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**BIOCHEMICAL CONTENTS OF PISICEAN CESTODE GENUS *SENGA*<sup>10</sup> AND ITS HOST INTESTINAL TISSUE****DHANRAJ BALBHIM BHURE, SANJAY SHAMRAO NANWARE  
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snanware@rediffmail.com**Received : 11.8.15; Accepted : 15.10.15****ABSTRACT**

Present study deals with biochemical contents viz. glycogen, proteins and lipids which were estimated in normal, infected intestine and their relevant six species of pseudophyllidean tapeworm of genus *Senga*<sup>10</sup> viz. *S. maharashtrii*<sup>14</sup>, *S. jadhavae*<sup>1</sup>, *S. madhavae*<sup>2</sup>, *S. satarensis*<sup>3</sup>, *S. mangalbaiae*<sup>4</sup> and *S. microrostellata*<sup>6</sup>, parasitic in *Mastacembelus armatus*<sup>17</sup>. The normal intestinal tissue contained more glycogen, protein and lipids as compared to infected intestinal tissue, where was low biochemical content in all the species of the genus *Senga*. Intestinal parasites were capable of extracting nutritious materials from their host and thus represented a high level in glycogen, protein and lipid.

Figure : 01

References : 20

Table : 01

KEY WORDS : Biochemical content, *Mastacembelus armatus*<sup>17</sup>, *Senga*<sup>10</sup>.**Introduction**

Genus *Senga* was established by Dollfus<sup>10</sup>. It is an intestinal tapeworm of freshwater fishes and has a serious impact on health productivity and quality of life, in addition gastro-intestinal disorders and lack of vital nutrients. Economically fishes are useful to man as a food, fish oil, leathers, medicines and disease control, fish meal and fish manure. Fishes are suffering from cestode infection, which leads to anemia and reduces the food value. The cestode parasites utilize the food from the intestinal gut of host. The metabolism depends on the feeding habits and the rich nourishment available in the gut of the host. The parasites use this nourishment for their normal development and growth. A major part of energy source utilized by the parasite is from

carbohydrates. Carbohydrates are chiefly energy source in all parasites. Proteins are the most abundant organic molecules in cells constituting 50 percent or more of their dry body weight. The main significance of the proteins is their role in structural make up of the body rather than in the yield of the energy. Lipids are of great importance to the body of cestodes as the chief concentrated storage form of energy, besides their role in cellular structure and various other biochemical functions. Investigations into the biochemical profiles are revealing new facts, which would be very useful in developing a rational approach to design the antihelminthic therapeutics. Keeping the view in mind, the nutritional, economical and medicinal value of fishes, the present work was done.

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### Material and Methods

Freshwater fish *Mastacembelus armatus*<sup>17</sup> were examined for tapeworm infection. The tapeworms were collected, identical parasites were sorted out with the help of microscope, preserved in 4 % formalin, stained with haematoxylin borax carmine and morphological observations turned out to be the six species of pseudophyllidean tapeworm genus *Senga*<sup>10</sup> viz. *S. maharashtrii*<sup>14</sup>, *S.jadhavae*<sup>1</sup>, *S. madhavae*<sup>2</sup>, *S. satarensis*<sup>3</sup>, *S. mangalbaiae*<sup>4</sup> and *S.microrostellata*<sup>6</sup>. The collected normal, infected intestinal tissue (small pieces) and cestode parasites were kept on blotting paper to remove excess amount of water. The material transferred in previously weighed watch glass and weight on sensitive balance. The biochemical contents were estimated by following standard methods.

- 1) Glycogen was estimated by Kemp *et. al.*, method<sup>16</sup>
- 2) Protein was estimated by Gornall *et. al.*, method<sup>13</sup>
- 3) Lipid content was estimated by Folch *et.al.*, method<sup>11</sup>

### Results and Discussion

Glycogen, protein and lipid contents in the infected, non-infected intestinal tissue of *Mastacembelus armatus*<sup>17</sup> and intestinal tapeworm of the genus *Senga*<sup>10</sup> viz. *S. maharashtrii*<sup>14</sup> ,

*S.jadhavae*<sup>1</sup>, *S. madhavae*<sup>2</sup>, *S. satarensis*<sup>3</sup>, *S. mangalbaiae*<sup>4</sup> and *S.microrostellata*<sup>6</sup> are shown in Table 1 & Fig. 1.

