

Evaluation of relative moisture loss from leaves of five mulberry varieties during silkworm rearing

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Leaf moisture content and moisture retention rate are important qualitative parameters from the point of young age silkworm rearing. In the present investigation relative moisture loss from tender leaves of five selected mulberry varieties viz. S₃₆, S₅₄, DD, V₁ and M₅ from Shimoga district were evaluated. Differences among the five varieties with respect to the leaf moisture retention capacity/moisture loss are included in this study. Based on the values recorded, variety V₁ showed higher retention rate at different hours of preservation compared to rest of the varieties. The lowest rate was recorded from M₅ variety.

Key words : Leaf moisture loss, Retention rate, Mulberry varieties.

INTRODUCTION

Importance of the nutritive care for young age silkworms and its influence on cocoon crop performance has been widely accepted (Yokoyama, 1965; Krishnaswami *et al.*, 1970; Chaluvachari, 1995). Mulberry (*Morus L.*) of the family Moraceae is the sole food plant of the silkworm *Bombyx mori L.* and is cultivated mainly for its foliage. Mulberry leaf moisture content is one of the key constituents determining the quality of the feed. Leaf moisture content and moisture retention are reported to have positive influence on the growth of silkworm larvae (Narayana Prakash *et al.*, 1985; Chaluvachari and Bongale, 1995). Observations available shows that young age silkworms require tender soft mulberry leaves with higher water content and water retention capacity (comparative to late age silkworms). The post harvest preservation of leaf under proper conditions in respect of harvested leaves before feeding and maximum retention of leaf moisture content in the rearing bed by standardization of rearing conditions and adaptation of timely intervals between the feedings is of immense importance (Kasiviswanathan *et al.*, 1973). Thus a thorough knowledge of water retention capacity of the particular mulberry variety is desired so as to feed the silkworm better.

Although the water retention capacity of mulberry leaf is proved to be one of the significant parameter in

the assessment of leaf quality, it is believed to differ from genotype to genotype. Hence in this context, an attempt has been made to evaluate the relative moisture loss from leaves of different mulberry varieties during storage, the area of study being Shimoga district, Karnataka.

MATERIALS AND METHODS

The improved varieties of S₃₆, S₅₄, DD, V₁ and M₅ of mulberry gardens from the study area (Shimoga district) were selected and studied for relative moisture loss during storage.

Moisture retention was recorded with 45 days tender leaves (1cm² sizes) for all the selected varieties under rearing conditions using wet foam pad and paraffin paper covering in the rearing trays at a temperature of 28°C ± 2°C and relative humidity (RH) of 80-90% in the rearing room. Freshly chopped mulberry leaves were uniformly spread to one foot² in the rearing tray with three replications. The percentage moisture loss was recorded at 4, 8, 12 and 24 hours. The oven dry weight was recorded (at 60-65°C) for calculating total moisture content. The percentage moisture loss out of total moisture content and moisture retention capacity at different intervals of preservation were recorded using the following formula,

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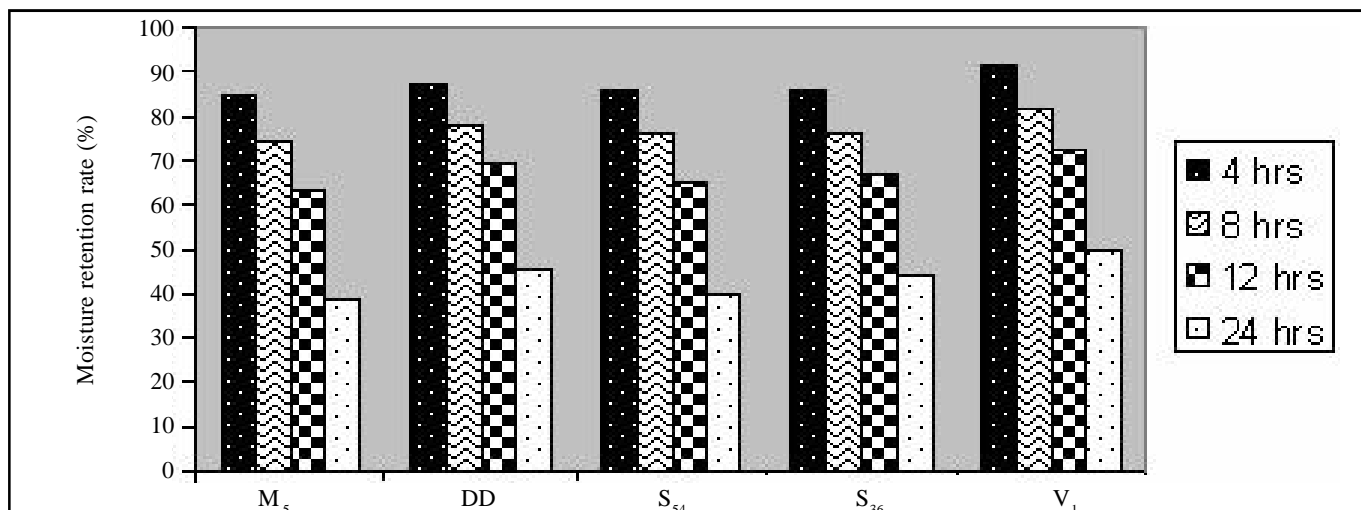


