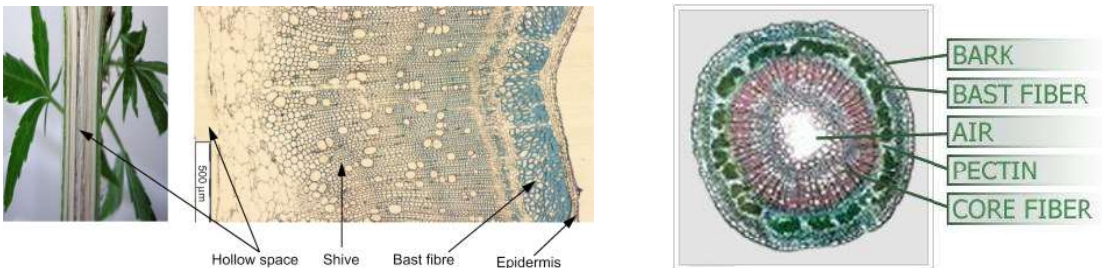


## BAST FIBERS

These fibers are constructed of long thick walled cells which overlapped one and other; they are cemented together by non cellulose material to form continuous strand that may run the entire length of the plant stem.



The strand of the bast fibers are released from the cellular and woody tissue of the stem by the process of natural composition called retting. Often, the strands are used commercially without separating the individual fibers one from another.

Hemp as Bast Fibre:

(Discussed through Documentaries)



The cellulose fiber from hemp is used to make many products, including jeans, shirts, dresses, hats, bags, ropes and canvas, skin care products, building materials, paper and many food products.

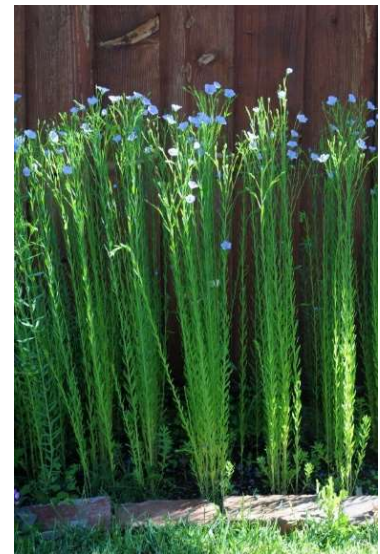
## **Jute as Bast Fibre:**

On the quantity based the jute is most important in the bast textile fibers, but the most of is made into baggage cloths for wheat sacks etc.



## **Flax as Bast Fibre:**

Flax appears to be the earliest vegetable bast fiber to be used industrially and there fibers come from the stem of an annual plant "Linum usitatissimum". The plant grow almost in all European country, but major production is confirmed from France, Ireland, Belgium, Holland, Russia & North America. The production of the flax is 1/7 of the jute fibers.



## **Manufacturing of Flax Fibers:**

Flax is the fibers from which we make linen fabric; Flax is expensive fiber and linen is a high quality textiles. It's on that basis, the most important of the bast fibers in textiles.

The plant is 3-4` in height, when it has reached its full growth the plant is pulled up & cut down then subject to a process called "Rippling"

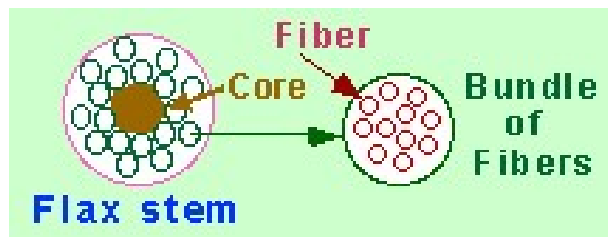
### **Rippling**

Removal of leaves and seeds by a series of upright forks is called Rippling. The flax stalk or straw is tightly in the bundles for the next process.



### **Retting**

It involve the decomposition of the woody matter enclosing the cellulose fibers. The processes one of the fermentation and may be carried out by stagnant water in pools. In slow moving streams by exposing it to sunlight and dew for about two week or by various chemical process.





The pectin matter which held the fiber together most are not be completely removed by retting as its controlled amount maintained the strength and elasticity of the flax. Over retted flax is brittle and weak. The retted flax is dried and a process next carried out is called “Breaking and scutching”

### **Breaking and Scutching**

It involves several pairs of fluted rollers in a breaking machine which brakes-up the woody matter without damaging the fibers. The broken straw is than subject to the process



“Scutching”. The process separate the unwanted woody matter from fibers. This is also done by beating the straw with blunt wooden or metal blades on the scutching machine. The woody matter is removed as shave, which is usually burnt as fuel, leaving the flax in the form of the long strands formed of bundles of individual fibers adhering to one another.

