International Journal of Food, Agriculture and Veterinary Sciences ISSN: 2277-209X (Online)
An Online International Journal Available at http://www.cibtech.org/jfav.htm
2012 Vol. 2 (1) January-April, pp.54-57/ Singh and Bandey
Research Article

SUPPLEMENTATION OF SYNTHETIC VITAMIN C IN THE FIFTH INSTARS BIVOLTINE HYBRID LARVAE OF $NB_4D_2 \times SH_6$ OF SILKWORM, *BOMBYX MORI* L.

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ABSTRACT
The finding of the study exhibited that supplementation of vitamin C in the last larval stages in the bivoltine hybrid $NB_4 D_2 \times SH_6$ of silkworm exerted significant improvement in the parameters studied such as larval weight, cocoon weight, shell weight, shell % over the control batches.

Key Words: *Bivoltine Hybrid, Silkworm, Vitamin C*

INTRODUCTION

Silkworm, *Bombyx mori* L., is a very important economic insect that contributes to the national economy of India. For the enhancement of silk production various methods were tried and among them supplementation of vitamin C give wide range of scope for improving the economic parameters of the silkworm. Vitamin C (ascorbic acid) abbreviated as VC is available in wide variety of diet supplements, for example tables, capsules, liquid forms, crystalline powders *etc.* Ascorbic acid is an indispensable vitamin in the diet of silkworm and other polyphagous insect (Ito & Arai, 1965; Kaur & Srivastava, 1995). The ascorbic acid most likely is not synthesized in the silkworm (Ito & Arai, 1965**)** rendering its ingestion necessary from exogenous supplements or diet. Synthetic vitamin C supplementation to mulberry leaves to improve the economic parameters in the silkworm has been more exploited than any other vitamin (Etebari *et al.,* 2004; El-Karaksy & Idriss, 1990 and Hussain & Javed, 2002). Supplementation of vitamin C to mulberry leaves improved economic traits in the silkworm as studied by Babu *et al.,* (1992), Chauhan & Singh (1992) and Prassad (2004). Keeping this in view, an experiment was under taken to assess the supplement effects of synthetic vitamin C in the fifth instar bivoltine hybrid larvae of $NB_4D_2 \times SH_6$ of silkworm, *Bombyx mori* L.

MATERIALS AND METHODS

The bivoltine silkworm hybrid $NB_4D_2 \times SH_6$ was utilized for the experiment and silkworm rearing was carried out as per the method advocated by Rajan & Himantharaj (2005). The silkworm larvae were reared on normal mulberry leaf without any treatment till the completion of 4^{th} instar. Freshly ecdysed 5^{th} instar larvae of $NB_4D_2 \times SH_6$ was classified into 100 groups including control. Five different concentrations were prepared in distilled water of synthetic vitamin C (Tablets) *viz.*, 0.50, 1.00, 1.50, 2.0 and 2.5% sprayed on mulberry leaves for feeding. The sprayed leaves were kept under shade for 15 minutes to evaporate the excess water and fed @ 50ml/100 larvae. Treatments were imposed daily once from 1^{st} day of 5^{th} instar till onset of spinning preferably with night feeding for proper ingestion of mulberry leaves by the larvae. A total of 21 trays having size of 3´ × 2´ ft (5 treatments + 2 controls general and distilled water control × 3 replications) were set up in a random arrangement with 100 larvae/tray. On the 7^{th} day of mounting, cocoons were harvested and the following cocoon parameters were recorded such as 10 larval weight, cocoon weight, shell weight and shell percentage. The collected data were subjected to suitable statistical analysis ANOVA using SPSS package (7.5) for windows Berkowitz & Allaway (1998) and results are presented in the form of figures 1-4.

RESULTS AND DISCUSSION

Among the five different concentrations *i.e.*, 0.50, 1.00, 1.50, 2.00 and 2.50% tested as VC on the 5th instar larvae two concentrations *viz.*, 0.50 and 1.00% exhibited significant improvement in the parameters studied Fig 1-4.

