Chemical compositions present in Haemolymph of male millipede Anoplodesmus Tanjoricus (Pocock) from Amravati region

Suwarna K Zilpe

Department of Zoology, Smt. Radhabai Sarda College of Arts, Commerce & Science, Anjangaon Surji, Amravati, Maharashtra, India

Abstract
India is one of the twelve major diversity areas in the world, in terms of animals. The country is home to many endemic and exotic fauna. Despite of the great ecological importance of millipede not much attention has been made to study this fascinating arthropod. In the study undertaken, we have surveyed some of the common species of Millipede found in Amravati region. Our objective is to assign correct taxonomic status to this interesting myriapod species both at morphological and biochemical level. In the present study, after careful application of taxonomic keys we also analyzed major chemical composition of haemolymph from male. We estimated all the major inorganic constituents like Na^+, K^+, Ca^+, Mg^{++}, Chlorides and phosphates. This significant chemical composition have been discussed.

Keywords: male millipedes, anoplodesmus tanjoricus, vidarbha, haemolymph.

1. Introduction
A quantitative analysis of the cationic and anionic pattern of the haemolymph is provided in male millipedes. Sodium and Chloride appear to be the major electrolytes primarily responsible for maintaining the osmotic balance and low concentration of inorganic phosphorus seems to be peculiar features of the haemolymph of malemillipede. The inorganic constituents of myriapod haemolymph so far has been worked out only to a limited extend that includes work on the ionic pattern of haemolymph in the New Zealand centipede, Cormocephalusrubriceps [1], the effects of rapid dehydration on the haemolymphosmolarity and Na^+, Cl^- and K^+ concentrations in the millipede, Pachydesmuscrassicutis [12], the inorganic composition of the haemolymph of millipede, Spirostreptusasthenes as compared to another insects [11] and studies on the transport of ions (K^+ and Na^+) across the isolated hindgut wall in the desert millipede Orthoporusornatus [6].

2. Material and methods
Millipedes were collected near the Amravati, Maharashtra state, India. The animals were brought to the laboratory and maintained in glass aquaria filled with moist soil containing cowdung and fed with leaf litter, carrot, cabbage and cucumber etc. Millipedes were acclimatized in the laboratory and maintained at temperature 26 ºC to 28 ºC. The fully grown male millipedes were used in the experiment work. Experimental animals were separated from the stock glass and starved for 24 hours before used for determination of chemical composition of haemolymph that is cationic and anionic concentration of the haemolymph of millipede anoplodesmus tanjoricus.
A sharp incision on the dorsal surface of the head was made and the haemolymph dripping from the hole was drawn with the help of hypodermic syringe. The haemolymph was chilled immediately subjected to centrifugation at 2000 rpm in order to sediment the haemocytes. The supernant were used for the determination of various inorganic constituents (table). The method used for the determination of sodium, potassium and calcium cations were flame photometry, for magnesium calorimetric, for chloride and for inorganic phosphate.

3. Results and discussion
The composition of various inorganic constituents in the haemolymph of male millipedes is given in the Table. Each value represents a mean of at least five determination, after collecting blood for each sample from at least 40–50 millipedes. Sodium and chloride are the most abundant ions in male the haemolymph the former being always present in the higher concentration. The ion level in males shows that sodium, potassium, and calcium occurs in significantly higher and Chloride level is slightly lower in male millipedes, while magnesium level does not show much variation.

Table 1: Cationic and anionic patterns of the haemolymph of male

Determination	Results
	Male
Sodium (Na^+)	145.96 meq/lit.
Potassium (K^+)	10.98 meq/lit.
Calcium (Ca^+)	49.69 meq/lit.
Magnesium (Mg^{++})	2.74 meq/lit.
Chloride (Cl^-)	98.32 meq/lit.
Inorganic Phosphate (P_4)	5.54 meq/lit.

Anoplodesmus tanjoricus
In Orthetrumchrysis the concentration of sodium and chloride is higher than that of other ions, they appear to be responsible for maintaining the ionic balance in the haemolymph of dragonfly [2, 7-8].
A survey of the haemolymph ionic concentration of various insects reveals the striking presence of sodium and chloride is higher and that of potassium, calcium, magnesium and inorganic phosphate is lower concentration in hemimetabolic and heterometamobicexopterygotes than in holometabolicendopterygotes and also higher in various forms adopted to fresh water habitats with carnivourous feeding habits [3, 8, 10]. The high sodium or potassium molar ratio of *O. chrysis* resembles that found in lower arthropods on one hands and in some orthopteroid taxa on the other.
A study of the cationic pattern of the male millipede haemolymph reveals that it confirms to a very primitive pattern in arthropod groups characterized by a high sodium and low magnesium. There is very little information available on the haemolymph composition of myriapods. Most of our existing knowledge of ionic pattern in arthropoda pertains to crustaceans and insects, on the effect of rapid and slow dehydration on the haemolymphosmolarity, sodium, potassium and chloride

concentrations in the millipede Pachydesmuscrassicutis has been worked out [12]. The value reported by the above authors for the undehydrated normal millipede are lower than the values obtained for the present millipede.

The ionic pattern of haemolymph in male millipede anoplodesmus tanjoricus were notable different when as compared to crustaceans and arachnids. The high chloride content noticed in haemolymph of male millipede anoplodesmus tanjoricus probably neutralizes entire inorganic cations.

The inorganic phosphate content of haemolymph in anoplodesmus tanjoricus can be compared with that of centipede *C. rubriceps* and millipede S. asthenes. During present investigation the cationic content noticed higher in male and ionic is less in male. This is similar to the situation in centipede *C. rubriceps* [1-2] and millipede Spirostreptusasthenes [11].

4. References

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