



RESEARCH ARTICLE

Effect of Flavonoidal Compound of *Tephrosia purpurea* on Growth of Late Instar Larvae of Silkmoth '*Bombyx mori*'

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ABSTRACT

The nutrient diet effect the weight of cocoon as well as silk ratio. During the study period, it was noticed that when low nutrient diet was given to the silkworm, the weight of cocoon and silk ratio percentage reduced as compared to the weight of cocoon and ratio of sufficient nutrient diet. The flavonoidal effect of *Tephrosia purpurea* on 4th and 5th instar larval stage showed maximum enhancement in larval duration which got decreased to be 24hrs as compared to the control. Weight of 4th larval stage of silkworm after treatment got increased to 22.82%, and in 5th instar larvae it was 23.66%. Similarly, length of the fibre, shell ratio and single shell weight was also comparatively increased much in 5th instar as compared to the earlier instar.

Key words: Mulberry Leaves, Instar Larvae, *Bombyx mori*

INTRODUCTION

Silk is the most elegant textile in the world with unparalleled grandeur, natural sheen, and inherent affinity for dyes, high absorbance, light weight, soft touch and high durability and known as the "Queen of Textiles" the world over. On the other hand, it stands for livelihood opportunity for millions owing to high employment oriented, low capital intensive and remunerative nature of its production. Hence every effort is to be made to enhance the silk production by using natural products to ensure environmental safety. The plant *Tephrosia purpurea* belong to the family leguminosae (Fabaceae) is suitable for use in silk industry as it contains unique natural substances which chemically are flavonoids mostly.. Flavonoid are commonly found in oily plants alongwith plants of leguminosae family and flavon and isoflavon are widely distributed in vascular plants including family leguminosae. The flavonoids are structurally derived from the parent flavones nucleus, the flavonoids have been found distributed in monocotyledons and dicotyledons both out of 48 families of monocot, first ten families have been reported to process flavonoid. Among dicot families leguminosae shows wide range of flavonoidal compounds. The flavonoids are mainly water soluble compound they are therefore, extracted with 70% ethanol and remain in the aqueous layer, following partition of this extract with petroleum ether.

The fourth and fifth instar larvae are late age worms. Once the chawki rearing is perfect and result is healthy, robust stock of silkworm, the late age rearing is comparatively easy. Yet, proper care is necessary to obtain the full potential of larval growth maximum yield and best cocoon quality. Keeping these points in view, the present study highlights the use of extract of *Tephrosia purpurea* containing flavonoidal compounds to enhance the quality and production of silk.

MATERIAL AND METHOD

The plant selected for the study i.e, *Tephrosia purpurea* belongs to the family Leguminosae which is an annual shrub and herb found distributed throughout the central India. On the basis of preliminary reports of growth promoting and growth regulating effect of this plant, Leguminous were carried out to see the potentiality of this family for growth promoting effect. The extraction of whole plant powdered material of about 40-60 mesh size was carried out in

soxhlet apparatus. Harborne's (1984) cold percolation method was used for reference purpose for extraction and purification. The extraction was carried out with 70% ethanol and ether. The extract were isolated and purified by using standard methods in phytochemical laboratory. The statistical analysis of experimental data on growth was measured before one day of moulting. All the statistical calculations were done using KpKy plot software for significance of study and percentage changes.

RESULTS AND DISCUSSION

The flavonoidal effect of *Tephrosia purpurea* on 4th and 5th instar larvae showed elevated larval duration which got decreased to be 24hrs as compared to the control, while weight of silkworm when treated 4th larval stage has been increased to 22.82% but in treated set of 5th instar larvae, it was 23.66%. Similarly, length of fibre, shell ratio and single shell weight was also comparatively increased significantly in the 5th instar as compared to the earlier instar. Results indicate significant difference between control and treated population as shown in table using ANOVA.