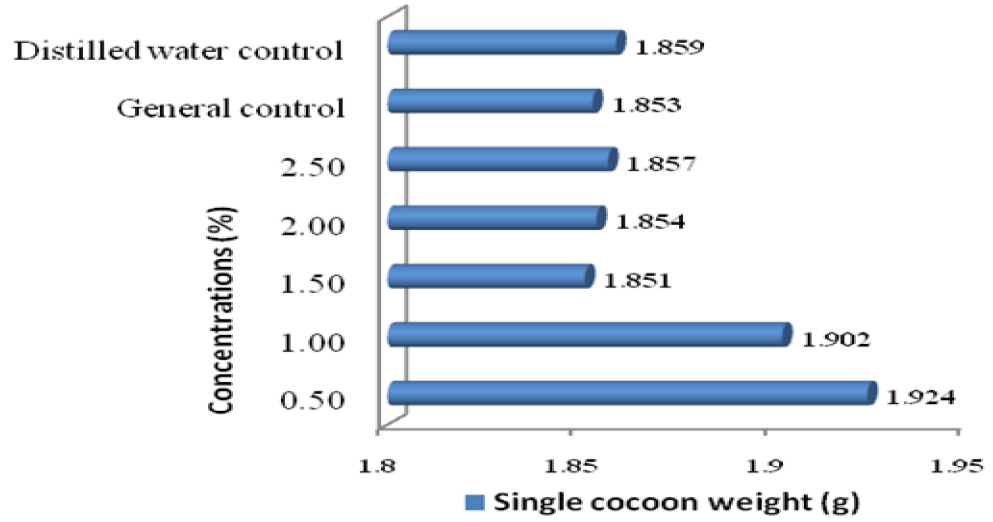

Fig 1: Supplementation effect of synthetic vitamin C on single cocoon weight (g).

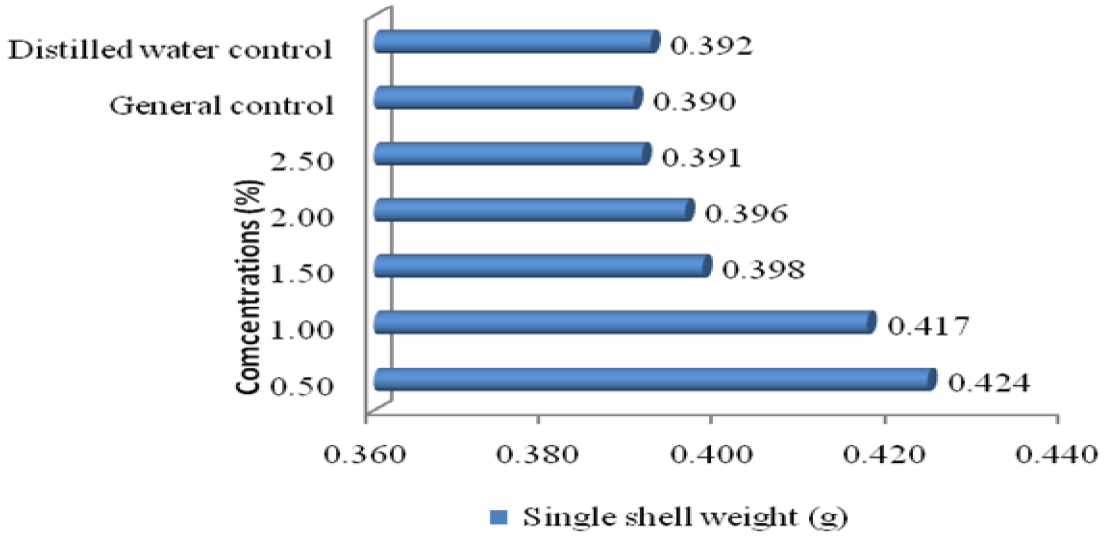

Fig 2: Supplementation effect of synthetic vitamin C on single shell weight (g).

