

Current Scenario of *Hibiscus Sabdariffa* (Mesta) In India (Maharashtra)

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Abstract

Green fibres like flax, jute, sisal, kenaf, mesta which has been used for more than 8000 years are the present and the future raw materials not only for the textile industry but also for modern eco- friendly composites, cosmetics, medicine, food, fodder, bio- polymers, agro fine chemicals and energy. Potentially under optimum cultivation conditions they cause little or no detrimental effect on the eco- system and they can be grown in different climatic zones. Organically cultivated, they recycle the carbon dioxide in the earth's atmosphere. In the present study the current status of the cultivation process, harvesting and retting methods of *Hibiscus Sabdariffa* (mesta) are studied and documented along with its current uses and socio economic factors influencing the production of the crop. The crop is cultivated in the most organic and efficient way with the sowing happening in the month of July, with the onset of monsoon. Special organic compost is prepared as manure and applied to the crop at regular intervals. Harvesting is done individually in the month of December with the help of a sickle. The plant is not uprooted rather cut at the bottom with utmost care to avoid any damage to the fibre. The crop is planted for the calyces and the leaves which are consumed as food, while the stalks are the by- product so the process of retting takes its own time. Water retting is carried out with beat and jerk extraction method and then the fibres are dried in sun. The current scenario is fortified with the farmer's interview about various socio economic factors which revealed the reality of farming. The younger generation is not interested in farming and the farmers don't wish to involve their children in farming either. Hence, is the future of natural fibres in safe hands!

Keywords: *Hibiscus Sabdariffa*, mesta, cultivation, harvesting, retting

Introduction

a) Morphology of the plant: *Hibiscus*

Sabdariffa (Mesta) is a shrub belonging to the family—Malvaceae and genus *Hibiscus*. It is an annual erect shrub with red or green stem, practically unbranched or with branches at the base; stem is glabrous or slightly hairy with minute tubercles; leaves are serrate, lower leaves ovate and undivided, upper ones palmately 3-5 lobed; flowers are large yellow with dark crimson eye; epicalyx united



Fig. 1: Dried calyces of Mesta

at the base and adjoined to calyx. As seen in Fig 1. Calyx is dark red to purple; fleshy capsules are ovoid and pointed with numerous seeds (Wealth of India, 2001).

b) **Classification on the basis of names:** It is considered to be a native to Asia (India to Malaysia) or Tropical Africa. The plant is extensively grown in tropics like Africa, Brazil, Australia, Caribbean, Central America, India, Hawaii, Florida and Philippines as a kitchen garden crop. It is known by the names like Roselle, Rozelle, Sorrel, Red sorrel, Jamaica sorrel, Indian sorrel, Guinea sorrel, Sour-sour, Queensland jelly plant, Jelly okra, Lemon bush and Florida cranberry. In North Africa and the Near East, Roselle is called karkade or carcadé and it is popular by these names in the pharmaceutical and food-flavoring trades in Europe. In Indian languages it is known as Gongura, Lal ambari, Patwa (Hindi), Lal-mista, Chukar (Bengali), Lal-ambadi (Marathi), Yerra gogu (Telugu), Pulichchai kerai (Tamil), Pulachakiri, Pundibija (Kannada), Polechi, Pulichchai (Malayalam) and Chukiar (Assam) (Mahadevan et.al).

c) **Classification on the basis of race:** Based on the plant coloration *Hibiscus Sabdariffa* can be further classified under four races, namely *race ruber*, *race albus*, *race intermedius* and *race bhagalpuriensis* (Wealth of India, 2001).

Cultivation in India

Mesta is cultivated in an area of about 1.5 lakh hectare and the average national productivity of the crop is around 11q/ha. According to CRIJAF, though its productivity has increased two folds since independence, despite it faces tough competition from cheaper synthetic fibres. It is one of the important bast fibre crops which stand next to jute in production. At the time of partition, India had to loose about 80% of total jute

production area. The jute crop needs a particular set of climatic conditions, therefore, the cultivation of jute could not be extended beyond the states of West Bengal, Assam, Bihar, Orissa, and parts of U.P. and Tripura. As a result the production of jute fell below the requirement of mills. Mesta can, however, be grown even in those areas where jute is not grown under wider climatic and soil conditions with much less care. This helped the country to expand more area under mesta (Singh, D.P.).

