

What is jute? Some Features of Jute : Jute Processing & Their uses.

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Jute is a long, soft, shiny plant fiber that can be spun into coarse, strong threads. It is produced from plants in the genus *Corchorus*, which see for botanical information and other uses. Jute is one of the cheapest natural fibers and is second only to cotton in amount produced and variety of uses. Jute fibers are composed primarily of the plant materials cellulose and lignin. It falls into the Bast fiber category (fiber collected from bast or skin of the plant) along with Kenaf, industrial Hemp, Ramie and Flax(Linen) fiber.

Jute is called in different names in different parts of the world. For instance, jute fiber is often called Hessian fiber, jute fabrics are also called Hessian cloth, and jute sacks are called Gunny Bags in some European countries. The fabric made from jute is popularly known as Burlap in North America. In Spanish, jute is called Yute and jute fabrics are called Arpillera.

Some Features of Jute Fiber:

Jute fiber is 100% bio-degradable and recyclable and thus environmentally friendly.

Jute is a natural fiber with golden and silky shine and hence called The Golden Fiber.

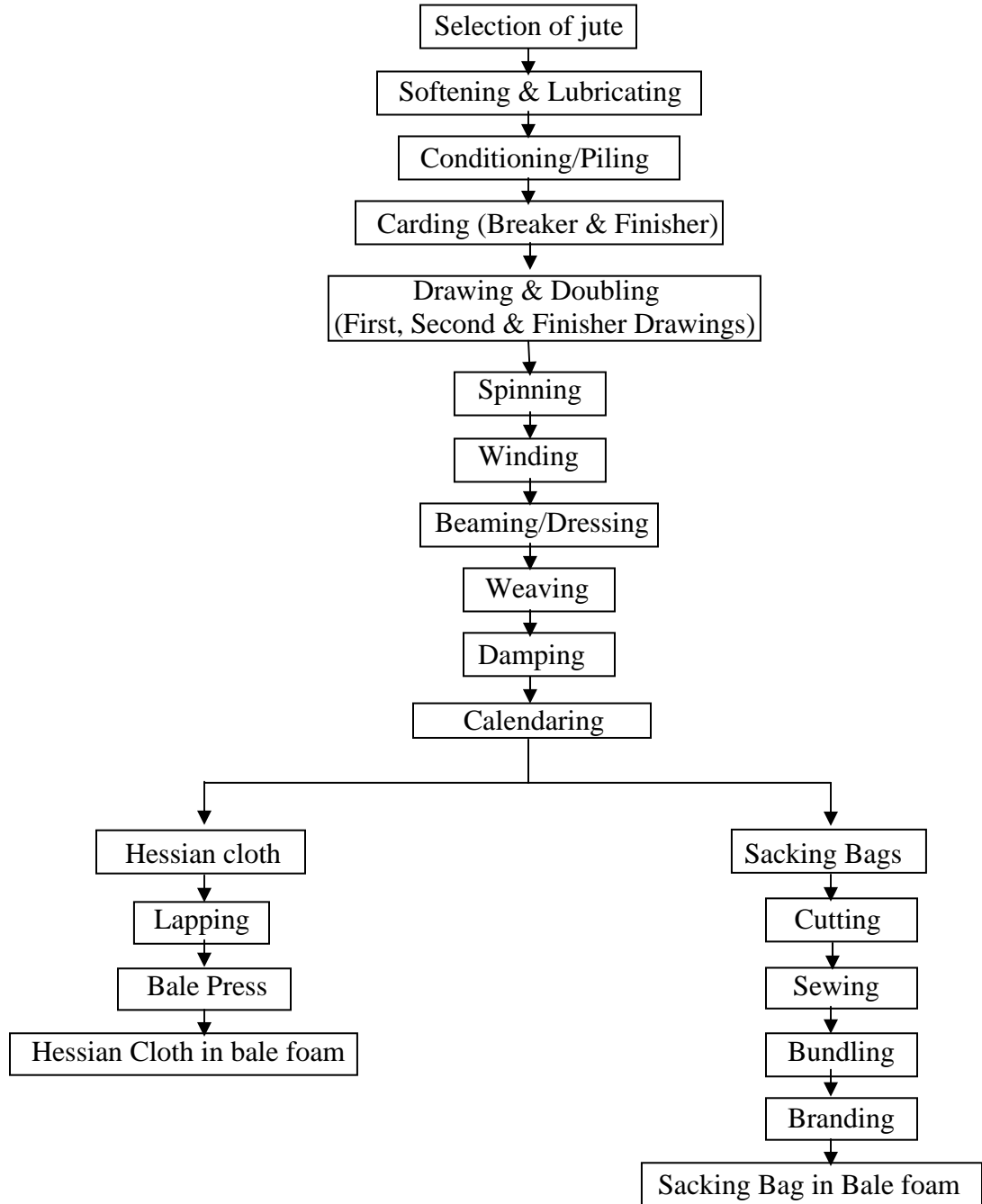
Jute is the cheapest vegetable fiber procured from the bast or skin of the plants stem.