Fig. 1 : Leaf moisture retention rate of selected mulberry varieties

$$\% \text{ moisture loss of total moisture content} = \frac{\text{Moisture loss at specific period}}{\text{Total moisture content}} \times 100$$

$$\% \text{ moisture retention} = (100 - \% \text{ moisture loss of total moisture content})$$

RESULTS AND DISCUSSION

The results obtained on leaf moisture retention with respect to five mulberry varieties are presented in the Table 1 and Fig. 1. The data analyzed revealed that the varieties under study exhibited significant differences in respect of different durations of preservations (4, 8, 12 and 24 hours). Among all, variety V₁ recorded the highest moisture retention rate after each duration (91.36, 81.58, 72.06 and 49.31 at 4, 8, 12 and 24 hours of preservation, respectively). The retention rate observed was distinctly poor in case of M₅ variety.

Table 1 : Leaf moisture retention rate (%) of selected mulberry varieties

Period of preservation Varieties	4 hrs	8 hrs	12 hrs	24 hrs
M ₅	84.34	74.16	63.44	38.29
DD	87.24	77.87	68.84	45.30
S ₅₄	85.31	75.41	65.00	39.31
S ₃₆	86.19	76.41	66.66	43.91
V ₁	91.36	81.58	72.06	49.31

Young age silkworms are known to require higher levels of leaf moisture content (Krishnaswami, 1986). From present study V₁ variety showed lesser relative moisture loss and more retention capacity followed by DD, S₃₆, S₅₄ varieties. Among all, M₅ variety showed poor

retention of leaf moisture content. Keeping in view of the importance of leaf moisture retention capacity as a qualitative parameter with regard to silkworm rearing, the information from the present study can be utilized in selecting better variety for commercial rearing to promote the economy and interest of the sericulture industry.

REFERENCES

Chaluvachari (1995). Leaf quality evaluation of few mulberry varieties. Ph.D. Thesis, Bangalore University, pp.220.

Chaluvachari and Bongale, U.D. (1995). Evaluation of leaf quality of some germplasm genotypes of mulberry through chemical analysis and bio-assay with silkworm, *Bombyx mori* L. *Indian J. Seric.*, **34** (2): 127-132.

Kasiviswanathan, K., Krishnaswami, S. and Venkada Ramu, C.V. (1973). Effect of storage on the moisture content of mulberry leaves. *Indian J. Seric.*, **12** : 13-21.

Krishnaswami, S. (1986). *Improved Method of Rearing Young age (chawki) Silkworms.* Central silk board, India, pp. 1-24.

Krishnaswami, S., Ahsan, M. M. and Sriharan, T. P. (1970). Studies on the quality of mulberry leaves and silkworm cocoon crop production, Part 2. Quality differences due to leaf maturity. *Indian J. Seric.*, **9** (1) : 11-25.

Narayana Prakash, R., Periasamy, K. and Radhakrishnan, S. (1985). Effect of dietary water content on food utilization and silk production in *Bombyx mori* L. (Lepidoptera: Bombycidae). *Indian J. Seric.*, **24** (1): 12-17.

Yokoyama, T. (1965). *Physiology and pathology of the silkworm.* American Association for the advancement of Science, pp. 375-399.