Biochemical contents (glycogen, protein and lipid) in normal intestinal tissue of *Mastacembelus armatus*<sup>17</sup> is (27.47mg/100 mg , 27.27 mg/100 mg and 17.36 mg / 100 mg); in infected intestinal tissue is (25.22 mg / 100 mg, 26.06 mg/100mg and 17.36 mg / 100 mg) where as in *S. maharashtrii*<sup>14</sup> is (24.32mg/100g, 20.90 mg/100g and 12.42mg/100 g); in *S.jadhavae*<sup>1</sup> (20.72mg/100mg, 24.24mg/100mg and 13.44mg/100mg); in *S. madhavae*<sup>2</sup> is (23.42 mg / 100 mg, 25.00 mg / 100 mg and 15.84 mg / 100 mg.); in *S. satarensis*<sup>3</sup> is (22.52 mg / 100 mg, 23.63 mg / 100 mg and 14.68 mg / 100 mg); in *S. mangalbaiae*<sup>4</sup> is (21.62 mg / 100 mg, 22.42 mg / 100 mg and 13.16 mg / 100 mg) and in *S.microrostellata*<sup>6</sup> is (21.17 mg / 100 mg, 21.21 mg / 100 mg and 12.88 mg / 100 mg).

Similar findings were reported earlier<sup>15</sup>. There was low content of glycogen in *Davainea shindei* (15.17 mg/100mg), high in host intestine (17.56 mg/100 mg). Nanware *et.al.*<sup>18</sup>, reported Amount of glycogen were lower in parasites than infected and normal intestinal tissue of host<sup>18</sup>. On estimation, glycogen contents in normal intestinal tissue as 93.25 mg/100 mg, infected intestinal tissue contents 91.02 mg / 100 mg where as *Tylocephalum sp.* contents 88.28 mg / 100 mg.<sup>5</sup>

**TABLE- 1: Biochemical contents in the intestine of *Mastacembelus armatus*<sup>17</sup> and their relevant Cestode parasites of the genus *Senga*<sup>10</sup>.**

Sr. No.	Tissue	Glycogen mg/100mg	Protein mg/100mg	Lipid mg/100mg
1.	Normal intestine	27.47	27.27	19.60
2.	Infected intestine	25.22	26.06	17.36
3.	<i>S. maharashtrii</i> <sup>14</sup>	24.32	20.90	12.42
4.	<i>S.jadhavae</i> <sup>1</sup>	20.72	24.24	13.44
5.	<i>Senga madhavae</i> <sup>2</sup>	23.42	25.00	15.84
6.	<i>Senga satarensis</i> <sup>3</sup>	22.52	23.63	14.68
7.	<i>Senga mangalbaiae</i> <sup>4</sup>	21.62	22.42	13.16
8.	<i>Senga microrostellata</i> <sup>6</sup>	21.17	21.21	12.88

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Glycogen content of *Moniliformis dubis* was determined from male rat and it was noticed, when expressed as mg glycogen/g wet weight of tissue, was over twice than the amount found worms i.e. 16.81 (14.3) in male while 7.87 (11.76) in female<sup>12</sup>.

Similar result for protein contents was also reported earlier<sup>15</sup> from *Davainea shindei* i.e. amount of protein present in *Davainea shindei* was 13.20 mg/gm wt. of tissue whereas in host intestine was 15.42 mg/g wt. of tissue. A reporter<sup>5</sup> reported protein contents in non-infected intestinal tissue was 30.12 mg/mg, infected intestinal tissue contents 27.72 mg/mg whereas tapeworm *Tylocephalum sp.* contents 25.01 mg/mg wet tissue. There was lower amount of protein in the body of parasites than infected and normal intestinal tissue of host<sup>9</sup>. The distribution of protein content shown in present study is in agreement with the previous study.

The difference in lipid content of the parasite is due to the difference in diet. Hence there is a relationship between the lipid content of parasite and nutrient content in environment. Similar finding was recorded earlier<sup>9</sup> that lipid was lower in the body of parasites than infected and normal intestinal

tissue of host. There was lipids contents in non-infected intestinal tissue as 19.60 mg/100 mg, in infected intestinal tissue contents 17.37 mg / 100 mg<sup>5</sup> where as in tapeworm *Tylocephalum sp.* contents 16.74 mg / 100 mg<sup>15</sup>. from *D. shindei* was 17.85 mg/g and its host intestine is 19.85 mg/g<sup>19</sup>., described regional distribution of glycogen in *Stilesia sp. i.e.* immature region contain low glycogen as compared to mature and gravid region. Higher content of lipid in older proglottids has led to the view that much of this lipid largely represents waste products of metabolism<sup>7</sup>. It reported total lipids content of cestode *Ncokrimia singhia* in immature mature and gravid region was 4.675 ± 1.215, 29.200 ± 0.608 and 31.902 ± 2.804 mg/g fresh weight<sup>20</sup>.

Biochemical estimation in host non-infected and infected intestinal tissue of *Mastacembelus armatus*<sup>17</sup> and intestinal tapeworm of the genus *Senga*<sup>10</sup> i.e. *S. maharashtrii*<sup>14</sup>, *S. jadhvae*<sup>1</sup>, *S. madhvae*<sup>2</sup>, *S. satarensis*<sup>3</sup>, *S. mangalbaiae*<sup>4</sup> and *S. microrostellata*<sup>6</sup> were found that these parasites were capable of extracting nutritious material from their hosts and thus represented a higher level in glycogen, protein and lipids.

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