Epitome : International Journal of Multidisciplinary Research
ISSN : 2395-6968

THE IONIC STUDY REPORT ON ASCHELMINTHES PARASITES

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Abstract :

A number of nematode parasites revealed volume regulation in hypotonic media, gut, excretory system and specialized hypodermal gland cells have been suggested as sites of urine production. Intestinal sac preparation from A.lumbricoides can transport water from the luminal to the pseudocoelomic side. The variety of habitate and way of existence exhibited by the nematodes and appeared a distinct problem in comparative study of ionic and osmotic regulatory process within the class. very much focus is given on the deep investigation on the parasitic forms, due to the health and economic importance. The study of inorganic composition of any living organism may through a light on the internal chemical environment and biological interaction in the process of life. In the present work the inorganic composition of three important nematode parasites of sheep and goats i.e. O. columbianum, O. asperum and B. trigonocephalum was estimated and comparative study was carried out. An individual fractionation of the body organ could not be done due to the small size of the nematode parsite. The water content of the three parasites was determined.

Keywords : *Ions, aschelminthes, parasites etc .*

IMPACT FACTOR = 5.653

Discussion :

The inorganic constituents such as potassium, sodium, calcium, iron, copper and phosphorus were estimated after digesting the dry mass of the nematodes. So as to understand the role of iron in the external media and their regulation by the parasites the total ATPase (Na^+- K^+) ATPase and Mg dependent ATPase was estimated in these three parasites. Some batches of nematodes were use to study the influence of ions in the media on the nematodes and their regulatory capacity. The parasites were maintained in different ionic concentrations for 2 hours, homogenized and (Na^+- K^+) ATPase was estimated. These studies gave the information regarding the role of ions in the regulatory mechanism of the parasite.

H_2O:

It is an important constituent for all living form, which is a universal biological solvent. This provides a medium where a biological reaction takes place. All living form maintain a stability of water content in their tissues. There are two water sources for organisms i.e. performed H_2O (intake), oxidative water (metabolic). But it can be lost in many ways, the balance between lost and gain is the H_2O content of the body. When an enhanced the intrication in course of evolution, new methods of regulatory systems evolved in animals. Osmo-conformity is the probably the most primitive stage where organism maintain its body fluid nearer to the environmental condition.

Ions:

Water uptake is isosomatic and coupled to solute uptake, but *A. lumbricoides* preparation, glucose rather than sodium appears to be the major osmotic effector. During fluid transport, the intercellular spaces in the gut preparation swell. In addition to this the functions of inorganic ions in the biological system are many and diverse. They play a major role in activation of enzymatic system, stabilizing protein solution, development of electrical excitability, regulation of H2O permeability and maintenance of isotonity of cell with their

body fluid. The sodium ion is a physiological entity and function with a certain limit, are independent, whatever ion associated it. Regarding sodium ion composition of nematodes, the works of Flury (1912), Hobson (1938), Roger (1948), Myers (1966), Croll and Viglierchio (1969), Viglierchio (1974) are important.

Potassium like sodium and magnesium is present in plants and animal tissues and it is the major base of the body cells. Its serves in osmotic pressures regulation and acid base balance and has a role in number of basic cellular enzymatic reactions. It is an important electropositive ion having influence on growth. Many researchers an attempted to study the potassium levels in nematodes, among them Flury (1912), Von Brand (1943), Bueding (1949), Hobson (1952), Schwebel (1959), Myers (1966), Croll and Viglierchio (1969), Viglierchio (1974) are important.

As concerned to the calcareous corpuscles i.e. the parenchyma of many adult and larval contains large numbers of calcareous corpuscles. The main inorganic components of calcareous corpuscles are calcium, magnesium, phosphorus and carbonate. Calcareous corpuscles may function either as reserves of the phosphate or of alkaline buffering capacity. Calcium is also an essential element which found in all living cells, which regulates the permeability of cell membranes and irritability of cells in general. The decrease in calcium level results in hyper irritability in nervous system and results in tetany.

The studies on occurrence of iron in nematodes are made by Faure- Freneit (1913), Flury (1912), Roger (1940), Lee et al. (1965). The biological system in which copper occurs, its ions are coupled with oxidation and reduction system. In helminthic parasites the study of copper ion is very limited. The studies of that type are made on *Chlonorchis sinensis* (Ma, 1963), *D. latum* (Villoko and Hangel, 1958), *Strongyloides sp.* (Roger, 1940) and host tissue copper content and parasitic absorption by Bremhear (1961).

Observations & Results :

The water content in the nematode parasitic tissue was estimated as per the procedure of Narayan reddy (1977) and the result are expressed in percentage of water content in whole fresh weight and dry weight is given,

Sodium:

The sodium ionic content in dry tissue of the nematodes is illustrated in millimoles pergram of dry weight and the same was calculated and given in percentage of ion in total dry weight of the nematode parasites.

O.columbinum female has 0.165m moles of sodium per gram and male has 0.339 m moles per gram of dry tissue and the ratio between female and male is about 1:2. In case of *O.asperum* female has 0.1878 m mole per gram dry tissue i.e 0.0095% in dry weight and its male has 0.2961 m moles per gram i.e 0.152% and the ratio between female and male is 1:1 and the last *B.trigonocephalum* female has 0.4649 per gram dry tissue i.e 0.240% and its male has 0.7579 m moles per gram i.e 0.039% and the ratio between females and males is 1:2.