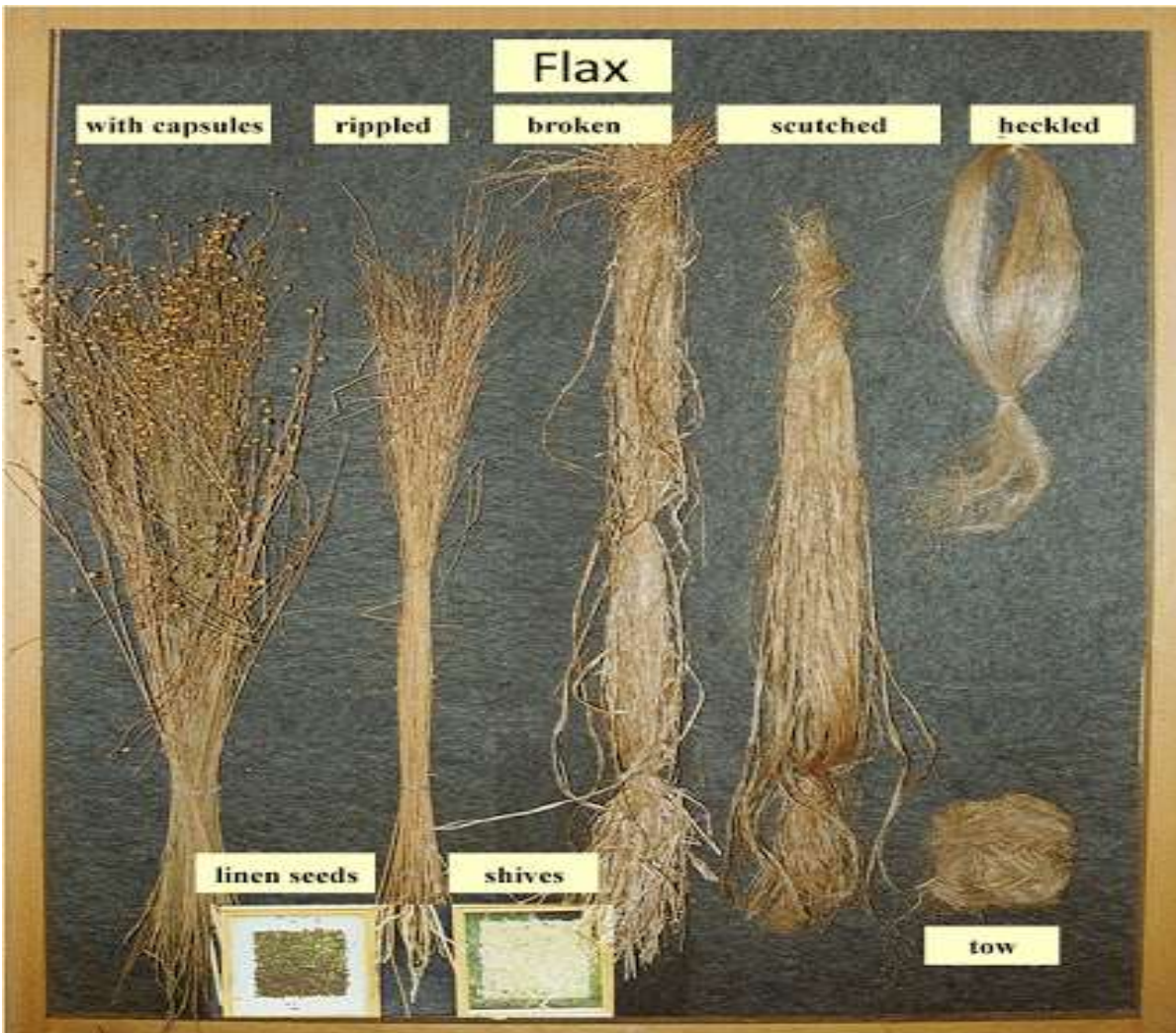
### **Heckling**

After scutching the fibers are usually hackled (combed) by drawing them through sets of pins, each successive set being finer than the previous one. The coarse bundle of fibers are, in this way separated into finer bundles, and the



fibers are also arranged parallel to one another the longer fine fibers are known as "line".

