



Some biochemical parameter in relation to roundworms of *Ovis bharal* from Aurangabad region.(M.S)

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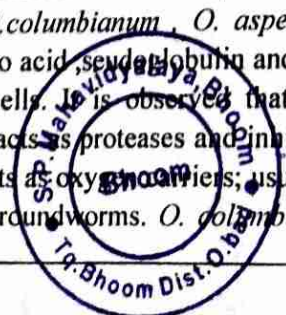
ABSTRACT

Proteins, carbohydrates and fats were estimated in gastrointestinal round worms *Oesphogostomum columbianum*, (Curtice, 1890), *O. asperum* (Ralliet et Henry, 1913), *Bunostomum trigonocephalum* (Rudolph, 1808) of *Ovis bharal* inhabiting various region of intestine. These chemical composition responsible for antigenicity of parasite and cataloguing their constitute molecules so as to perform metabolism .Protein comprises from peptones ,albumins, globulins, albumoses and purine bases as protein fractions segregated from the round worms ,protein concentration determined with including nematodes ,is usually calculated by multiplying their total nitrogen content. These proteins amount available in the form of enzymes, neurosecretory hormones and metabolic compounds which determine life expectancy .Carbohydrates which is core sources of energy found as stored nutrients ,primarily in the form of glycogen which estimated from female worm 5.7 % of the fresh weight and 66.00% of total body glycogen are in the body wall .Fats constitute 1.2-1.9 % of fresh weight and 10.8-10.9 % of the dry weight of the body .Comparatively carbohydrate content was much higher which metabolize very efficiently under anaerobic condition by fermentation in energy production.

Key Words – Biochemical parameter, Round worms, *Ovis bharal* and Aurangabad.

INTRODUCTION

As roundworms have an alimentary tract simply that most exogenous proteins are ingested and digested inside the alimentary canal where the secretory mechanism occurred that is holocrine and merocrine; In addition to this after extraction of intestine conclusion , it conclude that endopeptidase and exopeptidase activity accomplished. Though the proteins not to be absorbed through the living of digestive tract, even though luminal digestion, the resulting amino acid and peptides are utilized via this route. However the roundworm cuticle is permeable to H₂O, few ions as well as hydrophobic antihelminthics, which unlikely that uptake of nitrogenous compounds via this patch is of common phenomenon but also few evidences that absorption via the gut may be supplemented by uptake via the cuticle. Proteins comprises from longchains of amino acids, linked with peptide bonds. Generally protein structure reveals considerable variation both in amino acid sequence and its gross morphology. As proteins perform various functions in all the tissues like structural, supportive as well as functional (enzymes, hormones antigens etc.)Proteins in combination with carbohydrates and lipids form glycoproteins as well as lipo proteins. As proteins available in two form viz.soluble (H₂Osoluble) and insoluble.the soluble proteins consist of enzymes, hormones, antigen, phospholipids, lipoproteins and glycoproteins; While as insoluble proteins sclero proteins, collagen, keratin albumin etc. which utilized for support protection in nature. It is observed that the proteins contents of male parasite are higher than female .The primary oocytes of *O.columbianum* , *O. asperum* and *B. trigonocephalum* had granular structure with the presence of amino acid, pseudoglobulin and protamines the participation of proteins in the formation of layers of egg shells. It is observed that nematodes proteins are having antigenic properties. Amongst these proteins acts as proteases and inhibitor against host digestive enzymes, while metal proteins like haemoglobins acts as oxygen carriers; usually the protein metabolism reaches at peak level during the egg production in roundworms. *O. columbianum* female has 8.4 mg of water soluble





proteins while male shows 9.4 mg of protein per gram wet weight, *O. asperum* male has 9.2 and female 7.8 mg of soluble protein per gram wet weight. At the last *B. trigenocephalum* male has 9.6 mg of soluble protein where as female 7.9 mg per gram wet weight. The insoluble proteins associate to structural proteins of nematodes were hydrolyzed by potassium hydroxide and estimated by Lowry et al method(1964).

Carbohydrates are the principle energy reserves in the adult stage of these nematodes; variation can be seen in their quantity composition, mode of metabolism, by the factors of stage development, sexual dimorphism, seasonal fluctuation and varieties of host and parasite. As carbohydrates are more available in animal parasites than to glucose and trahalose. The chemistry of glycogen shows different in the glycogen biochemical content in the molecular chain length between the host and parasites and from parasite to parasite.