In India, mesta is grown in larger parts covering areas from Karnataka to Tripura including Maharastra, Andhra Pradesh, West Bengal, Bihar, Orissa and Meghalaya. In Tripura and Meghalaya the mesta is grown in highlands either as a pure crop or in mixture with rice. In West Bengal and Bihar it is grown in sandy to sandy loam marginal lands. In Orissa it is grown in the hilly districts of Koraput and Kalahandi. Andhra Pradesh has maximum area under mesta in the country (Singh, D.P.).

Climate and soil

According to Singh, a warm humid climate is considered most suitable for growing mesta. It grows well in the drier rain fed areas. The sabdariffa being drought resistant type grows well in tropical areas also. In areas where the rainfall is 50 to 90 mm, the *Hibiscus Cannabinus* suits better by virtue of shorter duration and comparatively faster growth than the other. It cannot withstand water logging and is grown in kharif season in India. It requires rich loamy soils although it may grow in a variety of soils including new and old alluvium & lateritic loam. The acid soils are not suitable without proper amendment. The sabdariffa develop chlorosis with high pH of the soil.

Objectives of the study

1. To document the cultivation process, harvesting methods and retting process of *Hibiscus Sabdariffa*
2. To document the current uses of *Hibiscus Sabdariffa*

3. To study the socio economic factors influencing the production of *Hibiscus Sabdariffa*

Methodology

The major objective of the study was to document the traditional cultivation, harvesting and retting methods of *Hibiscus sabdariffa*, to study the present methods of fibre extraction and uses of *Hibiscus Sabdariffa* in Maharashtra (India). A descriptive research design was planned. To study the cultivation process seeds of *Hibiscus Sabdariffa* were planted at home and its growth was monitored. To get complete and authentic information multiple field visits was planned. The interview schedule and participatory observation techniques were undertaken. The data was collected with the help of interview coupled with observation method. The schedule consisted of closed and open ended questions. The questions dealt with demographic details, current cultivation process, present harvesting methods, retting methods, versatility of the crop and their socio-cultural life. Purposive sampling method was adopted for selection of the sample. A multi visit, interview method was implemented along with photographic and video documentation for the collection of authentic data. The sample sizes comprised of three families; one from Kacheri Sawonga village, second from Khekranala village near Nagpur and third from Ambhora village near Wardha(Maharashtra) i.e. one family from each village.

Results and Discussion

a) Sowing and cultivation: Cultivation of *Hibiscus Sabdariffa* was being carried out in most organic and efficient way. Seeds of *Hibiscus Sabdariffa* were sown by broadcasting/ line sowing method with the onset of monsoon in the 1st or 2nd week of July, and the same is also mentioned in the Natural Fibres- Handbook with cultivation and uses by NIIR and Vegetable Fibres by Kirby R.H. that the planting should be done at the commencement of rainy season. While sowing the moisture level of the soil was maintained around 20-30% and seeds were sown at a depth of 2-3 cms for good germination. The spacing between the seeds was maintained for proper growth of the plant. For manure, organic fertilizers in the form of compost were being used. It was prepared from cow dung, cow's urine, gram flour, jaggery, soil.

The mixture of this is applied on the field at regular intervals as compost. Weeding, thinning and hoeing were the three major inter-cultural operations attempted in mesta crop. The growth in case of sabdariffa is low in the initial stages but picks up in the later stages.

b) Harvesting: It is generally done after the six months of sowing and it is very important aspect in a bast fibre crop. Harvesting is done by cutting the plant close to the ground with the help of a sickle. After the harvesting, the plants are sorted out according to the thickness of stems. This is followed by bundling of plants in convenient sizes of 20-25 inches in diameter. These bundles are kept standing- in the field for two or three days for shedding of seeds.

c) Retting and fibre extraction: The stems were retted in water in the same way as jute is retted i.e. by beat and jerk extraction method. The stems were immersed in stagnant water for 15-20 days so that the fibre loosens and can be easily taken out. The outer sheath of the stem was removed manually from hand. Then it was washed thoroughly in clean water to get rid of all the impurities. The fibres separated and due to their length it was needed to tie them in the form of a knot while cleaning. The cleaning process was carried out by beating the fibre(tied in the form of a knot) against the hard rock/stone. The fibres were then hanged vertically on the wire and dried in the sun. Similarly the same procedure is also mentioned in the Handbook with cultivation and uses by NIIR and Vegetable Fibres by Kirby R.H.