Jute is the second most important vegetable fiber after cotton, in terms of usage, global consumption, production, and availability.

Advantages of jute include good insulating and antistatic properties, as well as having low thermal conductivity and moderate moisture regain. Other advantages of jute include acoustic insulating properties and manufacture with no skin irritations.

Jute has the ability to be blended with other fibers, both synthetic and natural, and accepts cellulosic dye classes such as natural, basic, vat, sulfur, reactive and pigment dyes. Jute can also be blended with wool. By treating jute with caustic soda, crimp, softness, pliability, and appearance is improved, aiding in its ability to be spun with wool. Liquid ammonia has a similar effect on jute, as well as the added characteristic of improving flame resistance when treated with flame proofing agent.

Flow Chart of Raw Jute Processing:



Selection of jute

In the selection process, raw jute bales are opened to find out any defect and to remove the defective portion by workers. Raw jute bales are of two types i.e. 150kg weight and 180kg weight with or without top portion cutting. The bales are assorted according to end use like Hessian weft, Sacking warp, Sacking weft etc. After selections, jute bales are carried to softening section.

Softening & Lubricating

In softening process of jute are made soft and pileable. Two methods are used for softening; use of softening machine and use of jute good spreader. Generally an emulsion plant with jute softener machine is used to lubricate and soften the bark and gummy raw jute. The emulsion plant consists of gear pump, motor, vat jet sprayer, nozzles, emulsion tank and the jacket. In this softening process jute becomes soft and pileable and suitable for carding.

Conditioning/Piling

The main function of pile breaker is to break the pile and serve it to the carding machines. The softener machine output material is carried by pile men through a pile to the pile place for piling. During piling superficial moisture penetrates inside fiber and “Thermo fillip” action takes place which softens the hard portion of the root. After piling for nearly 24 hours the pile breakers carry the material to the carding machine. Generally root cutting is done after piling near the hand feed breaker carding machine. The root weight varies from 5 to 7% of the total weight of jute.

Carding (Breaker & Finisher)

Carding is a combining operation where jute reeds are splitted and extraneous matters are removed. Jute fibers are formed into ribbon called “sliver”. There are three different carding sections; (1) Breaker Carding (2) Inner Carding (3) Finisher Carding.

Breaker Carding;

In different jute mills the carding operations have been carried out in two ways:

- a. Hand feed breaker carding.
- b. Roll feed breaker carding.

The material after piling more than 24 hours is used hand feed breaker where the material after piling for 12 hours is used in the roll feed carding.

In the breaker carding machine soft jute after piling is fed by hand in suitable weight. The machine by action with different rollers turns out raw jute in the form of jute silver for finisher carding. In this process root cutting is necessary before feeding the material to the hand feed breaker carding machine.

Finisher Carding:

Finisher carding machine make the sliver more uniform and regular in length and weight obtained from the Breaker carding machine. Finisher carding machine is identical to the breaker carding machine, having more pair of rollers, staves, pinning arrangement and speed. Nearly 4 to 12 slivers obtained from Breaker carding machine is fed on this machine. The material thus obtained is send to drawing section.

Drawing:

Drawing is a process for reducing sliver width and thickness by simultaneously mixing 4 to 6 sliver together. There are three types of Drawing Frame machine. In most mills three Drawing passages are used in Hessian and two Drawing passages are used in sacking.

First Drawing:

The slivers obtained from finisher carding machine is fed with four slivers on to the first drawing frame machine. The first drawing fram machines makes blending, equalizing the sliver and doubling two or more slivers, level and provide quality and colour. This machines includes delivery roller, pressing roller, retaining roller, faller screw sliders, check spring, back spring, crimpling box.

Second Drawing:

In the second Drawing Frame machine obtain the sliver from the First drawing machine and use six slivers and deliveries per head. The second Drawing machine make more uniform sliver and reduce the jute into a suitable size for third drawing.

Third Drawing:

In the Third Drawing frame machine uses the sliver from second drawing. The Third Drawing machine is of high speed makes the sliver more crimped and suitable for spinning.

Spinning:

Spinning is the process for producing yarn from sliver obtained from Third drawing. In the spinning process sliver are elongated and fibers are twisted into yarn to impart strength. Spun yarns in the spinning process are wound onto bobbins. The entire time is called an average cycle time. The time for replacing the bobbins full of yarn by empty bobbins is called softening time. The jute spinning frame machine is fitted with slip draft zone and capable of producing quality yarns at high efficiency with auto-doting arrangements also. A 4 pitch slip-draft sliver frames available of 20 spindles 100 spindles, having a production range 8 lbs to 28 lbs with a flyer speed of 3200 to 4000 Rpm. Spinning of several types of yarn is processed by spinning frame machine using different kinds of bobbins, such as; Food grade HFC, Sacking Warp, Hessian Warp, and Hessian Weft.

