

RESEARCH PAPER

Impact of thyroxine hormone on protein fractions of fat body in v instar silkworm larvae [*Bombyx mori* (L.)]

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ABSTRACT

Influence of thyroid hormone on Jaya hybrid (PM \times NB $_4$ D $_2$) silkworm, *Bombyx mori* (L.) larvae was studied. The hormone was fed through mulberry (*Morus alba*) leaves from the 1st day of III instar to 5th day of V instar silkworm larvae. Quantitative changes of proteins fractions and protein ratio were studied in the tissues of fat body of silkworm larvae. The total, soluble and structural protein levels were significantly increased in fat body. The ratio of soluble proteins/total proteins was significantly higher than control. The structural proteins/total proteins ratio also noted similar pattern. The ratio of soluble proteins/structural proteins showed no significant change over control. The increased protein content in the fat body may indicate the acceleration of the protein biosynthetic process in view of the hormone treatment

Key words: Silkworm, *Bombyx mori*, Thyroid hormone, Protein metabolism, Fat body.

Biochemical and physiological studies on silkworm [*Bombyx mori* (L.)] have received considerable attention from various investigators (Horie and Watanabe, 1983; Mathavan *et al.*, 1984). It has been demonstrated that the increase in the body weight of silk worm was accompanied by the accumulation of various biochemical constituents like proteins, amino acids, carbohydrates, lipids and enzymes (Dhinakar, 1988). The study of (Chen, 1971) provided an innovative report on the role of biochemical constituents during insect metamorphosis. Various biochemical constituents like total proteins, soluble proteins, free amino acids, ALAT, AAT and protease activity have been examined in tissues of silkworm with reference to its metamorphosis (Sumio *et al.*, 1981). Sivaprasad and Murali Mohan (1990) have reported an increase in the levels of total proteins and soluble proteins in [*Bombyx mori* (L.)] during metamorphosis. The growth and development of insects have been correlated with changes in the levels of protein metabolism (Mansingh and Banquaya, 1971). A comparative study on the transaminase activity in relation to the amount of glycine and alanine was made in [*Bombyx mori* (L.)] and *Philosamia ricini* (Bai-Shang, 1979). Transamination is one of the mechanisms involved in regulation of the balance between amino acid pool and protein synthesis (Pant and Kumar, 1980).

The silkworm [*Bombyx mori* (L.)] is a monophagous insect. It feeds mainly on mulberry leaves. Ravi Kumar (1988) reported the leaves of superior quality enhance the good cocoon crop. Jeyapaul *et al.* (2003) reported

the increased biological characters and nutritional efficiency on application of different plant extracts in mulberry silkworm. Increased ingesta and other nutritional parameters were studied in temperate breeds of silkworm (Horie *et al.*, 1978; Jaksheva and Genova, 1991), as well as in tropical breeds (Ramadevi *et al.*, 1992). The higher ingestion was also observed in the last instar of silkworm on treatment with juvanoid hormone (Sashindran Nair *et al.*, 2004).

Though several studies reported earlier related to thyroxine impact on growth and development of silkworm larvae was available, on different areas, but the influence of thyroxine hormone on protein fractions of fat body in silkworm larvae is scanty. Hence, the present study is carried to find out the relationships which exists between the treatment of thyroxine hormone and protein fractions in silkworm larvae.

MATERIALS AND METHODS

The present work was carried out on Jaya, hybrid variety of PM \times NB $_4$ D $_2$ silkworm, [*Bombyx mori* (L.)]. The silkworm larvae were reared in the rearing house and the standard rearing techniques (Krishnaswami, 1994; Ganga and Sulochana Chetty, 1998) were followed through out the experiment. The silkworm larvae were reared in the same rearing tray up to II instar. Before the first feeding of the III instar, larvae were divided into two groups *i.e.* control and experimental with 200 worms in each group. Each uncoated thyroid hormone tablet contains thyroxine sodium IP 100 μ g (as anhydrous,