d) Socio economic factors: The respondents clarified that the cultivation process was being carried out by the entire family except for children. They have planted Sabdariffa from last 2-3 yrs. The age of the farmers ranged around 40-45 yrs and only the older generation is into farming. Younger generation had no inclination to pursue and continue with the traditional farming practiced by the family. One of the farmers conversed in the vernacular language and the other two conversed in hindi. They stayed in their own cemented house. Two farmers belonged to a joint family and only one farmer belonged to a nuclear family. The children in the family were motivated by the parents to study further and would take up a good job rather than being

involved in the farming because of poor returns which farmers are getting irrespective of their hard work. Farming is the main source of income for all the farmers.

Process of cultivation of H. Sabdariffa

Mesta is grown in a farmer's field either as a supplementary vegetable crop, or as a hedge crop or on bunds as wind breakers. The crop is generally a rain fed crop which has adversely affected the cultivation of the crop. Land is ploughed 3-4 times before sowing depending upon the type of the soil. The soil in this region is medium to light loamy soil so it doesn't require much of preparation. Optimum dose of organic fertilizer is applied as a basal dose after the preparation of land.



Fig 2: Cultivation of *Hibiscus sabdariffa*

Under the extension of technology, line sowing was administered due to which growth of the plant was uniform. 1 kg of seeds was sown in 1acre of land. Intercultural operations like weeding, hoeing was easier to attempt. Recommended dose of compost was administered at regular intervals of time. Inorganic fertilizers were not used because the soil was already rich in nitrogen due to crop rotation.

For irrigation as it is a rain fed crop, it is mainly dependent on the rains. Excess of rainfall can destroy the crop so, water logging should be avoided. As seen in Fig. 2 the crop gets mature within 6-6.5 months from the time of sowing and gets ready for harvesting.

Process of harvesting H. Sabdariffa

Harvesting time is very important in bast fibre crops like sabdariffa. An optimum stage of

harvesting gives higher yield as well as better quality of fibre. If the plants are harvested prematurely in early stage the quality of fibre is good but the fibre yield is poor. Mesta has two distinct phases of growth i.e. vegetative phase and the reproductive phase. The plant is harvested when it completes the reproductive stage i.e. when flowering and fruiting occurs. That is when it gives the maximum benefit to the farmer. Before harvesting the leaves are removed for consumption and calyces are also removed for drying. Harvesting is done by cutting the plant very close to the ground level with the help of a sickle as referred in Fig. 3 and 4. After harvesting the plants are sorted out according to the thickness of the stem. This is further followed by bundling of the crop in convenient sizes of around 20-25 inches in diameter. The bundles are made to stand vertically upside down in the ground for few days. This is done to open the seed pod and obtain the seeds which can further be used for cultivation. After harvesting, the bundles of stems are kept for 2-3 months in the field. The bundles are then transported to the retting site where retting and fibre extraction is carried out.



Fig. 3 and 4: Process of harvesting *Hibiscus sabdariffa*

Present retting procedures

The stems were stacked vertically in the field after harvesting until farmer fetches sufficient water and time for fibre extraction. The traditional and most common method of retting employed is what is known as 'stem retting', in which the complete plant stem is immersed in water in bundles of multiple layers termed 'rets'.

The process involved immersion of rets in open water-river, pond, canal and ditches for 15-20 days which causes microbial decomposition and dissolution of non fibrous binding materials like pectin and hemi cellulose.



Fig. 5: Rets immersed in water

The bundles immersed in the water were weighed with the help of hard rocks and stones to avoid floating on the surface which is observed in Fig 5. This was done to attain uniform retting of the fibre.

Process of fibre extraction

Retting was complete when the bast fibre easily separated from the woody core of the stem. The weights were removed and bundles were taken out after 15 days of immersion. The fibre was stripped from the stem manually before it over rets, since over retted fibre has of poor strength. The fibres were extracted along the length of the stem so they were as long as the length of the stem as shown in Fig. 6. In the process of jerk and strip some fibres were left attached to the stem and goes waste which adversely degrades the quality of the fibre.

