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BIOCHEMICAL STUDY ON THE HOST PLANT "ASAN" (*TERMINALIA TOMENTOSA*) LEAVES OF TASAR SILKWORM *ANTHERAEA MYLITTA.D* COLLECTED FROM ECO-POCKETS OF SIMILIPAL BIOSPHERE RESERVE, MAYURBHANJ, ODISHA

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ABSTRACT
The Tropical tasar silkworm *Antheraea mylitta* Drury is an economically sericigenous insect abundantly cultivated around Simliplipal Biosphere area of Mayurbhanj district in Odisha. The larvae are reared on the Asan (*Terminalia tomentosa*) plant as the primary host plants. The leaves of *T. tomentosa* were procured from the eco-pockets Thakurmunda, Kendujuani, Sarat, Jadida, Khadambeda and Kuliana of Similipal Biosphere Reserve. The concentration of protein, carbohydrate and ascorbic acid were analyzed. The analyses revealed that the leaves collected from Khadambeda showed highest concentration of protein (245.36mg/g) and ascorbic acid (1.89 mg/g) whereas for the carbohydrate concentration in Kendujuani (4.63mg/g) are the suitable among all the eco-pockets studied. However, the rearing performance is concerned may be due to high concentration of protein ERR (51.1%) at Khadambeda compare to other eco-pockets.

INTRODUCTION

It has been reported that proteins are vulnerable to oxidative damage (Dean, 1991). Ascorbic acid (ASA) is a redox catalyst which can reduce, and thereby neutralize, reactive oxygen species (ROS) such as hydrogen peroxide (Padayatty *et al*., 2003).

Similipal Biosphere Reserve (SBR) is situated in Mayurbhanj district of Orissa state of India between 21º28'-20º08' north latitude and 86º4'-86º36' east longitude (Dey *et al*., 2010). The tropical tasar silk worm *Antheraea mylitta* Drury are reared all over the SBR region. Few important eco-pockets of the SBR like Thakurmunda, Kendujuani, Sarat, Jadida, Khadambeda and Kuliana where the larvae are reared on its host plant Asan (*Terminalia tomentosa*) for commercial production of cocoon. To date, study on the biochemical constituents of the host plant leaves of different eco-pockets of SBR has not been done.

Nutrition is a factor of paramount importance that regulates growth, development and reproduction of animals. Intake and growth targets are important to reach the functional optima in an insect (Raubenheimer and Simpson, 1999). The various chemical constituents of host plant leaves are responsible for successful cocoon harvest and silk productivity, thus the leaf quality of food plants plays a predominant role in healthy growth of silkworm. Hence, nutrition of silkworm, *Antheraea mylitta* is of primary importance as the cocoon production is directly influenced by Biochemical constituents especially the nutritional status of the host plant leaves.

It has been reported that (Dash *et al*., 1992) overall performance of the tasar was superior in Asan than all other food plants during all the seasons. Cultivation of tasar silkworm in the host plat *Terminalia tomentosa* gives better productivity (Deka and Kumari, 2013). Food plants play an important role on the reproductive and commercial parameters in *Antheraea mylitta* (Rath *et al*., 2008).

As information regarding the nutritional content of the host plant leaf of the different eco-pockets of the Similipal Biosphere Reserve is currently not available, investigation has been done to find out a better eco-pocket for tasar rearing.

In the present study the biochemical constituents like protein, carbohydrate and ascorbic acid content of the host plant leaves of different eco-pockets of SBR were determined to identify for a suitable pocket for better tasar cultivation.

MATERIALS AND METHODS

Sample collection

The freshly green leaves of the Asan (*Terminalia tomentosa*) plant were collected from the silkworm rearing fields present in the above mentioned eco-pockets of SBR. Samples were placed in polyethylene bags and transported under refrigerated conditions to laboratory. Samples received were washed under running tap water to remove the adhering dirt and then stored under -20^{0}C until analyzed. Analysis was completed within 24 hours of sample collection. All measurements were conducted in duplicates.

