
MATTRESS AND BRISTLE FIBRE

By
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Coconut is not altogether nutty as it sounds. Most of it is made out of a husk that actually represents the cover of the fruit. The natural packaging, provided to protect the seed inside is amazing. It has a leathery coat called the husk that enables migration across the seas. In fact the legend goes that the first 'divine' off-spring of coconut was sea born to Sri Lanka from a distant land. Thus, it is recited in religious functions where coconuts are used for divine sacrifice.

For the purpose of protecting the embryo or the off-spring inside, until it sees the light of the day as an independent plantlet; the husk, is equipped with many a feature. It is chiefly made up of (60%) pith, a porous mass of living plant material that could hold up to six times its dry weight of water. This gives protection from drying up of the rudimentary plant inside. The strength of the husky coat is derived from the fibres that are interspersed in the pith just like the reinforcement of fibre glass. These fibres are as strong as the best of hard woods, being made up of the wonderful chain chemicals of the plant world viz cellulose and lignin. These fibres also have sand grains adhered to its surface, making it repulsive to the predators. The fibres on the surface of the husk are covered with waxy

layers to repel the influence of germs and dirt in the surrounding water.

In the process of extracting material for the utility of man from the coconut husk, we derive advantages vide the properties inherent to fibers and fillers of a highly organized natural system of packaging. This is in the form of



strength, elasticity, suppleness, flexibility as well as the built in durability. In the traditional processes for the manufacture of white fibre, the husks are allowed to decay in reservoirs of water up to one year. The fibre remains intact while other vegetable matter decays showing ample evidence of the longevity of the strands. This industry is dealt with in detail in *Cocoinfo International* (vol. 1 no. 2 p.17). Moreover, examination of a husk that has gone through such a retting

process, reveals the distribution of various fibres and the specific arrangements.

The outer most layer of the husk is leathery with a waxy surface and contains long strands of thin fibre. Immediately below this, one could find the long thick bristles running from one end to the other length-wise. Most of the

valuable thick long fibres are located in this zone. The inner layers progressively contain thinner and thinner fibres which are shorter in length. All fibres are arranged more or less parallel to each other while long bristles are straight, the smaller ones tend to be wavy, interspersed among pith and sometimes adhering to the soft tissues and the shell. In most instances, these fibres are extracted with no concern for being selective of the length or the size of individual strands. In

such instance it forms the raw material for ropes and twines.

Referring to ropes it may be pertinent to give the translation of a Sinhalese nursery rhyme to indicate how far the industry is interwoven to the day to day life.

*The strand of coir, humble
and weak
Blown away by the mildest wind
Entwined together, with ropes
they make
Do tame the elephant,
stampeded and wild*

Twines on the other hand, demonstrate rate compatibility with an agro-industry in the temperate west, namely the "Hop vines" used for flavoring beer. Farmers prefer coir twine as supporting lines for hop wines. Under the ambience in those countries the coconut fibre perishes by the time, the vines are fully grown. This makes mechanical harvesting of vines easy.

In meeting most of the present day demand of the world however, it is advantageous to harvest the long thick bristles separately from the smaller fibres. The smaller fibres on the other hand, coil so easily and show unwinding properties that the commodity is of great demand for making mattresses, upholstery and cushions.

Thus the fibre that cushions the cradle of coconut offspring was discovered by man as ideal for his own bedding. However the skillful task of extracting that mattress fibres by working the husk on the machine is by no mean a comfortable job.

*Piercing the flesh doeth the
revolving spike
Hands of the worker that err
not spared
Clearing the bristles of the
coconut husk
Yields coir, that cushion
your siesta bed*

Mechanical processes adopted to manufacture mattress fibre and bristle fibre as two separate products, are many. The simplest of which, widely used in Sri Lanka, illustrates how this is being achieved.

The husks used as raw material for the fiber industry are usually in a dried state. Thus as the first step, the raw material is allowed to pick up water by keeping in soakage pits up to a fortnight. This process is found to be accelerated by crushing the husk, prior to soakage.

