

## RESEARCH PAPER

**Influence of thyroxine hormone induction on the protein fractions in the intestine of silkworm larvae, [*Bombyx mori* (L.)]**

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**ABSTRACT**

The popular silkworm, [*Bombyx mori* (L.)] hybrid (PM×NB<sub>4</sub>D<sub>2</sub>) were fed on V<sub>1</sub> variety of mulberry leaves treated with thyroxine hormone (1ml of thyroxine solution sprayed on 5g of mulberry leaves) in every day, every feeding from the first day of III instar and to end of the V instar. The effect of thyroxine on the intestine protein metabolism was analysed in the V instar silkworm larvae. Quantitative changes of protein profiles, their ratios and some key enzymes were analysed. The total, soluble and structural protein levels were significantly increased over control on administration of thyroxine. The S.P./T.P. and S.P./St.P. ratios were higher over control where as the St.P./T.P. ratio was lower over control. The key enzymes like ALAT, AAT and GDH recorded significant elevation over control on administration of thyroxine. The altered protein content, protein ratios, transaminases and GDH indicates that the administration of hormone was induced metabolic modulations which might be essential for improved production of cocoon.

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**Key words :** Silkworm, [*Bombyx mori* (L.)], Thyroid hormone, Protein metabolism, Intestine.

Proteins are the organic tools, which are involving in the expression of genetic information. These are most abundant macro molecules and also extremely versatile in their functions (Lehninger, 1993). The studies of Chen (1971) introduced new things on the role of biochemical constituents during insect metamorphosis. The biochemical parameters, which attracted considerable attention in this regard, especially the silk protein fibroin and increased total and soluble protein levels during metamorphosis in silkworm, [*Bombyx mori* (L.)] were analysed (Sarangi, 1985; Siva Prasad and Murali Mohan, 1990). Different biochemical constituents like total and soluble proteins, free amino acids, the enzymes such as ALAT, AAT and protease activities have been examined in the silkworm with reference to its metamorphosis (Bannikov *et al.*, 1982; Siva Prasad and Murali Mohan, 1990). Alterations in protein fractions were reported in silkworm larvae on administration of glucocorticoids (Ramesh Babu and Bhaskar, 2006).

The proteases and lipases were the most commonly found digestive enzymes in insects (Ann Sorensen *et al.*, 1983). Several investigators reported alterations in protease activity in the digestive fluid of the silkworm, [*Bombyx mori* (L.)] (Eguchi and Iwamoto, 1976; Sasaki and Suzuki, 1982) and changes in protease activity was reported in the fifth instar larvae of [*Bombyx mori* (L.)] (Maheswaramma, 1994). Mamatha *et al.* (1999) reported that the total proteins and amino acids were significantly increased in [*Bombyx mori* (L.)] under the influence of

JH analogues like labomin and fenoxycarb treated with different doses. Similarly, elevated total protein content was noticed in methoprene treated silkworm larvae over control (Chengamma *et al.*, 2000). Since the protein forms the basic structural organization and dynamic components of the silk, it is essential to understand the protein metabolic modulations that take place in body wall of silkworm larvae on administration of thyroxine hormone.

However, the literature on the impact of thyroxine hormone on protein fractions of silkworm larvae is scanty. Hence, an attempt was made in the present study to elucidate the relationship existing between thyroxine hormone and intestine protein fractions in silkworm larvae.

**MATERIALS AND METHODS**

The work was carried on Jaya, hybrid of PM x NB<sub>4</sub>D<sub>2</sub> variety of the silkworm, [*Bombyx mori* (L.)]. The silkworm larvae were reared in the rearing house and standard rearing techniques (Krishnaswami, 1994; Ganga and Sulochana Chetty, 1998) was followed throughout the experiment. The silkworms 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 with 200 worms in each group, *i.e.* control and experimental. The synthetic thyroid hormone was obtained as tablets. Each uncoated tablet contains thyroxine sodium IP 100 µg (as anhydrous, Eltroxin) obtained from Glaxo India Limited, Mumbai, India. The thyroxine sodium tablet was dissolved in 5 ml of distilled water to get concentration of 20 µg/1 ml.