Tissue preparation

Five grams of each leaf sample was homogenized in ice-cold extraction buffer soluble protein concentration were determined in the supernatant after centrifuging the homogenate at 10, 000 x g for 10 minute at 4ºC (Patra *et al*., 2011). Protein and carbohydrate content was determined in the supernatant.

Biochemical estimation

The amount of proteins was determined by the method of Lowry *et al*. (1951) with bovine serum albumin as standard. The carbohydrate content was estimated according to the method of Yemm and Willis (1954). Ascorbic acid content was measured according to the method of Jagota and Dani (1982).

Rearing

In each eco-pockets freshly hatched 1000 numbers of B.V. tasar silkworm in 10 food plants (T. tomentosa) were brushed in two seasons for consecutive three years. The ERR was calculated as per recommendation of Dash. *et al.,*1992 to make a comparatives analysis for all eco-pockets.

RESULTS

The concentration of protein varies from 245.36 mg/g to 183.82 mg/g respectively from Khadambeda to Jadida followed by Kuliana (238.09), Kendujuani (222.19) Sarat (200.11) and Thakurmunda (195.66). Carbohydrate concentration in 1 gm wet weight varies from 4.6mg at Kendujuani to 1.85mg at Kulliana followed by (2.59) at Sarat, (2.56) at Khadambeda, (2.47) at Jadida and (1.84) at Thakurmunda. Similarly ascorbic acid (vitamin- C) of leave tissue of 1gm wet weight varies from 1.89 mg at Khadambeda to 1.39 mg at Kuliana followed by (1.77) at Jadida, (1.59) at Kendujuani, (1.52) at Sarat and (1.47) at Thakurmunda which shows eco-pockets of specific

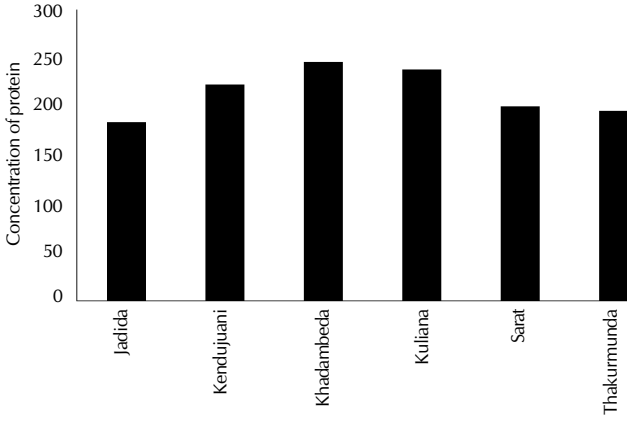

Figure 1: Concentration of protein (in mg/g) in the leaves of Asan (*Terminalia tomentosa*) collected from different eco-pockets of Similipal Biosphere Reserve.

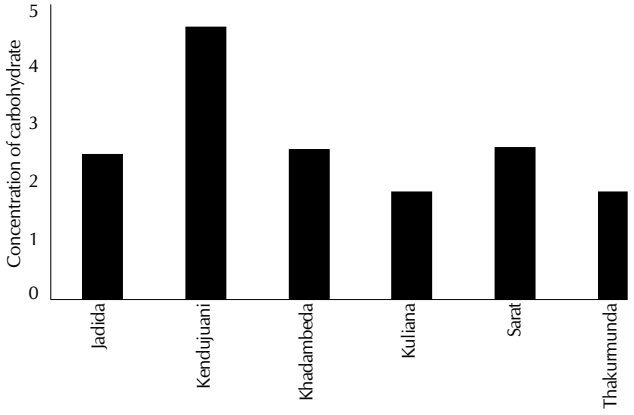

Figure 2: Concentration of carbohydrate (in mg/g) in the leaves of Asan (*Terminalia tomentosa*) collected from different eco-pockets of Similipal Biosphere Reserve

