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Effect of Sporlac on Protein Content of Silkworm *Bombyx Mori L*

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ABSTRACT
Silk production basically depends on the Bombyxmori L. larval protein metabolism which in turn needs more energy generating events, spinning requires more muscular activity and silk is being produced by the silk gland. The quality of the leaves has a profound superiority of silk produced by the B.mori (Priyadharshini et al., 2008). Probiotics are organisms and substances which contribute to intestinal microbial balance(Parker, 1974).The present study highlights the effect of sporlacs upplements on the biochemical parameters of silkworm B. mori. The total soluble protein was estimated by following standard procedure (Lowry et al., 1951) with bovine serum albumin as the standard protein. The total protein content in the different parts of larvae increased when the larvae was treated with increased concentration of sporlac. Highest protein content was observed in the silk gland of larvae treated with 5% sporlac (32.44±0.03 mg/dl) and minimum protein content (13.03±0.03 mg/dl) was observed in haemolymph of silkworm treated with 1% sporlac.
Keywords: *Bombyxmori L;protein;Silk gland;sporlac; haemolymph.*

INTRODUCTION

The silkworm, *B. mori*produces massive amount of silk proteins during the fifth stage of larval development. These proteins are stored in the middle silk gland and they are discharged out through the anterior duct and spinneret, at the end of the fifth instar. Two kinds of silk proteins have been distinguished as major components of silk cocoons, the first being fibroin and the second being sericin, a natural macromolecular protein, serving as an adhesive to unite fibroin for making silk cocoons of silkworm.Silk production basically depends on the *Bombyxmori L.* larval protein metabolism which in turn needs more energy generating events, spinning requires more muscular activity and silk is being produced by the silk gland. The quality of the leaves has a profound superiority of silk produced by the *B.mori* (Priyadharshini *et al.,* 2008).Amounts of storage protein in silkworm larvae fed on a low protein diet were less than those fed on the standard diet, but larvae fed on optimal levels of protein showed higher levels of storage proteins (Nagata and Kobayashi, 1990).Probiotics are organisms and substances which contribute to intestinal microbial balance(Parker, 1974).The present study highlights the effect of sporlac-supplements on the biochemical parameters of silkworm *B. mori.*

MATERIALS AND METHODS

Rearing conditions and experimental design

Disease free layings (DFLs) of PM x CSR2 multivoltine race was purchased from Government Sericulture Farm, Nannagaram, Tirunelveli District, Tamil Nadu, India.The temperature in the rearing chamber was maintained at 28±2°C and the relative humidity (RH) was maintained at 73±5%. All the rearing operations were carried out according to Krishnaswami *et al*. (1978). The hatched larvae were divided into untreated and experimental groups with three replications of 25

larvae each and fed with same quantity and quality of mulberry leaves.

Probiotic supplement preparation

For the present experiment, commercial probiotics selected for supplementation was Sporlac. Sporlac powder is a Lactic acid bacillus, earlier known as *Lactobacillus sporogenes*. Sporlac was prepared in different concentrations such as 1%, 3% and 5 % and sprayed uniformly on mulberry leaves that were already surface washed with distilled water followed by air drying. The Sporlac treated mulberry leaves were fed at one of the feeding schedules from the first day of third instar larvae onwards.

Sample preparation and protein analysis

Prolegs were cut and the haemolymph was collected in cleaned, sterilized and pre – cooled eppendorf tubes. A pinch of n-phenyl thiourea was added to prevent the oxidation of haemolymph. The samples were centrifuged at 10,000 rpm for 10 minutes. The supernatant was removed and kept in - 20°C for analysis. Body tissue and silk glands were dissected out. The unwanted fat bodies, blood vessels, and nervous system were removed from the body tissue with the help of forceps and homogenized in 20% TCA for protein. The total soluble protein was estimated by following standard procedure (Lowry *et al*., 1951) with bovine serum albumin as the standard protein.

RESULTS

The silkworm *B. mori* treated with 1, 3 and 5% concentration of sporlac showed higher protein content than the untreated (Table. 1 and Figure. 1). The total protein content in the different parts of larvae increased when the larvae was treated with increased concentration of sporlac. Highest protein content was observed in the silk gland of larvae treated with 5% sporlac (32.44±0.03 mg/dl) and minimum protein content (13.03±0.03 mg/dl) was observed in haemolymph of silkworm treated with 1% sporlac. The protein content in 1% and 3% sporlac treated larvae was 20.02±0.02mg/dl and 26.00±0.01mg/dl respectively. 17.21±0.02 mg/dl, 20.13±0.02 mg/dl and 23.16±0.01 mg/dl of protein content was found in the body tissues of 1, 3 and 5% of sporlac treated larvae respectively. In the body tissue, high protein content was found in 5% concentrations of sporlac treated group. In the haemolymph of silkworm larvae treated with 5% sporlac, the protein content was 21.14±0.02mg/dl and at 3%, the haemolymph protein content was 18.00±0.02 mg/dl.

