

Development of Sisal Decorticator



Assad Farooq

Department of Fibre and Textile Technology,
University of Agriculture, Faisalabad

There are lots of commonly used natural fibres in making textile products such as cotton, jute, hemp etc. There are other natural fibres that need utmost attention of researchers for having great potential of fulfilling needs of modern world both in terms of availability and versatility; thanks to their eco-friendly, non-toxic and user-friendly behavior. Sisal fibre is a big example of such neglected natural fibres and it has great potential of generating revenue for the country as substitute of jute fibre.

Sisal fiber is extracted from the leaves of *Agave sisalana* that is the Mexican plant and is now mainly cultivated in Tanzania, Brazil, Indonesia and India. Sisal plant is present in Pakistan and can be grown in the country due to its xerophytic nature. Due to its strength and durability, it is placed in the category of "hard fibers". A good sisal plant produces almost 200 leaves and mass composition of each leaf consists of 4% fiber, 8% other dry matter, 0.75% cuticle, and 87.25% moisture. It means a normal leaf having about 600 g weight can produce about 3% by weight of fibre. Well, a big constraint in getting benefit from properties of sisal fibre is extracting it from the leaves safely. Sisal fibres have the ability to be utilized into simpler end uses like twines, ropes and other packing materials, sisal fabrics, buffs, matts, carpets, filters and handicrafts. Moreover, specialized high value end uses include geo-textiles and fibre reinforced composites. However, in the presence of the sisal fibres in the country and also having the potential of being grown at vast areas, the country is lacking in the sisal processing machinery.



Sisal Plant

Methodology

Sisal fibre decorticator has been designed and developed in the department of Fibre & Textile Technology, University of Agriculture, Faisalabad. The developed decorticator machine is smarter than the other internationally available machines. The decortication machine has been developed on the basis of respaidor design. The sisal leaves one subjected to the action of blunt knives attached to a fast moving cylinder and feed plates. This action eliminates the green matter from the leaves and the fibres are decorticated. The Decortication action is more effective due to the special design of decortivating cylinder and knife. Hence, fibres come out clean and are almost free of green matter.



Sisal Decortivating Machine



Sisal Fibres

Impact

There is no natural packing fibre present in the country. The jute industry of Pakistan is entirely dependent on the raw jute imported from Bangladesh. The restrictions imposed by the Bangladesh government on export of raw jute to Pakistan caused the shutdown of sixty percent jute industry (7 out of 11 jute mills) in the country. Sisal fibre having better fibre characteristics than jute can be a good substitute. The development of sisal fibre decorticator and combing machine will help to provide the sisal fibre to the already developed jute industry as substitute raw material. Moreover sisal fibre composites can be a cheaper substitute of commonly used synthetic composites. The development of sisal decorticating machine is an effort to take sisal fibre as a substitute for jute, sisal fibre product realization, development, commercialization and its industrial role.