

Rubber

Botanical Name: *Hevea brasiliensis*

Vernacular Name: Rubber

Family: U. Phorbaceae

Part Use: Milky sap [latex] extract of Tree Bark

Origin & Distribution: *Hevea brasiliensis*. commonly known as rubber plant belong to family U. phorbaceae. Initially source of natural rubber but other plants like *Picus elastica* belong to family moraceae & *parthenium* & *argentatum* belong to family asteraceae.

- ⇒ The origin of rubber belong from Amazon of South America a tropical region now, cultivated in Southeast Asia, in tropical, subtropical regions all over the world Thailand, Indonesia, Malaysia, India, China, Sri Lanka, Burma.
- ⇒ In India the natural rubber produce from two main states Coimbatore from Karnataka & Coimbatore from Tamil Nadu

Botanical Characters: The tree is fast growing medium to tall.

Habit: Tall, Perennial tree height = 20-40m

Root: Developed tap root system.

Stem: Erect, straight, small, tap root trunk weight, grey, bark

Leaf: leaves are compound dry foliate and spirally arranged.

Flower: small, unisexual and racemose, inflorescence from fruit woody capsule contain 3-4 seed which split open when lactiferous system while milky sap (latex) excrete from bark.

Rubber Plant part

Chemical Composition:

- ⇒ Rubber plant primarily contain rubber, hydrocarbon & non rubber substance
- ⇒ CIS-1,4-polyisoprene, 35%. it is main hydrocarbon component of latex and provide elasticity to rubber

Non-Rubber substance - Proteins = 2 %.

Lipid = 3 %.

Fatty acid, phospholipid, carbohydrate = 0.4 %, plant metabolites,
mineral ash, Mg, Ca, K, Fe, H_2O = 60 %.

Cultivation:

- ⇒ Rubber plant propagate by seeds and green bud propagules in nursery.
- ⇒ Seeds are ephemeral [short life span] so immediately sowing after maturity.
- ⇒ Tropical and sub-tropical, warm temperatures between $20-34^{\circ}C$ humid with high rainfall climate conditions are better for rubber cultivation.
- ⇒ Loam soil, well drained, acidic [$pH = 4.5-6$] are required.
- ⇒ In nursery seeds germinate in two weeks and after 6 months ready for transplantation.
- ⇒ Loam soil prepare by adding organic manure and phosphatic fertilizer.
- ⇒ Six year old rubber plant can produce latex for around 25 years.

Harvesting

Processing of Rubber Tapping: The milky latex is expelled from the cambium layer of tree.

- ⇒ Rubber can be obtain by following process

Imp ~~****~~ ^{collection}
a) Tapping of latex : extraction / of latex by cutting bark by sharp knife is called tapping.

⇒ Latex can be extracted from 6 year old young plant a groove is made by a narrow slit. using sharp knife called gauge into bark of tree.

⇒ The groove is made at height of 1.5 m from ground at angle of 30°

⇒ The latex collect in a pot.

b) Processing of Rubber : The rubber obtained from plant is whitish or light yellow colour in form of colloidal emulsion.

⇒ It contain 30-35% H_2O .

⇒ The processing is carried out in following steps.

i) Filtration : The collected latex is sieved through Aluminium sieve and discard pieces of bark, leaf and other contaminations.

ii) Standardization : With the help of hygrometer the amount of water present in rubber is standardised

iii) Coagulation : The latex is mixed with a formic acid, acetic acid and it is constantly shaken. i.e coagulation

iv) Washing & Rolling : The coagulate rubber is washed with water and with the help of rollers the rubber obtain in the form of sheets

v> Drying of Rubber sheet :- For drying these rubber sheets are placed in small chambers at 50°C for 3-4 days.

c> Vulcanization of Rubber :- This is a chemical process in which rubber is treated with sulphur and other chemicals like carbon peroxide, ~~str~~ selenium, Nitrogen peroxide at $140 - 160^{\circ}\text{C}$ this forms cross linked between long rubber molecules which make it more elastic, ~~abb~~ abrasion ~~streng~~ resistant, durable and tensile strength.

Uses:

- (i) Due to electrical resistance, it is good for insulation purposes. To make gloves, shoes etc.
- (ii) Hard rubber used to make telephone ~~wire~~ covers, parts of radio sets, meters and many more electrical equipments.
- (iii) These are utilised to make fire tubes.
- (iv) Medical equipment like medical gloves, rubber tubes used in medical equipment, sheets etc.
- (v) Footwear and clothes, raincoat, hot water bottle etc.
- (vi) In vehicles shock absorbers are made.
- (vii) It sports ball, bat, football etc.
- (viii) Adhesive cassettes and rubber band.
- (ix) Used in cushion, pillow & mattresses.