An author has been attempted to understand the carbohydrates metabolism of the three parasites i.e. *O. columbianum*, *O. asperum* and *B. trigenocephalum*. In carbohydrates metabolism the study of glucose, glycogen, pyruvate and lactate level were studied which furnish the fundamental data for substrate and their intermediately metabolites, likewise focus is given on certain essential enzymes in carbohydrate metabolism such as LDH, SDH, MDH, PK and PEPCK by which possible to percept an idea of metabolic pathway through energy is derived by the parasites. To support this experiment certain confirmatory process were conducted on survival parasites with KCN, NaCl and tetramisole inhibitors of various pathway of energy metabolism and their influence on nematode parasite activity observed. The influence of pure oxygen, CO₂ and nitrogen gas phase on general activity and survival of the parasite was undertaken. *O. columbianum* male has 6.5 mg of glycogen per gram ;and female has 5.5 mg of glycogen; *O. asperum* male has 4.2 mg of glycogen per gram and female has 5.7 mg of glycogen; *B. trigenocephalum* male has 5.3 mg of glycogen where as female has 5.9 mg of glycogen. The glycogen level of these three parasites shows slight fluctuation between male and female parasites.

As carbohydrates and proteins comprises the form of nematode similarly fat also one an important biochemical component; lipids triacylglycerols are the most predominant storage form of energy, which continuously being degraded and resynthesized; several factors increase cAMP level therefore the activity of lipids constitute about 1:1 to 1:7% of the fresh weight and 10:7% of the dry weight of the body. The deposition of fat sites in nematodes is the thickened portion of the body wall musculature. However remarkable differences exist among *O. columbianum*, (male 1.2 & female 1 gm) *O. asperum* (male 1.4 & female 1.3 mg) and *B. trigenocephalum*. (male 1.1 & female 1.2 mg).

Name of parasites	%of carbohydrates	%of protein	% of lipid
<i>O. columbianum</i> Male	6.5	9.4	1.2
<i>O. columbianum</i> Female	5.5	8.4	1
<i>O. asperum</i> Male	4.2	9.2	1.4
<i>O. asperum</i> Female	5.7	7.8	1.3
<i>B. trigenocephalum</i> Male	5.3	9.6	1.1
<i>B. trigenocephalum</i> Female	5.9	7.9	1.2
Mean	5.51	8.71	1.2

MATERIAL AND METHODS

MATERIALS

To collect the nematodes parasites daily visit were made to the slaughter house early in the morning where numbers of sheep and goats are slaughtered in everyday; further viscera of sheep and goats were obtained for examination.

METHOD





Glycogen was estimated by using the method of Kemp and Kito Van Heijingen (1954) the parasites were washed well with tyrode's solution and weighed; and separated into various species sexwise. The proteins were estimated by Lowry et al. (1951) Lowry et al. (1964) which is extrapolative as compared to other.

The total lipid content was estimated by the method of Folch et al. (1957) as modified by Overturf Dryer (1969).

OBSERVATION

From table -1 the tabulated data itself indicate that out of total carbohydrate of three nematodes the female carbohydrates content is higher (5.7mg) than the male and total protein of *O.columbianum*, *O. asperum* and *B. trigonocephalum* (8.7mg of fresh tissue) is more than carbohydrate while as lipid content is very low i.e. 1.2 mg.

