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EFFECT OF MULBERRY CULTIVARS AND MAGNETIC FIELD ON PROTEIN IN THE SILK GLAND

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ABSTRACT

To study the role of mulberry cultivar and magnetic field in the protein content in Silk gland of *Bombyx mori*. L. Silkworm larvae of PM X CSR_2 were reared twice on S-41, S-1, Ber-799, Sujanpuri, S-13, S-34 and M-5 mulberry cultivars in permanent magnetic field of 300 G for 24, 12, 6, 3 and 0 hrs daily.

The results indicate that there was significant effect on protein content in the silk gland when reared on different cultivars and in magnetic field for different duration. The protein in the silk gland was maximum when they were reared on S-13 mulberry cultivar (513.4 µg) and least in Sujanpuri cultivar (456.7 µg). There was significant increase in silk gland protein when the larvae were reared in magnetic field for 12 hrs (546.1 µg) and least in non-magnetic field (430.4 µg). Rearing of silkworm on S-13 mulberry cultivar and keeping them in 300 gause magnetic field for 12 hrs resulted in highest protein of 586.7 µg in silk gland whereas it was least (415.0 µg) then larvae were reared on Sujanpuri in non-magnetic field.

Key words: Magnetic field, *Bombyx mori.,* mulberry cultivars, protein, gause

It is established fact that abiotic factors like temperature, light, humidity effect the development of silkworm *B. mori* Chougale and More (1992) reported that rearing of *Bombyx mori* in 3500 gause electromagnetic field for 20 min effected larval weight, protein, protease and phosphatase activity in midgut. In the study conducted on "Effect of magnetic field and cultivars on Haemocytes of *B. mori*" Aherkar and Satpute (2005) reported positive effect of permanent magnet on Haemocytes and economical parameters of silkworm. Thus to know the effect of mulberry cultivar and permanent magnet on the protein content in silk gland the study was planned.

MATERIALS AND METHODS

PM X CSR_2 race of mulberry silkworm was reared twice on seven different cultivars *viz.* S-41, S-1, Ber-779, Sujanpuri, S-13, S-34 and M-5 in the permanent magnetic field of 300 G for 24, 12 6, 3 and 0 hrs daily. When the silkworm were fully grown they were dissected in ice-cold sodium phosphate buffer (0.1 m pH 7.0) and the silk glands were removed. Removed silk glands were stored in 1 ml sodium phosphate buffer later on these were homogenized in mortar and pastel in ice-cold condition in sodium phosphate buffer (Protinase inhibitor) of pH 6.5 containing EDTA and PTU (Phenyl thio urea) (0.1 mm). The homogenate was then centrifuged at 15000 rpm for 15 min at 0°C in high speed refrigerated centrifuge. Solid debris and cellular material was discarded. The resultant post mito-chondrial Supernant obtained was stored at –20°C and was used as protein source. The estimation of protein in silk gland was done by Bradford method (Bradford 1976).

RESULTS AND DISCUSSION

There was significant effect of cultivar, magnetic field and interaction of cultivar and magnetic field on protein content in the silk gland.

a. Effect of cultivar on silk gland protein in full grown larvae

There was maximum of 513.4 µg protein in the silk gland of silkworm when reared on S-13 mulberry cultivar which was followed by S-1 (502.90 µg), S-34 (501.70 µg), S-41 (488.5 µg) and Ber-779 (474.6 µg) and least protein in the silk gland was when larvae were fed on Sujanpuri (456.7 µg) followed by M-5 (462.7 µg).

b. Effect of magnetic field on silk gland protein in full grown larvae

When the silkworms were reared in the magnetic field for 12 hrs there was increase in the protein to 541.1 µg in the silk gland of silkworm larvae, while increasing the period of magnetic field to 24 hrs had a detrimental effect on the protein content in the silk gland which was reduced to 485.2 µg and also reducing the period of magnetic field to 6 hrs and 3 hrs reduced the protein content in silk gland to 516.4 µg and 450.8 µg whereas rearing of silkworm in non-magnetic field recorded least 430.4 µg/ml of protein in the silk gland.

Table 1: Average effect of cultivar and magnetic field on protein in silk gland (µg/gland)

S. No.	Variety	Interaction					Factor A
		M_0	M_3	M_6	M_{12}	M_{24}	
1.	S-41	435.0	451.7	517.9	546.1	491.6	488.5
2.	S-1	438.1	449.7	568.2	574.4	584.4	502.9
3.	Ber-779	434.3	452.0	483.3	523.7	479.5	474.6
4.	Sujanpuri	415.0	431.5	479.8	508.8	448.4	456.7
5.	S-13	431.4	475.8	543.6	586.7	529.5	513.4
6.	S-34	438.9	458.5	536.4	558.6	516.3	501.7
7.	M-5	420.1	436.7	485.6	524.7	446.6	462.7
Factor B	430.4	450.8	516.4	546.1	485.2		

	Factor A	Factor B	Interaction A X B
'F' test	Sig	Sig	Sig
SE (m) ±	3.87	3.27	8.66
CD at 5%	10.74	9.08	24.02

c. Cumulative effect of cultivar and magnetic field on silk gland protein in full grown larvae

Maximum protein in the silk gland was due to rearing of silkworm on S-13 cultivar for 12 hrs daily in magnetic field was 586.7 µg. Least protein in the silk gland was due to feeding of silkworm on Sujanpuri in non-magnetic field *i.e.* 415.0 µg followed by M-5 non-magnetic field recording 420.1 µg protein.

Earlier Chaugale and More (1993) observed that keeping silkworm larva in electro magnetized field of 3500 G power for 20 min increased the protein, mid gut protease and acid phosphotase activity in the larva of silkworm. Aherkar and Satpute (2005) also reported increase in haemocytes in hemolymph of mulberry silkworm when reared in permanent magnetic field. The present findings give indication that when the silkworm larvae are reared in 300 G permanent magnet there is increase in protein in the silk glands. Reasons responsible to increase the protein in silk gland of silkworm larvae reared in magnetic field are yet to be recorded.

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