

## PROCESSING OF SILK

After the rearing practice processing of silk is the vital step in the silk industry. It include the following steps-

- a) **Dying or stifling**- This is the step where the pupa are killed inside the cocoon in order to ensure the collection of continuous fiber in future and storage of cocoon. It is done by sun drying/ heating or indirectly by exposing to steam or hot air.
- b) **Storage**- Cocoon with pupa inside can be stored for up to 6 month with pupa inside in dry favourable environment. Care should be taken to protect from insect or any fungal damage.
- c) **Sorting**-Irregular, flossy, thin end or any types of damaged cocoons are rejected and healthy, proper shell weight, with good colour are sorted out for reeling.
- d) **Cooking**- Cocoons are then boil in order to soften the silk coating, swelling the sericin fiber in water with a P<sup>H</sup> between 6.8- 7.4.
- e) **Deflossing / brushing**- Deflossing is the removal of un-reelable mass of silk on the surface of the cocoons to expose the actual reeling end. It is done with the help of brush or broom made of bamboo during boiling.
- f) **Reeling**- It is the extraction of continuous silk thread of desired thickness from the cocoon without any break. This is one of the most important step where filaments from multiple cocoon are combined together and attached to the reeling or spinning machine. The reeling machine then automatically unravels the cocoons an dcreat a single strand. Throughout the process the cocoons are remain in boiling water. When a cocoon get exhausted, a new one is immediately substituted in order to make an uniformity of the yarn.

During reeling the twisting and cementing of silk filaments is done with the help of a special device called croissure. This device also squeezes out excess water from the yarn. Reeling process can be done by three methods-

- i) **Charkha system** – It is a manually operated system, where inferior quality and defective cocoons are reeled. Here cooking and reeling is done in the same basin. Charkha reeling machine is traditionally homemade and use for small scale silk production.
- ii) **Cottage basin system** – It is superior to the earlier one in terms of production rate. Here cooking and reeling done separately. Here squeezing is done in croissure and good quality and uniform yarn produces. This system is popular in India.

- iii) **Filature system** – This is a power driven multiend reeling device. Continuous reeling is possible in this modern device. Due to higher cost of establishment, in spite of being a modern system only 8% of the total silk production done by this way in India.
- g) **Chemical processing of raw silk-** In order to bring softness, to develop lustre in the silk thread and to remove sericin and other impurities treatment is done in this step. Following treatments are done for this-
- i) **Degumming of silk-** It is the removal of impurities from the silk and to bring softness- done through three methods. **Extraction with water-**Silk is treated with hot water(100 – 130<sup>0</sup>C) up to 4 hrs, which remove the sericine. Another way is **treatment with alkali/ acid-** Sodium carbonate, sodium bicarbonate caustic soda etc are use for alkali treatment for ½ to 2 hours at a pH >8.5. Acid treatment done at pH<3.0 can eliminate sericine. **Proteolytic enzyme digestion** with trypsin (pH8.0), papsin (pH5.2) is also done at a temperature 40-50<sup>0</sup>C also useful for degumming.
- ii) **Weighting of silk-** After removal of sericine 22- 25% weight loss occur in silk. So, to compensate the weight loss silk again treated with heavy metals like iron, tin, lead, zinc etc. and organic compounds like tanning substances.
- h) **Re-reeling-** To get rid of some post reeling problem like broken thread, entanglement, gum spot etc. silk is first reeled to small reels and then to standard size hanks. This process is re-reeling.
- i) **Lacing and skeining-** The hunk is then tied with a coloured silk thread by the two ends. He hunk is then divided into five parts and is laced with a cotton thread. The lacing prevents entangling of silk in later operation.

The laced hunks are then put on a skeining machine to be skeined. During the process the hunk is twisted and folded upon itself to form a number of tight spirals or skeins. The skeins are then made into books. Ina book eight skeins are placed in horizontal rows and five in vertical rows. Each book is then tied with separate cotton bands at at three different places and wrapped with tissue paper. Books are kept in bales of 2kg weight.