The extracted fibres were kept together in the form of a bundle and washed thoroughly in the clean water to get rid of all the impurities like

pectin and lignin. As referred in Fig. 7 to avoid the further breakage of the fibre, they were tied together in the form of a knot and beaten against the hard rock. This process was repeated 3-4 times until a clean fibre was achieved. The fibres were then hanged and dried in sun as seen in Fig. 8. After drying the fibres were combed manually with a wide toothed comb so that they align parallel to each other which can be clearly seen in Fig 9.



Fig. 6: Extraction of fibre Fig. 7: Cleaning of fibre



Fig. 8: Drying of fibre

Fig. 9: Combing of fibre

Different uses of Mesta

Mesta fibre blended with jute is used in the manufacture of jute goods namely, cordage, sackings, hessain, canvas and rough sacks, ropes, twines, fishing nets etc. The stalks were used in making paper pulp, structural boards, as a blend for wood pulp and thatching huts. The seed contains 18-20 per cent oil and is used in soap and other industries. The crop possesses fleshy calyces which are used for preparing natural dyes, jam, jellies, pickles etc, and leaves for preparing pickles and leafy vegetable.

Recently mesta fibre was also used to develop some furniture like chair, stool and other products like lamp shades.

Socio economic factors influencing the production of Mesta

There are many socio economic reasons influencing the choice of farmers. One of the main reasons was the market value of the crop. Farmers were getting very low returns for this crop as people were not aware of its economic importance. Farmers prefer to grow cereals like

soyabean, black gram, and other pulses because they fetch them a higher market price as compared to mesta. Another reason is the younger generation is not interested in farming activities. They are moving to bigger cities for higher education. Hence, there lies a big question mark, what is the future of farming?

Farmers who were engaged in the production of mesta are unaware of its versatility. They are growing it as a subsidiary crop, which is consumed at cottage level. They are not producing it on commercial level.

Recently a few manufacturing units have come up with the production of edible products like jams, jellies made of mesta calyces. These are seasonal manufacturing units which are working on a small scale. There is no industry to take up the manufacturing of mesta fibre.

Conclusion

The above research was carried out to study the current scenario of *Hibiscus Sabdariffa* in the state of Maharashtra in India. The present cultivation methods, harvesting process, retting process, method of fibre extraction, uses and versatility of *Hibiscus Sabdariffa* was studied and documented. The farmers were using the most economical and organic ways to grow a healthy crop. There was no addition of external chemical fertilizer which adds value to the fibre. The growth is largely dependent on the climatic conditions as it is a rainfed crop. The process of harvesting and retting the crop is still traditional. There is a felt need to intervene in this sector. With the establishment of some food industries it is gaining popularity as raw material which can be used to make jam, jellies etc. The fibre of *Hibiscus Sabdariffa* was also used to develop various products like ropes, cordages, furniture and there is a lot of scope for the fibre to be utilized in the textiles sector as well.

Recommendations

There is lot of work being done for the upgradation of existing technology but less is done on the grass root level. There is an immense need to intervene at the basic stage so that it could give us good returns in future. Trainings and workshops should be conducted for farmers to make them aware about the utilities of mesta crop. So that more and more people could participate in this field. Practices that would reduce the effort

involved in harvesting and retting, which are versatile and profitable which could be easily introduced in other parts of the region should be examined, applied and promoted.

References

1. Mahadevan,N., Shivali, Kamboj,P.(2009), *Hibiscus Sabdariffa* Linn.- An Overview, *Natural Product Radiance*,8(1), 77-83
2. Vision 2030 retrieved on Mar25, 2014 from http://www.crijaf.org.in/top_menu/vision_2030.pdf
3. Singh, D.P. Mesta- *Hibiscus cannabinus* & *hibiscus sabdariffa*. N.d. Retrieved on Jan01, 2013 from <http://assamagribbusiness.nic.in/mesta.pdf>
4. *Natural Fibres, Handbook with cultivation and uses*(2009), NIIR Board of Consultants and Engineers, NIIR Project Consultancy Services, pp 151-155
5. Kirby, R.H. (1963). *Vegetable Fibres (Botany, Cultivation and Utilization)*. New York: Interscience Publishers,Inc