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Opportunities and challenges in the cultivation of senna (*Cassia angustifolia* (Vahl.))

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Abstract

Senna or Sanay (*Cassia angustifolia* (Vahl.)) is an important medicinal plant to India and it is drought tolerant, hence it is cultivated under rainfed condition in marginal soils by small and marginal farmers of Gujarat, Rajasthan, Maharashtra, Andhra Pradesh, Telangana, Karnataka, Tamilnadu and other Indian states. Senna is a small, perennial, branched under-shrub grown for its medicinal value of leaves and pods which contain sennosides A, B, C, D, rhein, aloe-amine, kaempferin and iso-rhein in free and glycosides forms. It is one of the most useful purgatives, especially in case of habitual constipation. Besides being a laxative, senna is used in splenic enlargements, anaemia, typhoid, cholera, jaundice, rheumatism, tumours, foul breath and bronchitis, and probably in leprosy. The ease of cultivation and high price for the leaves is attracting farmers for large scale cultivation. The future is excellent for extending its cultivation and production of numerous value-added products from its leaves and pods.

Keywords: Cultivation, Senna, Sennosides A, B and laxative

1. Introduction

In India, Tinnevely Senna (*C. angustifolia*) Andhra Pradesh and Karnataka, Pune (Maharashtra), Gujarat (Anand and Mehsana), Rajasthan (Kodhpur), Delhi and dry coastal districts of Tamil Nadu in Thoothukudi, Tirunelveli, Ramanathapuram and Madurai are the major states are concentrating on the cultivation of Senna. The total annual production of senna herbage is estimated to be around 8600 tonnes. The leaves and pods of a few other species of Cassia also possess laxative properties similar to those of *C. angustifolia*. Alexandrian senna is found growing in the wild in North African countries, including Ethiopia and Sudan. The international market receives leaves and pods of Alexandrian senna obtained from the North African countries in substantial quantities, accounting for about 25% of the international trade^[1, 2].

Cassia angustifolia popularly known as Indian or Tinnevely senna is cultivated for leaves and immature pods, which are used as laxative. The strong laxative properties of leaves and pods are due to the presence of dianthone glucosides, sennosides A and B in them^[3, 4].

1.1 Chemical constituents

The principal active constituents of senna are dimeric glycosides called Sennosides A, B, C, and D. The aglycones are composed of aloe-emodin + rhein for A and B and rhein + rhein for C and D. Other Phytochemicals sennoside C, sennoside D, rhein, chrysophanol, aloe-emodin, kaempferol, myricyl alcohol, salicylic acid, palmitic acid, stearic acid, isorhamnetin, barbaloin, kaempferol, Cathartic Acid, anthraquinone derivatives etc^[5].

2. Medicinal uses

Senna is a powerful cathartic used in the treatment of constipation, working through a stimulation of intestinal peristalsis. Senna also used as an expectorant, a wound dressing, an antidiarrhetic, and a carminative agent. It is useful in the treatment of gonorrhoea, skin diseases, dyspepsia, fevers and hemorrhoids. The herb is used in the form of crude plant material or powder as oral infusion or extracts (liquid or solid). It is always advised to use the drug under the supervision of Physician, because the excess use of senna may have adverse effect leading to sudden and intense stomach pains and colic or abdominal pains^[2].

3. Challenges faced by the farmer

The major problem faced by the farmer in marketing of Senna was the high cost of transportation. Though the exporters are in and around, the farmers face the problem of high cost of transportation. The next problem is the monopoly of buyers. The market was dominated with a few exporters and the farmers are forced to sell their produce to the few

buyers. The next problem is the farmers are priced less for their produce due to quality issues in their produce (usage of pesticides) [6].

3.1 Reason for cultivation of senna

1. Good source of income
2. Profitable crop
3. Low cost of cultivation
4. Drought tolerant crop
5. Less maintenance
6. Generation wise farming

3.2 Problems in production of Senna

1. Shortage of labour
2. Pest Incidence
3. High labour charges
4. Over drying of leaves
5. Drying problem if rain persist for prolonged period

3.3 Problems in marketing of senna

1. High cost of transportation
2. Monopoly of buyers
3. Less price due to quality as well as grading issue

4. Opportunities for cultivation

The global interest in this plant and the high demand for its leaves provide ample scope to cultivate this plant on commercial scale. Other opportunities for cultivation include: Present price for leaves is attractive, crop gives economically remunerative returns in comparison to traditional crops, ease of cultivation under rainfed condition, the crop can be integrated with traditional crops through crop sequencing, opportunities for marketing leaf and seed exist, bye-products can be profitably be utilized, value addition can increase profits, however, current exports are limited and large scale exports of leaves and value added products need to be explored [2].

