Asian Journal of Chemistry Vol. 2, No. 2 (1990), 221–222

NOTES

Time Action : Study on Time Action of Intestinal Mucosa of the Silk Worm Larvae (Bombyx mori) on their Feed and thus on Chloroplasts

P. A. LIMAYE* and P. H. HUDDAR

Poona School of Sciences, 339, Sadashiv (Navi) Peth, Pune-411 030, India

The time required for the bowl to move from oral to aboral in case of silk worm Bombyx mori variety Wai 4 was found out by X-ray technique.

In 1937 an English Biochemist Robert Hill discovered that leaf powder in suspension when supplied with salts e.g. ferric oxalate show enhanced activity of oxygen evolution when exposed to light, known after him as *Hill* reaction. It is also known that the chloroplasts are the sites of oxygen evolution. It could be seen while working with the problem on silk-worms that excreta is getting richer in green colouring matter, obviously due to absorption of water, sugars, aminoacids, proteins, lipids and part of β-carotene for their metabolism. Chloroplasts are abundant in castor leaves. Presence of free chloroplasts in excreta of *B. mori* and *Philsomia ricini* was observed by Limaye[1]. Therefore silkworm was used as a tool for preparing chloroplasts from leaves by Limaye and Huddar[2]. However as these chloroplasts are subjected to the action of enzymes of alimentary canal, the time action of these enzymes and thus their action on chloroplasts has been studied.

Bombyx mori, silkworm, were used as experimental material.

The surfaces of silkworm eggs supplied by K.V.I.C. breeding centre, Pune were sterilized by using 0.25% hypochlorite solution, one or two days before hatching[3]. Newly hatched larvae were reared on fresh, soft and tender mulberry leaves picked up from the mulberry plantation in the campus. The mulberry leaves were chopped and fed twice a day in the beginning and 3–4 times as the larvae attained higher instars.

The larvae were adapted to gelatin (0.3 gm in 50 ml distilled water) from the 2nd instar. At the beginning of 5th instar 30 healthy larvae each were selected for the following treatment for measuring the time required for the bowl to move from oral to aboral. (A) Barium sulphate (B.D.H. 2 gm) added to gelatin solution (0.3 g in distilled water (50 ml)). (B) Silver foil spread on leaves smeared with gelatin solution (0.3 gm in 50 ml distilled water). (C) Silver powder (200 mesh, 0.5 g) added to gelatin solution (0.3 gm in 50 ml distilled water).

These solutions were smeared on mulberry leaves, and solution was dried but without allowing the leaves to dry. Then the leaves were chop-

ped and fed to the silkworms. All the solutions were sterilized by heating on water-bath for 15 minutes daily, keeping volume constant. Observation was made during the development. After eating barium sulphate and gelatin treated leaves, larvae showed sluggish movement and some of them died, may be due to barium sulphate poisoning. In the case of silver foil and gelatin treatment, the larvae did not touch the leaves at all, may-be due to shining of silver foil. So both the above treatments were discontinued.

In the case of C-treatment i.e. silver powder and gelatin, the larvae consumed some leaves, Ten larvae from this treatment were selected. They were X-rayed and marked on cuticle where opacity was visible. After 20 minutes again the same individual larvae were X-rayed and marked on the cuticle. Again after ten minutes, the same individuals were X-rayed and marked on cuticle. Afterwards, markings on cuticle and length of individual larvae was measured with respect to time. The mean value of ten larvae was found out. The mean time was 45 minutes. The time required for the bowl to move from oral to aboral was noted from the X-ray studies as described. It was 45 minutes.

REFERENCES

1. P. A. Limaye, *Biovigyanam*, **1**, 183 (1975).
2. Isamu Shimizu, Seiji Kitabatake and Masaru Kato, *J. Insect Physiol.*, **27**, **9**, 593 (1981).
3. P. H. Huddar, Ph.D. Thesis, University of Poona, India (1985).

[*Received*: 10 December 1988; *Accepted*: 15 September 1989] AJC-100