The flax is then stored according to the quality. The shorter fibers or waste known as tow and spun into yarn of lower quality like twine and thin ropes.



## **Characteristics and Properties of Flax Fibre:**

### **1. Composition of Flax?**

Linen consists of largely cellulose but about 25% of the total fiber consists of pectin & waxes. This gives linen a luster not normally present in cotton.

**Pectin:** These are impurities they may be removed by careful boiling. Chemically they are highly molecular carbohydrates with a chain structure similar to cellulose.

**Waxes:** It acts as a water resistance protection coating as on raw cotton fiber. It is removed in careful boiling.

### **2. Structure & Appearance:**

Under the microscope linen fibers have characteristic transparent, cylindrical tubes. Convolution which is characteristic of the cotton fibers is not present in the flax.

The width of the fibers may vary several times along the length. Looking like the swelling at many points.

Because of its smooth surface, linen does not soil readily which makes it easy to remove.

### **3. Fiber length:-**

The individual fiber is longer than those of cotton from 45cm-50cm in length. By the time the fibers reach the stage of spinning, they have been broken down in length. Even the fibers in linen yarn may be shorter than 30cm-38cm (12-15 inch).

#### **4. Strength**

Linen is stronger than cotton because of the greater length of linen. It becomes stronger on wetting. The average tenacity is 5.8 g/tex. The dry tenacity ranges from 2.7 - 6.5 g/tex.

#### **5. Fineness:**

The mean diameter of the fibers is about 0.02mm (1/1200<sup>th</sup> in).

#### **6. Extensibility:**

Flax is particularly inextensible fibers. It stretches only slightly as tension increases. The (Elongation at break 2.5 %).

#### **7. Elasticity:**

Linen is least elastic of the natural fibers & linen garments are creased badly. It has a high degree of rigidity and resists bending. The creasing property is significantly reduced by modern crease-resisting treatment.

#### **8. Effect of Moisture:**

It absorbs water well but it dries fairly quickly (SMR 12%). Linen is about 20% stronger when wet than dry, which helps linen to withstand mechanical treatment in laundering.

#### **9. Effect of Heat:**

Linen can be stand at high temp and do not scorch easily and high resistant to decomposition up to about 120 °C, when the fiber begins to discolor.

It is a very good conductor of heat and clothes made from it are cool to wear.

### **10. Sun light:**

It is fairly resistant to the attack of sun light but gradual loss of strength on prolong exposure is reported.

### **11. Effect of Insect:**

Flax is not attacked by the moth grub or other insects.

### **12. Effect Micro-organism:**

When boiled and bleached flax is pure cellulose, like other cellulose fibers, flax in this state has high resistant to rotting. Under several conditions of warmth, damp and contamination, however, mildew may attack the cellulose of flax, but the resistance is generally high, particularly if the yarn or the fabric is dry.

### **13. Bleaching:**

It can be bleached if the care is taken but it is more easily damaged than cotton.

### **14. Effect of Acids:**



Flax withstands dilute, weak acids, but is damaged by strong acids.

### **15. Effect of Alkalis:**

Flax has a good resistance to alkaline solutions; linen fabric can be washed repeatedly without deterioration.

### **16. Effect of Organic Solvents:**

Flax is adversely affected by the dry-cleaning solvents in common use.

### **17. Dyeing:**

Compare to cotton linen has a poor affinity of dye because of thought, hard, non-porous.

Most linen is dyed in piece, using techniques similar to those for cotton. Good dyestuffs are generally used.

Flax is the fibers from which we make linen fabric; Flax is expensive fiber and linen is a high quality textiles. It's on that basis, the most important of the bast fibers in textiles.

### **Cost & Uses of Flax Fibers:**

- Flax is expensive fiber and linen is a high quality textiles. In past flax was in demand where extra strength and resistance to moisture were important. However, such flax product as tent canvas, fishing lies and bookbinders' threads have now been replaced by synthetic substitutes.

- Leather working thread, sewing thread and suture thread are still produced from the flax. The fine house hold trade has decline greatly, but the development in blending with synthetics to give linen 'easy care' properties ensured a long term future for flax products. The ability of flax to absorbed water rapidly is particularly useful in towel trade.
- **Linen glass cloths will remove all trace of moisture from the glass without leaving any particles of fluff behind.**
- Linen sheet are cool and linen garment are comfortable in hot weather.