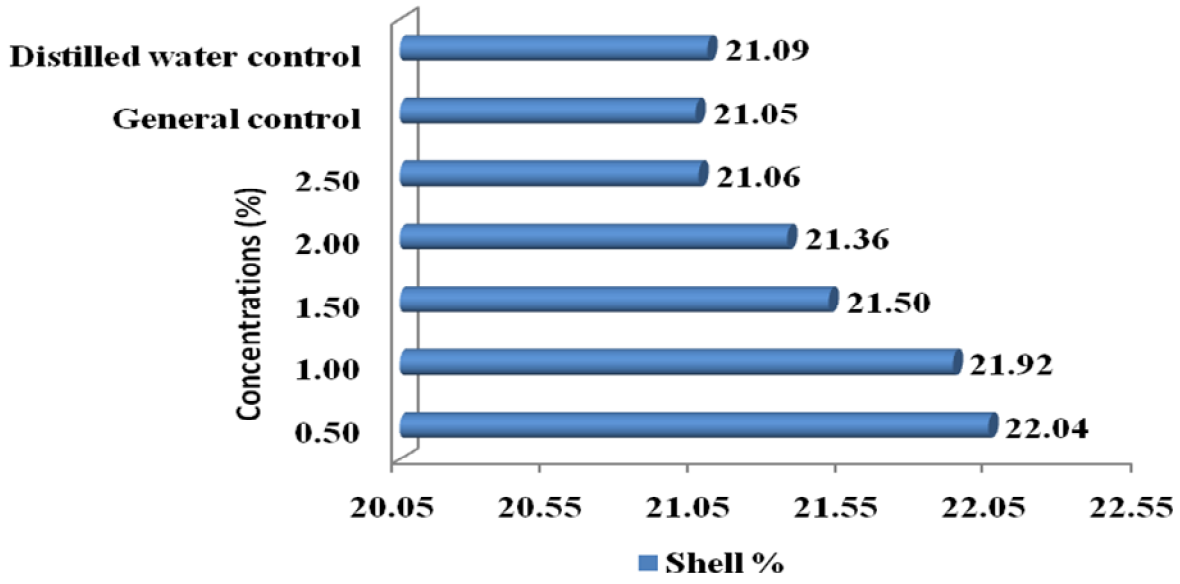

Fig 3: Supplementation effect of synthetic vitamin C shell %.

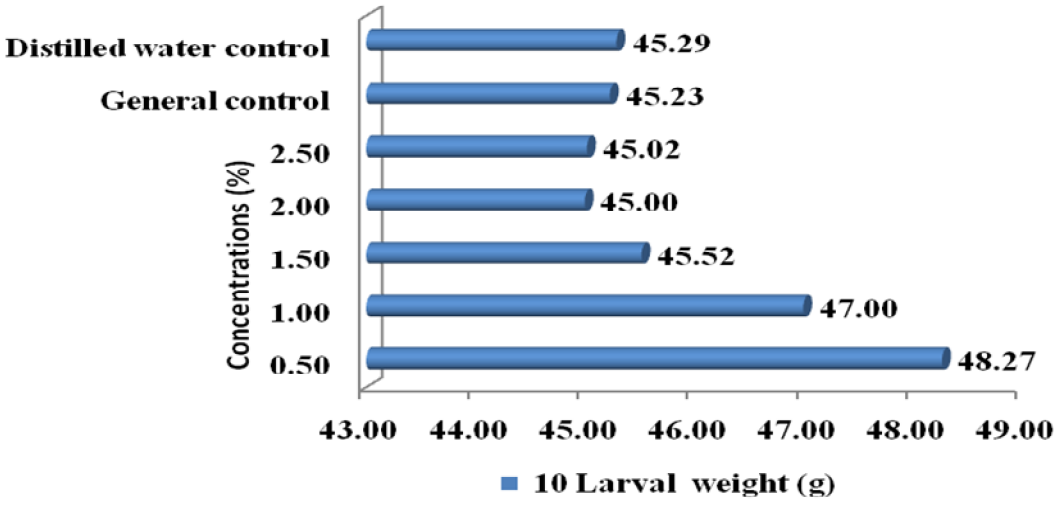

Fig 4: Supplementation effect of synthetic vitamin C 10 larval weight (g).

The data with regard to single cocoon weight exerted significant improved performance in the concentrations of 0.50 and 1.00% (1.924 & 1.902g) over the controls general and distilled water (1.853& 1.859 g) respectively (Fig-1). Similar trends were also reported in single shell weight and shell percentage when compared to controls (0.390 & 0.392g) (21.05 & 21.09) (Fig 2 & 3). These findings are in conformity with the studies of Aabid & Kanika Trivedy (2008) where the stated that supplementation of crude extracted of vitamin C significant improvement was achieved in the economic parameters of bivoltine silkworm hybrid. The results pertaining to weight of 10 larvae also showed significant improvement in two concentrations 0.50 and 1.00% (48.27 & 47.00) against the controls (45.23 &45.29) (Fig-4). These results are well supported with the studies of Gothif & Beck, 1967**;** EL. Karaksy & Idriss, 1990 they studied the effects of different concentrations of synthetic ascorbic acid on wide range of insects including silkworm and various results have been achieved. Etebari *et al.,* (2004) also demonstrated that 2.0% VC dose as the optimum for improving biological parameters of bivoltine hybrid silkworm when supplemented daily once from 1 is instar till 5th instar. According to Cui *et al.,* (2003) the supplemental VC dosage between 0.2% -0.3% with silkworm food are optimum for silkworm growth and development. Prasad (2004) also reported the 2.0% VC dose an ideal for improvement in cross breed races of silkworm. Further, it can be concluded that the improvement in the bivoltine hybrid silkworm at considerably lower doses of synthetic vitamin C could possibly be due to synergetic activity of ascorbic acid with other compounds in the vitamin C-complex that increase its bioavailability and efficacy.

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