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Glycogen Estimation in *Senga waranensis* n. sp.

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Abstract:

The present paper deals with description of estimation of glycogen from cestode parasite *Senga waranensis* n.sp collected from fresh water fish *Mastacembelus armatus*. The worms were collected and dried on blotting paper. Wet weight of the tissues was taken, dried and powdered. The weight was 100.02 mg, homogenized, material was digested, centrifuged. Supernatant taken, mixture was shaken well, cooled and readings were noted in Erma's Colorimeter at 530 mu filter. The amount of glycogen was calculated and found to be 20.27mg/100ml of solution.

Key Words: Glycogen, *Senga waranesis* n. sp. and *Mastacembelus armatus.*

Introduction:

The cestode parasites utilize the food from the gastrointestinal tract of the host. Their metabolism depends on the feeding habits and the rich nourishment available in the gut of the host. The parasite uses this nourishment for their normal development and growth. The metabolic and in vitro studies suggest that a complex nutritional relationship occurs between a cestode and its host. It has been observed in some cestodes that they are capable of fixing Co2. Thus it is clear that the parasites use the waste metabolic materials from the host intestinal mucosa very efficiently, whereas there are another species, which reveal to be capable of taking in the nutritional material by direct contact with the mucosa wall.

It is known by more than hundred years parasitic worms contain polysaccharides, Winland's classic work illustrated that the metabolism of intestinal worms is characterized by the fermentation of carbohydrates. Following the work of these and others pioneers who studied some phase of the carbohydrate relationship of the parasites (Von T. Brand, 1960), it has very soon become obvious

that many endoparasites have a pronounced carbohydrate metabolism.

Sufficient literate is present for parasitic worms in relationship to the distribution of carbohydrates. The quantitative values found in previous and many of the recent literature (Premavati G. and Tayal S. and Engelbrecht. H. et. al 1981); have been obtained by rather unspecific chemical method; these often give higher values than those obtained by means of an enzymatic procedure (glucose oxidase). The use of various analytical procedures may explain for example the widely differing glucose values reported (Brand, T. Von 1950) for *Moniezia expansa* reliable quantitative or semi- quantitative data has also been obtained by means of paper chromatography.

The glucose content of various helminthes fluctuates considerably and there is no link of peculiarities of the habitat, though no generalization is possibly the nutritional state of worms are of importance. This reveals the glucose concentration in the tissue of *Taenia taeniaeformis* which rises by as much 100-200mg/100 on incubating in vitro in glucose containing medium (Von Brand *et al.,* 1960) but it rises also in worms incubated in sodium free salines, which do not permit glucose absorption. In this instance enlarged tissue glucose has been presumably derived from glycogen break down (Von Brand and Gibbs, 1966). It is possible that glucose is not evenly distributed along the strobila of *Hymenolepis dimunuta* (Cheng, T. C. and Dyckman, E.) but whether nutritional factors play a role in it is not known.

The literature at our disposal, discloses that the carbohydrates play an eminent role in cestodes, that in most others parasitic worm, which are distinguished by different growth patterns. These carbohydrates are utilized exogenously, their mechanism of uptake is not known but the evidence indicates that the active mechanism undoubtedly is entangled in the carbohydrate transport of helmiths. The cestodes *Hymenolepis diminuta* (Phifer, 1956); *Taenia Taeniaformis* (Brand, T. Von 1950) and *Calliobothrium verticillatum* as well as the Acanthocephalan polymorphus minutes, absorb glucose against concentration gradients. Further more typical inhibitors of active transport (e.g. Pholoridzin interfere effective with the glucose uptake of cestodes (Read and Phifer 1956, *Taenia taeniaeformis* glucose absorption has an absolute sodium requirement (Von Brand et al, 1960). Apparently corresponding closely to the sodium pump of vertebrate tissues.

The glucose content of cestodes depende to some extent on the stage in the life cycle. In few cestodes developmental history changes, the growth and parasite is rapid at the first 18- 24 hours and then slows down even if the concentration is high as it was in the early phase. It has been observed that the same in *Hymenolepis diminuta* increases from 15% of the dry substance in 5 to 7 days old worms 37% of the dry in 13 to 16 days old specimens (Cheng, T. C. and Dyckman, E. 1964). It has also been observed that the

uptake of glucose is very much effective when Co2 is present in the surrounding than when it is absent.

The specimens which have been previously experimented by different workers for the carbohydrate metabolism at *Taenia crossiceps*, *T. pisiformis,T.saginatta, Moniezia expansa, Moniezia benedeni, Echinococcus granulose, Diphylidium conium, Bothriocephalus gowkongesis, Phyllobothrium folliatum, Hymenolepis diminuta, H.citelli, H.nana and the genus Oochoristica, Raillietina* etc.

Material and Methods

Ten intestines of fresh water fishes were brought to laboratory and dissected for the collection of cestode parasites. Four intestines heavily infected with cestode parasites. The identical parasites are sorted with the help of microscope; few of them were kept in 4% formalin for identification. Taxonomical observation turns them to a new species of the genus *Senga waranensis* n.sp.

Small pieces of infected and uninfected intestines collected for glycogen estimation.

Estimation of glycogen content in a particular was initiated here by Kempt et al (1954) method.

The collected worms were dried on the blotting paper to remove excess of water and taken the wet weight of the tissue. This material was transferred into previously weighed watch glass and kept in oven at 60c for twenty-four hours, for making the material dry. Taken the dry weight of material and prepared a powder. This powder weighed 100.02mgs on a sensitive balance and was homogenized in a mortar and pestle by adding 5ml of 5% T.C.A, and transferred in centrifuge tube. This material digested in boiling water bath for 15 minutes cooled and centrifuged for 15 minutes at 2000 R.P.M.

1ml of supernatant was taken in a test tube, added 3ml of sulphuric acid and cooled for 5 minutes. The mixture shaken well, then immediately cooled and readings were taken in a Erma's Colorimeter at 530mu filter.

Results and Discussion

The amounts of glycogen in the worm were calculated by the formula:

$$\text{Percentage of glycogen} = \frac{100 \times U}{1.11} \times S$$

Where:

U= O.D. of the unknown test solution.

S= O.D. of the 100mg of glucose standard.

1.11= Conversion factor of glucose to glycogen.

S= 2.

$$\text{Percentage of glycogen} = \frac{100 \times 0.45}{1.11 \times 2}$$

= 20.27 mg/100ml of solution

The glycogen in the host intestine calculated from the fish to be 25.20mg glucose/100ml of solution. Observing the result it shows that the worm *Senga* is quite successful in obtaining a sufficient amount of glycogen from the environment.

Conclusions:

Thus it is concluded that the worm maintains a good balance in glycogen content and histopathological relations.

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