and thus liberated amino acids are rapidly absorbed into the intestinal capillaries and thereby enter the general circulation by way of liver. The amino acids from the hydrolysis of dietary protein join the amino acids released from the continual disintegration of structural and functional protein from the tissues and become a part of the amino acid pool. From the common amino acid pool, amino acids are taken up by the cells, to be built into the cell structure as required.

Fish is correctly regarded as a healthy component of the diet. Fish is an excellent source of food. Its flesh is nutritionally equivalent to meat in protein contents, low in saturated fats and high in essential minerals and vitamins. To obtain healthy and quality meat fish, it is necessary that the fish should be free from all types of infections like viral, bacterial and parasitic. However, there are risks associated with eating cultured fish owing to the infection by helminthic parasites. Parasitic fish diseases are posing a problem for breeders in India cultivating fish for food. Despite several attempts to control these parasites, infestation continues to grow and until effective measures of control are devised and implemented, a serious decline in fish population is expected. Helminths are found in almost all the animals including fish throughout the world. Humans get automatically infected at the time of eating the infected and uncooked flesh of fish.

Cestodes are endoparasitic helminths which exclusively occupy the alimentary canal in preference to other common sites like the bile duct, the gall bladder or the pancreatic duct (Smyth and McManus, 2007). Elongated tape-like body of cestode enables it to live in its tubular habitat (Smyth and McManus,

2007). As an alimentary canal is absent, the worm derives its nutrition from the host's gut across its highly specialized, metabolically active body surface or tegument (Smyth and McManus, 2007). Carbohydrates are the most commonly used source of energy in cestodes (Cheng, 1986). Lack of protein in host's diet does not affect cestodes to a great extent but it results in stunting of growth, decreased egg production and development of morphologically abnormal eggs (Cheng, 1986).

MATERIALS AND METHODS

For the collection of Cestode parasites, the intestine of *Wallago attu* were collected from different localities of Nanded. Collected worms were washed in distilled water to render them free from intestinal contents; preserved in hot 4 % formalin. Worms were stained in Borax carmine, Aceto Alum Carmine and Delafield's Haematoxylin stain. Stained specimens were dehydrated through ascending alcoholic grades i.e. 30%, 50%, 70%, 90% and 100%, cleared in xylene and mounted in Canada Balsm and DPX. Drawings are made with the aid of camera lucida for taxonomic identification. The Cestode parasites collected from intestine of fish host *Wallago attu* was identified as *Gangesia sp.* according to Yamaguti 1959. Protein content was determined by the Lowery's Method (1951).

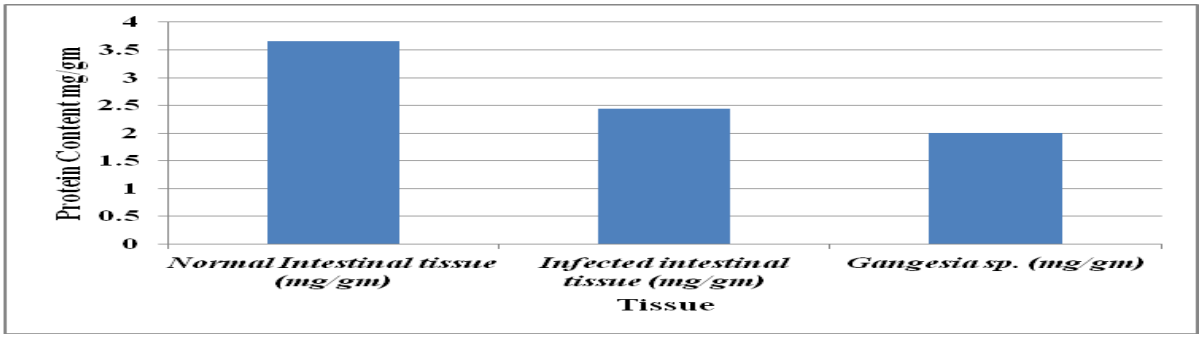
RESULTS AND DISCUSSION

Results

Result obtained in present study indicates that amount of proteins present in *Gangesia sp*.(2.0 mg/gm) is lower as compared to protein present in infected intestine (2.44 mg/gm) as well as in normal intestine (3.66 mg/gm) of host *Wallago attu*. This is summarized in table and graph.

Table 1: Comparative chart of protein content in Normal host intestinal tissue, Infected Intestinal tissue and their parasite

Protein contents (mg/gm wet weight of Tissue)		
Normal Intestinal tissue of *Wallago attu*	**Infected intestinal tissue of *Wallago attu***	***Gangesia sp.***
3.66	2.44	2.0



Graph 1: Graph showing protein content in Normal host intestinal tissue, Infected Intestinal tissue and their parasite

Discussion

Total protein content of cestodes usually lies between 20 and 40 % of the dry weight that is comparatively lower than that of other invertebrates (Smyth and McManus, 2007) but values, as high as 70% of the dry weight have been reported for *Macrachanthorhynchus hirudinaceus* and the infective larvae of *Nippostrongylus brasiliensis* (Barrett, 1981).

Result shows parity with findings of Jadhav *et al.,* (2008) who reported amount of protein in *Davainea shindei* is 13.20 mg/mg wt. of tissue where as in host intestine is 15.42 mg/mg of tissue. Nanware *et al.,* (2012) studied amount of proteins in *Cotugnia* sp. is lower (5.77mg/gm) as compared to protein present in

infected intestine (6.66 mg/gm), in host normal intestine (16.22 mg/gm). Bhure *et al.*, (2012) recorded lower (15.88 mg/gm) amount protein in *Ascardia galli* as compared to infected intestine (19.33 mg/gm) and normal host intestine (19.77 mg/gm).

Anil (2014) recorded total protein content appeared to have increased during the infection in *Catla catla* and *Labeo rohita* by *Pallisentis nagpurensis.* Bhure *et al.*, (2014) reported low amount of protein in *Moniezia expansa* (2.72 mg/gm wet weight) as compared to infected intestine of *Capra hircus* (3.63 mg/gm wet weight) and normal intestinal tissue of *Capra hircus* (4.09 mg/gm wet weight). Pallewad *et al.*, (2014) studied Protein contents in normal intestinal tissue of *Capra hircus L.* is 31.27 mg/100 mg; in infected intestinal tissue is 28.36 mg/100mg where as in *Cotylophoron sp.* is 23.60 mg/100gm. Observations of Bhure *et al.*, (2015) revealed amount of proteins in *Spinitectus indica* sp. is 2.55 mg/gm; in infected intestinal tissue of *Mastacembelus armatus* is 3.11 mg/gm; in normal intestinal tissue 4.22 mg/gm. The distribution of protein content in present study is an agreement with result of Dhondge *et al.*, (2010).

The study reveals that, protein is low in *Gangesia sp.* than infected and normal intestinal tissue of fish *Wallago attu*.

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