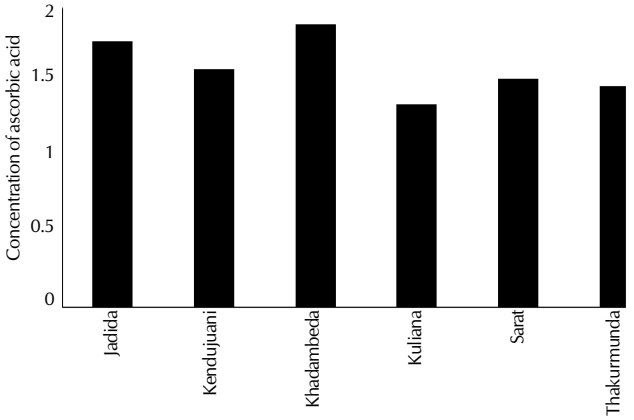

Figure 3: Concentration of ascorbic acid (in mg/g) in the leaves of Asan (*Terminalia tomentosa*) collected from different eco-pockets of Similipal Biosphere Reserve

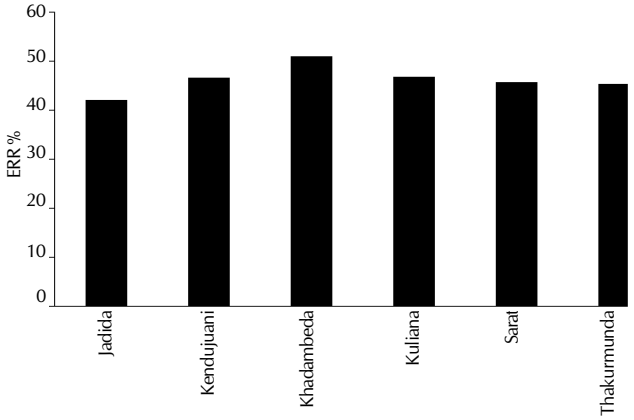

Figure 4: Cocoon performance (ERR) in different Eco-pockets of Similipal Biosphere

variation. The concentration of protein was found highest in the leaf collected from Khadambeda next to Kuliana and Kendujuani (Fig. 1). The concentration of carbohydrate was found highest in the leaves collected from Kendujuani next to Sarat (Fig. 2). The ascorbic acid (ASA) concentration of leaf was found highest at Khadambeda. whereas, Kuliana showed lowest concentration (Fig. 3).The tasar silkworm rearing performance of specified six eco-pockets depicted in Fig. 4 revels that cocoon production is highest in Khadambeda 511 followed by 469 at Kuliana, 467 at Kendujuani, 458 at Sarat, 455 at Thakurmunda and 422 at Jadida.

DISCUSSION

The leaf proteins have pivot role for production of silk. The leaves enriched with protein showed a significant enhancement of cocoon production (Deka and Kumari, 2013). Carbohydrate is the main source of energy require for larval-pupal-adult transformation (Thangamani and Vivekanandan, 1984).

The abundance of dietary ascorbic acid in phytophagous insect enhance molting in times (Navon, 1985).Absence of vitamin C declined growth rate, elimination of drier fecal pellets has been reported by Pant and Pandey 1978 in *P. ricine* (Mohanty and Mittra,1988) in *A. mylitta* D.

From present experimental study it is observed that the leaves showed highest concentration of protein and ascorbic acid that collected from Khadambeda indicates a suitable eco-pocket for tasar rearing with ERR of 51.1%. The carbohydrate concentration was found highest in Kendujuani which is the best eco-pocket for long duration crop like BV and UV. For the lowest concentration of ASA and carbohydrate in the leaf collected from Kuliana Cocoons Characters quantitatively not at par with other zone for rearing of tasar silkworm, *Antheraea mylitta. D*. It is conclude that Protein, Carbohydrate & ascorbic acid present in leaf have play pivot role for production of Cocoons.

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