Winding:

Winding is a process which provides yarn as spools and cops for the requirement of bearing and weaving operations. There are two type of winding:

1. Spool Winding
2. Cop Winding

1. Spool Winding.

In Spool Winding yarn is produced for warp (the longitudinal yarn). Spool Winding machine consists of a number of spindles. There is wide variation in the number of spindles per machine from one make to another. Productivity of spool winding depends on the surface speed of the spindle and machine utilization. Spool winding machine uses the bobbins contain smaller length of yarn. This machine wound the yarn into bigger packages known as spool. The spool are used in making sheets of yarn to form warp portion used during interlacements of weaving.

2. Cop Winding.

Cop Winding machine obtain yarn from the spinning machines. The spinning bobbins are placed on a suitable pin on top of the cop machine and yarn tension is maintained by means of a small lever. The yarn on bobbins is converted into hollow cylindrical package said to be cop. The cop is used to form Transverse thread during interlacement of weaving. Generally a cop winding machines consist 120 spindles.

Beaming/Dressing:

Beaming process is follows after spool winding. In beaming operation yarn from spool is wound over a beam of proper width and correct number of end to weave jute cloth. To increase the quality of woven cloth and weaving efficiency, the warp yarns are coated with starch paste. Adequate moisture is essential in this process.

Quality characteristic of a beam is width of beam-number of ends and weight of stand and there is a continuous passage of yarn through starch solution from spools to the beam. Starch solution in water contains tamerine kernel powder (TKP), antiseptic-sodium silica fluoride (NaSiF_4) and its concentration varies with the quality of yarn.

Weaving:

Weaving is a process of interlacement of two series of threads called **warp** and **weft** yarns to produce the fabric of desired quality. There are separate looms for Hessian and Sacking in weaving section. The Hessian looms, shuttle which contents cops (weft yarn) is manually changed. The sacking looms are equipped with eco-loader to load a cop automatically into the shuttle.

Damping:

Damping is a manual process in which the rolled woven cloth is unrolled and water is sprinkled on it continuously to provide desired moisture. Each roll is generally 104 yards or 96 meters.

Calendaring:

Calendaring is a process similar to ironing of fabric. After damping the damped fabric passes through pairs of heavy rollers rendering threads in fabric flattened and improve the quality and appearance.

Lapping:

Lapping is the process in which Hessian fabrics are folded into the required size used in Bale press operation on the lapping machine.

Cutting, Hemming/Heracles sewing:

Cutting is the process where the sacking/Hessian cloth is cut to the required length for making bags for different size and capacity. In Hemming process, the raw edges of jute cloth cut pieces are shown by folding it with sewing machine. In Heracles sewing the side of sacking cloth cut pieces are shown to make complete bags.

Baling:

After the bags are stitched or Hessian lumps as the case may be, they are piled and packed in standard packing as per requirement and is baled by iron strip applying hydraulic force into hydraulic bale pressing machine.

Uses:

- ▶ **Core uses:** Twine and rope, sackings, carpets, wrapping fabrics (cotton bale), and the construction fabric manufacturing industry. It can be used in curtains, chair coverings, carpets, are rugs, Hessian cloth, and backing for linoleum. Other uses include espadrilles, floor coverings, home textiles, high performance textiles, geotextiles and composites.
The jute is being replaced by synthetic materials in many of these uses, jute is still valuable due to its biodegradable nature. Synthetics are not suitable in some cases.
- ▶ **Twine and Rope:** A very popular use; jute fibers are used alone or blended with other types of fibers to make twine and rope.
- ▶ **Paper:** Jute fibers can be turned into pulp and with increasing concern over forest destruction for the wood pulp used to make most paper, the importance of jute for this purpose may increase.
- ▶ **Textile machineries:** Such as textile fibers having cellulose (vegetable fiber content) and lignin (wood fiber content). Just is applied in the automobile, pulp and paper, and the furniture and bedding industries to manufacture non-woven, technical textile, and composites.
- ▶ **Home textiles:** Jute has many advantages in home textile, either replacing cotton or blending with it. It is a strong, durable, color and lightfast fiber. Its UV protection, sound and heat insulation, low thermal condition and antistatic properties are advantageous. Jute fibers are also carbon dioxide neutral, naturally decomposable and can be used in high performance technical materials.
- ▶ **Fabrics:** Jute can be used for Hessian cloth, sacking, scrim, carpet backing cloth (CBC), canvas and even blended to make silk. Hessian, lighter than sacking, is used for bags, wrappers, wall-coverings, upholstery, and home furnishings. Sacking, a fabric made of heavy jute fibers, has its use in the name.
- ▶ **Geotextiles:** Made jute more popular in the agricultural sector. It is a lightly woven fabric made from natural fibers that is used for soil erosion control, seed protection, weed control, and many other agricultural and landscaping uses.

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