Potassium :

The potassium ionic composition of nematodes was assayed and narrated in M moles per gram dry tissue and the percentage of potassium in dry weight of the nematode parasitic tissue was given and the obtained values are shown in the table No. 50. *O. columbianum* female has 0.1229 millimoles of potassium per gram dry weight i.e. 0.01826% and its male has 0.1142 M moles per gram i.e. 0.01693% and the ratio between male and female is 1:2; *O.asperum* female has 0.4775 mm of potassium per gram dry weight i.e. 0.0814% and its male has 0.1890 M moles per gram i.e. 0.1890% and the ratio between male and female is 2:3. *B. trigonocephalum* female has 0.1575 millimoles of potassium per gram dry weight i.e. 0.0268% and its male has 0.2413 millimoles per gram i.e. 0.0369% and the ratio between male and female is 2:3 or 1: 1.5.

Calcium :

The active uptake or elimination of ion has not been demonstrated in nematodes, although regulation of body fluid ions certainly takes place and *A. lumbricoides* for example can regulate its internal K^+, Mg^{++}, Ca^{++} and Cl^-. A number of nematodes show volume regulation in hypotonic media and the gut, excretory system and specialized hypodermal gland cells have all been suggested as sites of urine production. In addition to this the level of Ca ionic content in the nematodes is illustrated in moles/ gm dry tissue.

O. columbianum female has 0.00502 M moles per gram dry weight i.e. 0.009% and its male has 0.01534 m moles of calcium per gram i.e. 0.003%, the ratio of calcium content between male and female is 1:2. *O. asperum* female has the calcium content 0.0799 M moles per gram dry weight i.e. 0.0129% in dry weight and its male has 0.0999 M moles per gram i.e. 0.01603% and the ratio between male and female is 1: 2 and *B. trigonocephalum* female has 0.0235 M moles of Calcium per gram dry weight i.e.0.0038% and its male has 0.1722millimoles of calcium i.e. 0.0277% and the ratio between is 1:6.

Iron :

The iron content of nematode parasites was assayed in their tissues and expressed as M moles of iron per gram dry weight and percentage of iron in dry tissue of the nematode parasite is explained as percentage and the ratio between male and female as well as values are tabulated in table no.52.

O. columbianum female has 0.0011 M moles of iron per gram dry weight of the tissue i.e. 0.004% and its male has 0.0074 M moles i.e. 0.0023% and ratio between male and female i.e. 1:7 while *O. asperum* female has 0.0169 M moles per gram dry weight i.e. 0.0053% and its male has 0.08865 M moles i.e. 0.0277% , the ratio between female and male is 1:6. Lastly the *B. trigonocephalum* female has 0.004 M moles per gram dry weight of the parasitic tissue

0.002% in dry weight and its mole has 0.0788 M moles i.e. 0.0246% and the ratio between female and male nematode parasites is 1: 11.

Copper:

The level of copper in the nematode parasitic dry tissue is given M moles per gram dry weight parasitic tissue and the percentage of copper is illustrated on dry weight basis and the values are tabulated in table no.53. *O. columbianum* female has 0.0005962 M moles of copper per gram i.e. 0.00025% and its male has 0.0030511 M moles of copper per gram dry weight of tissue i.e. 0.00125% and the ratio between female and male is 1: 4. *O. asperum* female has 0.00243 M moles per gram dry weight of the tissues i.e. 0.009% and the male nematode parasite estimation could not be done .*B. trigonocephalum* female has 0.0004562 M moles per gram dry weight i.e. 0.0001844% and its male has 0.00254 M moles of copper per gram i.e. 0.00211% dry weight, and the ratio between male and female is 1: 9.

Phosphorous:

The phosphorous content is a variable and there is always a series of minor elements present that, probably depend on the host's diet. The inorganic phosphorous content in the nematode parasites is expressed in millimoles per gram dry weight and percentage of phosphorous in dry weight is also given. The relation between female and male also worked out and values are tabulated in the table no.54. *O.columbianum* female has 0.2684 Mmoles of phosphorous per gram dry weight i.e. 0.0236% and its male has 0.2918 Mmoles per gram i.e. 0.02567% and the ratio between female and male is 1:1. *O.asperum* female has 0.01963 Mmoles per gram dry weight of tissue i.e.0.01698% and its male has 0.2483 Mmoles per gram i.e.0.0219% and the ratio between female and male is 1:1. *B.trigonocephalum* female has 0.3075 Mmoles of phosphorous per gram dry weight i.e. 0.0272% and its male has

0.3912 Mmoles of phosphorous per gram i.e. 0.03563% and the ratio between female and male is 1:1.

Total ATPase, (Na^+- K^+) ATPase , mg dependent ATPase:

The total ATPase of tissues (Na^+- K^+) sensitive ATPase and mg dependent ATPase were estimated as per the procedure of Narayana Reddi and Kaply (1983). And the enzymatic activity of ATPase was estimated on hydrolysis (the breakage of chemical bond to the addition of a water molecule; the reverse of dehydration synthesis) of ATP with respective enzymes and assayed phosphorous was taken as in index of enzymatic activity and estimated as per the procedure of Fiski and Subbarow (1925).

References :

Atkionson, H.J. 1972.Aspects of respiratory physiology of the marine nematodes *Enoplus brevis* (Bastian) and *Enoplus communis*(Bastian).Ph.D.thesis,Newcastle University.

Barger, I.A., 1999. The role of epidemiological knowledge and grazing management for helminth control in small ruminants. Int. j. parasitol. 29, 41- 47.

Biochemistry and physiology(1978): Respiration and carbohydrates energy metabolism of the lung-dweiiing parasites *rhabdias bufonis* (Nematoda,Rhabdiasoidea). Helminthological abstracts Series A. Animal and Human Helminthology.vol.47.No.3660.

Bremner, K.C., 1969. pathogenetic factors in experimental Bovine Oesophagostomiasis. Expt. Parasitol. 24: 364- 374.

Dirchies, P. 1988. Condition determining the effectiveness of anthelmintics in sheep. Medicine Veterinaire,139(1): 53- 60.