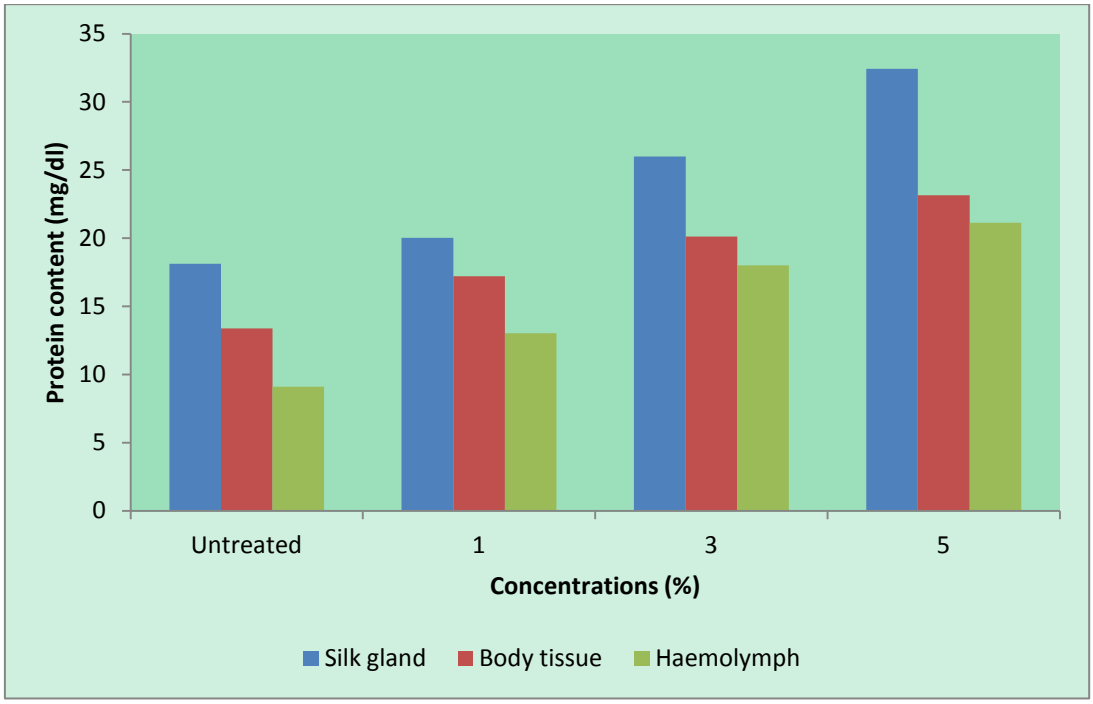
Table 1 Effect of sporlac on protein content (mg/dl) in the different tissues of silkworm, *B. mori* larvae

S.No	Tissues of silk worm	Concentrations (%)			
		Untreated	1	3	5
1	Silk gland	18.12±0.02	20.02±0.02 (10.48)	26±0.01 (43.48)	32.44±0.03 (79.02)
2	Body tissue	13.37±0.01	17.21±0.02 (28.72)	20.13±0.02 (50.56)	23.16±0.01 (73.22)
3	Haemolymph	9.11±0.02	13.03±0.03 (43.02)	18±0.02 (97.58)	21.14±0.02 (132.05)

Each value represents the mean ± SD of 3 replications

Percent deviation over control values inparentheses

Figure 1 Effect of sporlac on protein content (mg/dl)in different tissues of silkworm*B. Mori* larvae



DISCUSSION

Nithya *et al.* (2008) have also reported that increase in silk protein showed marked changes in silk percentage when larvae of *B. mori* fed by ascorbic acid. The increase protein or nitrogen in the silkworm diet causes the increase of total protein in the larval haemolymph. Supplementation of silkworm diet with different compounds can affect the amount of protein (Etebari and Fazilati, 2003). In order to study the impact of pre and probiotics on the protein level of silkworm larvae *B. mori*, three different tissues viz., silk gland, body tissue and haemolymph were selected in the present study. In the present study, 23.16±0.01mg/dl of protein was observed in the body tissue of 5% sporlac treated silkworm larvae. According to Bai (2013), the protein content of the body tissue of *B. mori* ranged from 11.21±0.25 (1% bifilac) to 13.58±0.25mg/dl (5% immunorm) among the treated larvae. Krishnan *et al*. (1995) also reported that the level of storage proteins in the haemolymph was increased by the increasing concentrations of hydrolyzed soy protein supplementation.

CONCLUSION

The earlier research works have evoked the effect of feed supplement on silkworm growth and silk productivity. Probiotics refers to administration of live beneficial microbes which provide positive effect on the health of the consumer by inhibiting the growth of pathogenic bacteria. The present work confirmed that the probiotics (sporlac) increased the protein content of silkworm larvae. Thus it is inferred that silkworm larvae fed with commercial probiotics (sporlac) beneficially influence the cocoon production.

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