

ESTIMATION OF CHOLESTEROL AND FATTY ACIDS OF TWO INSECT PARASITIC NEMATODES OF PERIPLANETA AMERICANA OF WESTERN U.P.

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Abstract

Two insect parasitic nematodes *H. diesingi* and *S. orientalis* were studied for the estimation of cholesterol and fatty acids. Both these parasites inhabit same host and found in the gut of *Periplaneta americana*. Both these parasites exhibit difference in the amount of cholesterol and fatty acids. Both nematode parasites utilize cholesterol and fatty acids to a different degree for the production of energy. But the difference in biological parameters of both the species may be due to the difference in their micro ecological niche. As *H. diesingi* inhabits the rectum freely, on the other hand, *S. orientalis* is found in intestine. The amount of cholesterol is very less in both the species. But it was estimated that *H. diesingi* has more cholesterol in comparison to *S. orientalis*. Higher amount of free fatty acid was observed in *S. orientalis* as compared to *H. diesingi*.

Key words: *Hammerschmidtielladiesingi*, *Schwenkiellaorientalis*, Cholesterol and Fatty Acids



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Introduction

As reported by various workers, insect parasitic nematodes can be employed as an agent of biological control to reduce the pest population without disturbing the ecology (Barron, 1981; Swarup and Gokte, 1986). During the course of study of insect parasitic nematodes of western U.P., the author came across two nematode species viz., *Hammerschmidtielladiesingi* (Chitwood, 1932) and *Schwenkiellaorientalis* (Singh and Agarwal, 1997), inhabiting the gut of *Periplaneta americana*. Present communication deals with the biochemical composition of *H. diesingi* (Chitwood, 1932) and *S. orientalis* (Singh and Agarwal, 1997).

Materials and Methods

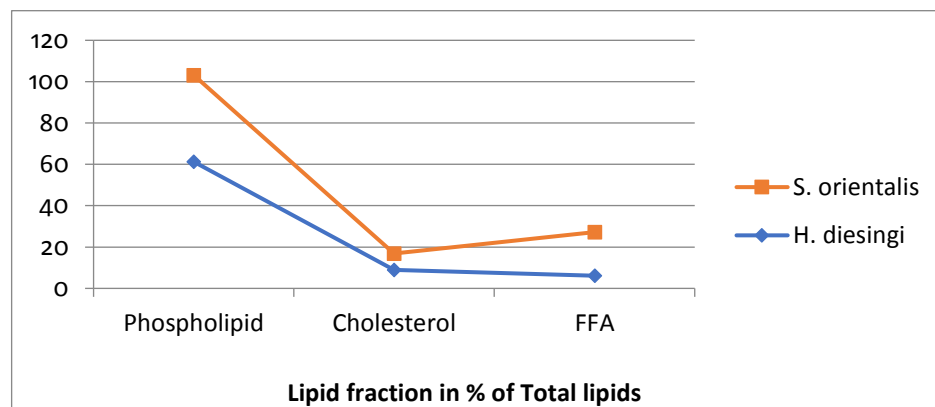
Total cholesterol was estimated by the method of Sackett (1925). The total cholesterol calibration curve was previously prepared by using a cholesterol solution of known strength in chloroform. Free fatty acids were estimated by the method suggested by Lowry and Tinsley (1976). The amounts of free fatty acids were worked out against the previously prepared standard curve.

Observation

Result of the quantitative estimation of various biochemical constituents of female specimens of *Hammerschmidtelladiesingi* Chitwood, 1932 and *Schwenkiellaorientalis* Singh and Agarwal, 1997 are appended in the following Table

Table 1: Different lipid fractions viz., Phospholipid, Cholesterol and Free Fatty Acids in percent total lipids in female specimens of *Hammerschmidtelladiesingi* Chitwood, 1932 and *Schwenkiellaorientalis* Singh and Agarwal, 1997

	Lipid fraction in % of Total lipids		
	Phospholipids	Cholesterol	FFA
<i>H. diesingi</i>	61.26	8.97	6.12
<i>S. orientalis</i>	41.88	7.9	21.06



Discussion

Cholesterol

The amount of cholesterol is very less in both the nematodes. In *H. diesingi* the cholesterol estimated to be 8.97% of total lipids. Whereas in *S. orientalis* the value is 7.9% only. Presence of low cholesterol content in the body of parasite has been documented by large number of workers like Barrett (1969) in *Strongyloidesratti*; Ansari et.al., (1973) in *Setariacervi* and Kapoor and Sood (1985) in *Haemonchuscontortus*. These workers are of opinion that the low concentration of cholesterol in the body of parasite is basically because they have fairly no enzyme system to convert acetic acid into cholesterol and what so ever cholesterol they have in their body is from the dietary source. However, Hutchison et. al., (1976) and Turner and Hutchison, (1979) are of opinion that low concentration in nematode body might be due to its utilization for synthesis of some steroid like substances in the neurosecretory cells of these parasite, with which I also agree.

Low concentration of cholesterol in *S. orientalis* in comparison to *H. diesingi* has been observed during the present investigation. In my opinion, like phospholipid this might be also a age dependent difference.

Free fatty acids

Free fatty acids are estimated to be 6.12% in *H. diesingi* and 21.06 % in *S. orientalis*. Earlier, Barrett (1976) reported that free fatty acids are highest of all lipid fractions in *Strongyloides ratti* and *Nippostrongylus brasiliensis*. Kapoor and Sood, (1985) reported presence of 10.95% of free fatty acids in *Haemonchus contortus* which confirms the present findings. The low concentration of free fatty acids in comparison to other lipid fractions corroborates the findings of Hrzenjak et.al., (1980). According to these workers nematodes are mostly incapable of synthesizing de novo fatty acids as they do not have desired enzyme system at microsomal and mitochondrial level. Thus they chiefly depend upon dietary supply of fatty acids, with which I also agree.

Higher amount of free fatty acids present in *S. orientalis* can be explained on the basis of having lower rate of fecundity, which required more triglycerides for the production of egg and ovulation.

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