Research Paper :

Effect of *Ocimum sanctum* leaf extract on matured larvae of silk moth, *Bombyx mori*

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SUMMARY

The plant hormones extracted from *Ocimum sanctum* showed effect on maturation of 5th instar silkworm larvae.The effect was more pronounced on day 3rd and 4th.

Key words : Phytochemical, Bivoltine, Cocoon

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The mulberry leaf is used as food for rearing of silkworm larvae for their growth and development and subsequent cocoon production depending mainly on the nutrient composition of mulberry leaf (Krishanaswamy *et al*., 1971; Bhuyian,1981).

Protein forms the main constituents of mulberry leaf, which plays a vital role for development of silk gland during the initial stage of larval period (Quader,1987).The larval stage lasts about 21 to 25 days after hatching and the final size is attained by the larva with matured salivary gland (silk gland).The larva now suspends its feeding and prepare for the next stages, which is called pupa with cocoon. The cocoon is a hard protective covering formed of silk fibre, which is produced by the larva in 6 days after maturation. The cocoon is the final stage for obtaining the silk. So, by the nutritional management of mulberry plant, the production of cocoon can be improved.

Most rearing practices are designed to meet the market demand to increase yield and to reduce labour and other cost of production. The catastrophic loss due to infectious disease is greater and needs intensive management for rearing since it is an important component of the system and silkworm rearing needs to be carefully managed. The management of silkworm disease needs the co-operation of a large population than individual role because of the economics involved. The effect of plant hormone on cocoon production and reeling parameters have been studied by Trivedy *et al.*, 1998,Prasad *et al.*, 2001 and Zhuang *et al.*, 1992. Looking to the commercial use of silk and growing interest among the farmers regarding silk industry, it is quite imperative to observe the effect of plant hormones on rearing and growth of silk moth larvae. The present paper reports the effect of *Ocimum sanctum* on maturation of 5th instar larvae .

MATERIALS AND METHODS

Rearing of silk worm in the insectary :

Before rearing of the silkworm larvae, the eggs were kept in plastic trays in a closed dark room and were exposed to 0.5 KR U.V. light for 15 minutes along with control.

The silk breed, bivoltine (CSR2 ×CSR4) hybrid was selected for experimental work. This bivoltine race is recommended for temperate regions having adequate irrigation facilities in the mulberry garden (Rajan *et al.*, 2001).

Silkworm (*Bombyx mori*) belongs to the Phylum Arthropoda and Class Insecta. It is a member of a small family of about 300 moth species of the order Lepidoptera. The larva of silk moth is an elongated caterpillar, commonly known as silk moth. Larvae are monophagous and feed only on mulberry plants. The larvae moult four times before spinning a silk cocoon of one continuous fibre for pupation. Silk

cocoon obtained from this species is the commercial source of silk. The life cycle of *Bombyx mori* demonstrates the most advanced form of metamorphosis termed holometabolous, the serial progression of the four distinct stages of development of the species, during complete one generation is ova, larva, pupa and moth.

Phytochemical methods of *Ocimum sanctum* :

Parts of herbal plant such as stem, leaves, roots seeds and flowers contain primary metabolites like carbohydrates, lipids, proteins, nuclic acids, etc.They are found in all plant cells and include certain chemicals called secondary metabolites such as alkaloids, glycosides, corticosteroids and essential oils, etc. That are collectively known as phytochemicals. Such plants have been used for the preparation and production of a number of secondary metabolites out of which insect moulting hormones from a major group of chemicals. It has been clearly estbilished that most of the common phytoecdysteroids with 20-hydroxyecdysone (20HE) like activity affects insect growth and development on ingestion.

Extraction methods :

Dried powdered material was extracted in Soxhlate using different solvents e.g. chlorophorm, methanol and water.

Method of application :

5th instar larva were used for topical application of the plant hormones and effect was observed after 2 days, 3 days and 4 days period of treatment.

RESULTS AND DISCUSSION

The leaf extract was spread after 24 hours and 30 hours duration on the 5th instar larvae as shown in Table 1. There was no maturation after 24 hours but after 30 hours, it was found to reach an average of 42 % and no significant difference of application of leaf extract was observed during the treatment. The present results are in accordance with the findings of Trivedy *et al.,* 2003, who have mentioned no maturation of larvae after 24 hours administration of plant extracton 5th instar larvae.

When leaf extract was spread after 3 days in 5th instar (Table 2), maturation ranged from 77.3 % in control to 83.83% in 15mg. per 50 larvae /100g mulberry leaf after 24 hours. After 30 hours, maturation ranged from 83.83% to 96.60%.In both the periods of recording (24 and 30 hours) a significant increase of 8.3%was observed in treated larvae over control. After 4 days of administration of plant extract in 5th instar larvae (Table 3), maturation value of larvae (after 24 and 30 hours) was significant over control.

Table 1 : Effect of various leaf extract concentrations of *Ocimum sanctum* on 5th instar larvae after 2 days for early maturation

Sr. No.	Concentration of leaf extract mg/ml.	No. of reared larvae	Maturation (%) observed in continuation after	
			24 hours	30hours
1.	10	50	-	40.126 %
2.	15	50	-	42.450 %
3.	20	50	-	43.090 %
4.	Control	50	-	42.320 %
Mean			-	41.990
C.D. (P=0.05)			-	5.384

Table 2 : Effect of various leaf extract concentration of *Ocimum sanctum* on 4th instar larvae 3 days for early maturation

Sr. No.	Concentration of leaf extract mg/ml.	No. of reared larvae	Maturation (%) observed in continuation after	
			24 hours	30hours
1.	10	50	79.807 %	87.507 %
2.	15	50	83.830 %	90.600 %
3.	20	50	83.820 %	90.450 %
4.	Control	50	77.320 %	83.830 %
Mean			81.195	88.095
C.D. (P=0.05)			0.696	2.044

Table 3 : Effect of various leaf extract concentration of *Ocimum sanctum* on 4th instar larvae 2 days for early maturation

Sr. No.	Concentration of leaf extract mg/ml.	No. of reared larvae	Maturation (%) observed in continuation after	
			24 hours	30hours
1.	10	50	86.25 %	90.59 %
2.	15	50	97.61 %	99.30 %
3.	20	50	97.61 %	99.00%
4.	Control	50	80.04 %	79.31 %
Mean			90.38	97.21
C.D. (P=0.05)			4.342	1.019

Doses of 15 mg/ml. were at par and 98.46 % maturation was achieved by administration of 10 ml. of 15 mg/ml. concentration of plant extract which was 23.6%higher than the control.This increase was a significant one as it increased the maturation from 80% to 98.46%. Thus, the result indicated the involvement of moulting hormones.

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