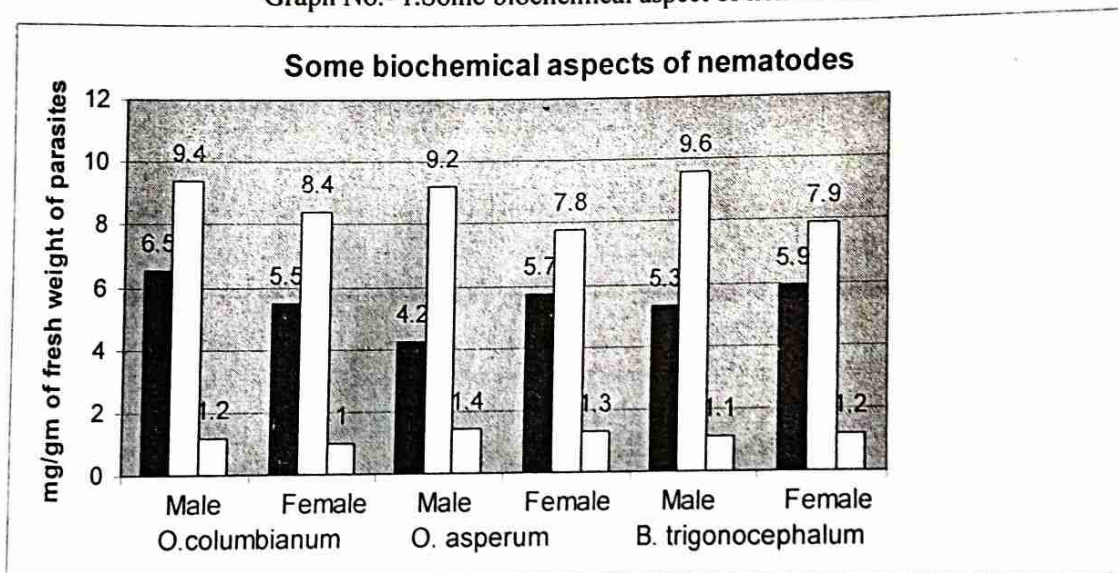
All values are in mg.

Mean % of carbohydrates = 5.51 mg.

Mean % of protein = 8.71 mg.

Mean % of lipid = 1.2 mg.

Graph No.- 1. Some biochemical aspect of nematodes.



DISCUSSION

In the *O. columbianum*, *O. asperum* and *B. trigonocephalum*, the quantity of proteins (8.71 mg) and carbohydrates (5.51 mg) is higher as compare to the lipid (1.2 mg content Table-1). The fluctuation of values can be explained indirectly by studying by observation of another roundworms inhabiting same niches of mammals. In Jejunum an appropriate oxygen tension appears to be present. Moreover an adult nematodes contain a fluid which has affinity for oxygen combining at lower oxygen tension than the corresponding mammalian blood matrix. Such a high affinity for the oxygen even though makes it unlikely physiological carriers of this gas. Since it binds the oxygen to eagerly and would probably not dissociate appreciably under physiological condition.

It can be concluded that *O. columbianum*, *O. asperum* and *B. trigonocephalum* are also an aerobic nematodes parasites living in oxygen rich surrounding that blood might theoretically drive most of their energy from oxidation of fats or proteins but carbohydrate metabolism nevertheless predominates in such form either or not a completely functional Krebs cycles operates in roundworms has been a controversy. Since this pathway is the terminal oxidative pathway for the end products of carbohydrate, protein and lipid metabolisms, and playing a core part in synthetic mechanisms, however earlier work generally not possible to unequivocally a functional role for the the cycle in





nematodes (Barret, 1981) but work has established that, *O.columbianum*, *O. asperum* and *B. trigonocephalum* under partly aerobic conditions, it plays an efficient metabolic function.

Proteins deposited in the oocytes are not used as sources of energy however as precursor for the proteins of the egg shell. Specific target has been the proteins, released by nematodes such as *O.columbianum*, *O. asperum* and *B. trigonocephalum* at various stages of their life cycle viz.skin penetration, food digestion, the cuticle of adult, larval form and direct or indirect involment of amino acids for synthetic and energy. The potential significant of amino acids in the energy metabolism is the observation that aerobically but not an aerobically; amino acids can sustain motility as well as glycogen, ATP level in the above said parasites (Singh et.al, 1992a.).

At lipid metabolism *O.columbianum*, *O. asperum* and *B. trigonocephalum* are very important because lipid not only a part of storing and releasing energy but also important constituents of cell membranes ;The large amount of triacylglycerols and other lipids are incorporated into the oocytes and eggs. The total lipid content of *O.columbianum*, *O. asperum* and *B. trigonocephalum* 1.2 mg of fresh tissue in Table-1.These nematodes parasites revealed carbohydrates and lipid metabolism are directly related (Cheng 1973).

At last can be concluded that comparatively the carbohydrates content is higher than lipid; Apart from this protein amount is highest than the carbohydrate and lipid ,which available in the form of enzymes,neurosecretory hormones and metabolic compounds(from Table -1),however the core energy source of nematodes parasites is only carbohydrate which is in the form of glycogen .

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PRINCIPAL
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