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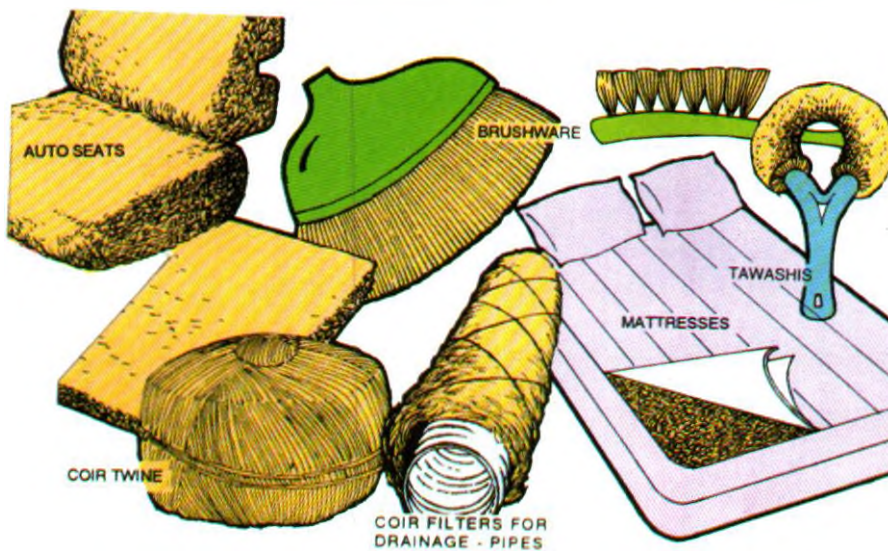
The soaked husks are manually held against a machine, popularly called the "Drum". The drum consists of a rotating cylinder with spikes on the surface. As the husk is pressed against this, the pith is torn apart separating the smaller fibres as well. The shorter (mattress) fibres and disintegrated pith are taken away by the spikes while the bristles remain in hand.

The husk of bristle fibre is further cleaned by holding against a second drum with finer spikes called the cleaner drum. The details of the process is given in the APCC publication on "Processing of Coconut Products in Sri Lanka".

Thus "Bristle fibre" and "Mattress fibre" are separated from each other by the processing operation. The latter however is mixed with particles of pith and is isolated by sending through a rotating cylinder of steel mesh.

The fibre as yielded by the drum process remains wet and soggy with different grades adhering to each other. Thus, it has to be dried to facilitate the separation of various grades. This is carried out by spreading in the open sun. In fact drying is a very important stage of the process so much so that absence of clear skies, limit the capacity of production. This is well illustrated by the fact that production of coir has been consistently lower in years of high rainfall in Sri Lanka. (See *CORD* Vol. XI No. 1, 1995 p. 26)

Hanks of bristle fibre obtained by exposure to breaker and cleaner drums after drying, are bundled into rolls using a single sling. This single sling signifies the degree to which it is processed. Such bristles that has not undergone specific cleaning are called "one tie" fibre. The length of the shortest strands of one tie bristle is about 8 to 18 cms. while the longest can be over 22 cms.



The one tie bristles are "hackled" manually by using steel combs to get rid of the fibres shorter than 20 cms. This is a process performed by experienced hands. The resulting product is traditionally named, two tie bristles. If the bristle are longer than usual in such a bundle (upto 30 cms.) it is labelled by a triple sling indicating that it is the superior 3 tie quality.

As most of bristle fibres are used for brushes the strength of the strand is of considerable importance. The thickness is greater in long fibres. Thus the three tie fibres are preferred for brush work etc. where a thicker gauge is required. In fact the fibre is thickest at the middle of it while the ends are tapering. Thus to obtain the thickest strands of a desired length the ends are trimmed leaving short stout bristles at the center as a bundle. These bristles may be used as they are, or dyed with dark colours such as black for the construction of table brushes, "Tawashi" brushes, brooms and door mats.

Mattress fiber after drying can be cleaned further by passing through a turbo cleaner. It is important to have the material clear of the pith as the latter tends to absorb moisture from the atmosphere and add to the weight of the material. Thus the buyers are

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generally particular about the moisture content of the mattress fibre.

The relatively short slender mattress fiber being somewhat wavy in appearance possesses

properties of metallic springs as described above. This can be easily observed when a strand is made to bend by using the fingers. These natural recoiling wires are thus of immense use in the manufacture of mattresses, upholstery cushions etc.

Mattress fibre together with little bristles that are separated during combing are widely used in the manufacture of ropes. The processes are very much similar to those described in COCOINFO INTERNATIONAL Vol. 1 No. 2 p17. Accordingly the carpets, door mats, nets and even geotextiles are made out of such ropes.

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One problem that is encountered in fibre utilization, is the fact that it is inflammable. However unlike the synthetics, coir on burning doesn't release any noxious gasses to the environs. Present technology has opened doors for fire retardation of coconut fibre as well.

Thus, the mattress fibre has found its way into the luxurious car seats of almost all the limousines of the up-market bracket, while the brushes made out of coir bristle adorn the most modern pantries, toilets and drawing rooms of the affluent world. □

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