In the present investigation an attempt has been made to analyse the nutritive value of different ages of leaves of various mulberry plants to the silkworm, *B. mori*. This problem has been dealt with by a two-pronged approach which includes:

1. **Biochemical analysis of varying ages of leaves (tender, medium and coarse) of some selected mulberry varieties (ichinose, kosen, MR2, S14, M, and C1).**

and

2. **Feeding experiments in silkworm, *B. mori* to determine:**
   a). the protein profile of haemolymph and fat body
   b). bioenergetic profile and
   c). moulting, larval and economic characters.

**Phytochemical analysis**

The nutritional assessment of leaves of different ages of the selected mulberry varieties revealed that vital nutritional factors, such as leaf moisture, total soluble protein,
soluble carbohydrates, minerals and total phenols, were more abundant in the tender leaves of all the varieties suggesting the high nutritive value of such leaves. The poor nutritive value of medium and coarse leaves could be inferred by the relatively high content of total lipid and crude fibre.

Assay of the RuBPCase enzyme (the enzyme involved in the formation of RuBPCase protein, which is the most abundant nutrient protein in the mulberry leaves) showed a significantly higher activity of this enzyme in the tender leaves of all the varieties than in the medium and coarse leaves of the respective varieties. However, maximum activity was noted in the tender leaves of ichinose variety. Similar results were noted in the SDS-polyacrylamide gel electrophoretic leaf protein profile analysis where RuBPCase protein (55 and 15.5 kD subunits) was found in abundance in the tender leaves of all the varieties and especially in the leaves of ichinose.

The results obtained by the phytochemical screening of the mulberry varieties suggest that the tender leaves among the varying ages of leaves, and leaves of ichinose among differing varieties of mulberry, exhibit the best nutritional composition.

**Feeding experiments**

During the development of the fifth instar larva, all the polypeptides separated by SDS-PAGE, particularly the storage proteins [82 kDa (SP-1) female specific storage protein and 76 and 72 kDa polypeptides (SP-2) in both the sexes], showed
greater staining intensities in the haemolymph and fat body of the larvae that had been fed on the tender leaves of all the varieties; this was especially so in the tender leaves of ichinose. Densitometer scanning of the haemolymph protein profile (on the seventh day of the larval period) revealed the maximum peak area for storage protein and 30 kDa polypeptides in the haemolymph of those larvae that had been fed on the tender leaves of all varieties and on the leaves of ichinose.

The homology of the storage proteins was further confirmed by Western Blot analysis on the haemolymph samples obtained from the seven day old larvae. The electroblotted gels, when probed with antibodies developed against the storage proteins (SP-1 and SP-2), showed strongly reacting antigens of SP-1 and SP-2 in the haemolymph of the larvae that had been fed on the tender leaves of all the varieties and on the different leaves of ichinose in both the sexes.

In the study on bioenergetic profile, all the nutritional indices were related to various phytochemical parameters of the leaves of various ages of the different mulberry varieties. It was found that the higher the content of moisture, total soluble protein, soluble carbohydrates, minerals and total phenols in the leaves, the higher the developmental rate, production, production rate and the efficiencies of conversion of ingested food (ECI) and digested food (ECD). On the otherhand an increase in total lipid and crude fibre contents of the leaf resulted in a decrease in the developmental rate, production rate, ECI and ECD and an increase in the consumption, assimilation and metabolism and their rates.
From these various findings, one could infer that a diet composed of the tender leaves of mulberry among ages of leaves, and ichinose among varieties, significantly influences various bioenergetic parameters of the larvae.

Larval characters, such as moulting, larval duration, larval weight and silk gland weight were found to be significantly improved in larvae that had been fed on the tender leaves of different varieties, especially those of ichinose. Economic characters, such as cocoon weight, pupal weight, shell weight, shell ratio and fecundity were also found to be significantly bettered in the larvae that had been fed on tender leaves, among leaf ages, and leaves of ichinose, among varieties of mulberry.

To conclude it can be seen that the age and variety of the mulberry leaf used as feed have a profound influence on many parameters in the silkworm, *B. mori*. This work has shown that tender leaves, particularly of ichinose variety have the greatest effect on the growth and development in silkworm larvae. It is hoped that these observations may be considered when formulating an optimal diet for the silkworm, *B. mori*. 