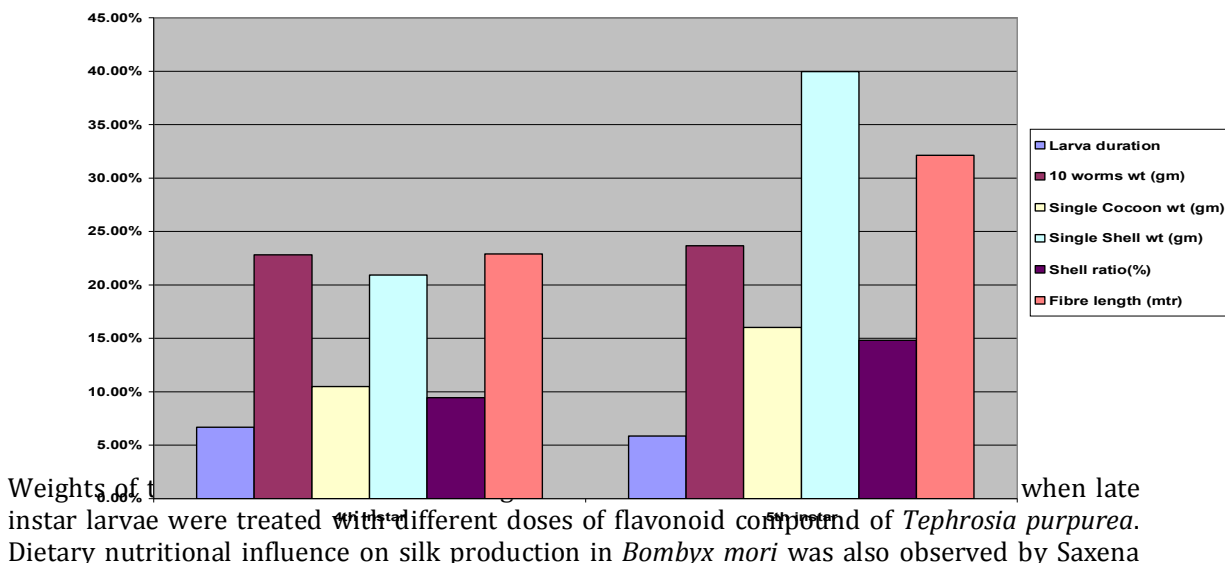
Table 1: Effect of *Tephrosia purpurea* on 4th instar larvae of silk moth *Bombyx mori*

Parameters	Control set	Experimental set	% Difference	Significance level
Larva duration	717	669	6.69%	P<0.05
10 worms wt (gm)	36.528±2.087	44.987±1.734	22.82%	P<0.01
Single Cocoon wt (gm)	1.839±0.174	2.037±0.193	10.50%	P<0.05
Single Shell wt (gm)	0.368±0.023	0.445±0.032	20.92%	P<0.01
Shell ratio (%)	20.01±1.017	21.90±0.697	9.45%	P<0.05
Fibre length (mtr)	1013±64.700	1245±57.110	22.90%	P<0.01

Table 2: Effect of *Tephrosia purpurea* on 5th instar larvae of silk moth *Bombyx mori*

Parameters	Control set	Experimental set	% Difference	Significance level
Larva duration	717	675	5.85%	P<0.05
10 worms wt (gm)	35.499±1.195	43.842±1.100	23.66%	P<0.01
Single Cocoon wt (gm)	1.754±0.137	2.035±0.155	16.02%	P<0.01
Single Shell wt (gm)	0.343±0.023	0.456±0.026	39.95%	P<0.001
Shell ratio (%)	19.56±0.605	22.46±0.774	14.82%	P<0.05
Fibre length (mtr)	809±72.381	1069±73.560	32.14%	P<0.001

Fig. 1: Effect of *Tephrosia purpurea* on 4th and 5th instar larvae of silk moth *Bombyx mori*



(2002) who had worked on lipid and fat metabolism of *Bombyx mori*. *Tephrosia purpurea* is a medicinal shrub found distributed throughout central India was selected because of its chemical constituent like flavonoid, alkaloids, saponin etc (Shukla, 2002), (Khare *et al.*, 2001). The flavonoid when applied topically in direct application by spray as well as through diet on mulberry leaves by hand application show significant result in terms of growth moulting, metamorphosis of *Bombyx mori*. Nathan and Sangeetha (2002) have reported the growth promoting effect of botanicals *Lucas aspera* on *Bombyx mori*. The present findings are also in confirmation with Jadhav *et al.* (2016) observed effect of medicinal plant extract of *Asparagus recemousces* and *Astracantha longifolia* as food supplement of silkworm *Bombyx mori* L. for improved cocoon traits and Waktole and Bhaskar (2015) showed fortification of Mulberry Leaves with Medicinal Botanical Plant Extracts Effect on Silkworm, *Bombyx mori* L. (Lepidoptera: Bombycidae) Larval Growth and Cocoon Traits.

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