4.1 Processing of the leaves and value addition

The leaves are stripped from the branches and dried in shade for 10-15 days to a moisture content of 8-10 percentages. The leaves are collected by local traders and transported to wholesale dealers and exporters in Tuticorin of Tamilnadu state. The leaves are processed manually or mechanically depending upon the quantum of the trade. They are winnowed to remove dust and stones and then passed through sieves of different sizes to sort them into different grades [7, 8].



Fig 1: Grading instrument for Senna



Fig 2: Winnower to remove dust

Table 1: Different grades of senna leaves

| Sl. No. | Grade | Length (cm) |
|---------|---------|-------------|
| 1. | Prime 1 | >3.5 |
| 2. | Prime 2 | 2.5-3.5 |
| 3. | Prime 3 | 1.5-2.5 |
| 4. | Prime 4 | 0.5-1.5 |
| 5. | Prime 5 | <1.5 |

The leaves of Prime 1, 2 and 3 grades are exported and grades 4 and 5 are traded in the internal market. Prime 5 is known as the pharma grade and is used for extraction of sennosides and production of calcium sennosides within the country 20% etc. The left-over stem is sold as senna stem and the left-over leaf is powdered and sold as senna leaf powder. The exporters employ more than 1000 women every day for processing thereby creating an employment generation of 3, 12000 man-days. This can become a flourishing rural industry with the village women processing the leaf cultivated in their villages [8, 9].

Over 80% of the leaf produced in the country is exported without any value addition except grading. The importing countries are doing value addition. Value addition should be India's main objective to compete globally since the raw material is produced within the country. Some value-added products from senna are presented in Table 2.

Table 2: Value added products from senna leaves

| Sl. No. | Products |
|---------|-------------------------------|
| 1. | Flavored senna |
| 2. | Senna tea |
| 3. | Sennosides |
| 4. | Senna Tablets and other drugs |

There will be lot of opportunities are there for cultivation of senna In India about 6000-7500 tonnes of senna leaves and pods are produced and about 80% of the production is exported. The export earnings range from Rs. 35.0-36.0 crores [10, 11].

- a) Since Indian senna has to compete with Alexandrian senna for cost effectiveness, leaf size and sennosides content, there is an urgent need to develop a variety with long leaves (> 5.00 cm) having higher sennosides content (> 5.0%). There is a need to find ways and means to reduce cost of production [3].
- b) As synthetic sennosides are not available in the market, the demand for natural sennosides will continue to increase and provide an excellent opportunity for India to

earning foreign exchange.

- c) Because of the simple cultivation practices and grading techniques, rural industries can be setup based on senna leaves and pods.
- d) There is an urgent need to develop cost-effective processes for value-added products in order to export them instead of exporting crude drugs (leaves and pods).

5. Challenges and conclusion

The challenges for Senna cultivation and business are: Market exploitation of farmers by middlemen, price fluctuations of leaves, demand-supply fluctuations of leaves, limited exports, patenting by foreign companies, changing climatic conditions, long duration of the crop, low leaves yields, pests and diseases infections labour problems (high cost, non availability during peak season, unreasonable demands by labourers), lack of knowledge about post-harvest technology and problems associated with long term storage of leaves.

Senna is an important medicinal crop grown for the extraction of Sennosides which is having laxative property and senna is drought tolerant crop thrive well in less water and require less management practices as compared to other crops and suited well to waste and low rainfall area. As synthetic sennosides are not available in the market, the demand for natural sennosides will continue to increase and provide an excellent opportunity for India to earning foreign exchange. As synthetic sennosides are not available in the market, the demand for natural sennosides will continue to increase and provide an excellent opportunity for India to earning foreign exchange and also because of the simple cultivation practices and grading techniques, rural industries can be setup based on senna leaves and pods and also there is an urgent need is required to develop cost-effective processes for value-added products in order to export them instead of exporting crude drugs (leaves and pods).

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