



FACULTY OF AGRICULTURAL SCIENCES AND ALLIED INDUSTRIES

Aloe - Importance, chemical composition, origin, distribution, area, production, climate and soil requirements, varieties, propagation techniques, planting and after care, nutritional requirements, plant protection, harvesting, grading and processing

Importance and chemical composition

- Aloe species, perennial succulent belonging to the family Liliaceae and has long been employed in medicinal preparation and for flavouring liquors and a source of the drug 'aloe'.
- Out of 275 species, three are commercially important species.
- They are: *A. barbadensis*, *A. ferox* and other species (*A. Africana* and *A. spicata*).
- Two of the major products derived from the leaves are the yellow bitter juice consisting of aloin and the gel consisting of polysaccharides.
- Apart from these products, several other products like dehydrated aloe powder, concentrates are also prepared.
- The Aloe contains cathartic anthrax-glycosides as its active principle ranging from 4.5 to 25 per cent of aloin.
- These are extensively used as active ingredients in laxative and anti-obesity preparation, as moisturizer, emollient or wound healer in various cosmetic and pharmaceutical formulations.

Origin and distribution

- Plants of the genus Aloe belong to the old world and are indigenous to Eastern and Southern Africa, the Canary Islands and Spain.
- The species spread to the Mediterranean basin and reached the West Indies, India, china and other countries in the 16th century and

certain species are now cultivated for commercial purpose, especially in some of the West Indian Islands of the North Coast of South America .

- It is also cultivated in India.

Description of the plant

- Aloe is a coarse looking, perennial, shallow rooted plant with a short stem, 30-60 cm high.
- The plants have multiple tuberous roots and many supporting roots penetrating into the soil.
- Aloe does not have a true stem but produces bloom stalks.
- The plants generally grow slow close to the ground in a typical rosette shape.
- The fleshy leaves are densely crowded, strongly, cuticularized and have a spiny margin with thin walled tubular cells.
- The flowers vary from yellow to rich orange in colour and are arranged in axillary spikes.
- The ovary is superior, triocular with axile placentation. The plant does not produce many viable seeds.

Soil

- Because of its hardy nature, the plant can be grown on a variety of soils. It can be seen growing successfully from sandy coastal soils to loamy soils of plains with a pH of up to 8.5. However, water logged conditions and problematic soils do not suit its cultivation.

Climate

- It has wide adaptability and can grow in various climatic conditions. It can be seen growing equally good in warm humid or dry climate with even 150-200 cm to about 35-40 cm of rainfall per annum. It is usually cultivated between March and June. However, in dry regions, the crop should be provided with protective irrigation.
- **Propagation**
- It is generally propagated by root suckers or rhizome cuttings, for this purpose, medium sized root suckers are chosen and carefully dug out without damaging the parent plant at the base and directly planted in the main field. It can also be propagated through rhizome cuttings. In this case, after the harvest of the crop, the underground rhizome is also dug out and made in to 5-6 cm length cuttings which should have minimum 2-3 nodes on them. It is rooted in specially prepared sand beds or containers and after it has started sprouting, it is ready for transplanting.
- **Planting**
- The field should be prepared well before the onset of monsoon and small furrows opened. About 15-18 cm long root suckers or rhizome cuttings are planted at a spacing of 60x45 cm in such a way that two third portion of the planting material should be under the ground.
- **Manuring**
- It is a newly domesticated crop and its full production technology including manurial requirement is yet to be worked out. Application of a mixture of 150kg/ha of nitrogen, potassium and phosphorus is recommended. The fertilizers are applied in the soil near the root system, after the plants are established.
- **Irrigation and weeding**
- Soon after planting, the land is irrigated. During the crop period, irrigation must be given according to the moisture status of the soil. Generally, 4 to 5 irrigations per year are sufficient. However, water should not be allowed to stagnate near plant. The land is kept weed free by weeding the plot as and when necessary.

Pests and diseases

Major insect : Mealy bug

Major diseases : Leaf spot, Leaf rot and Anthracnose

Control measures

1. For controlling mealy bugs spray Chlorpyrifos 2 ml in 1 litre of water.

2. Spray the crop with Bavistin 10 g with Carbendazim 2g per litre and repeat at 10 days interval for controlling leaf rot and anthracnose.
3. Leaf spot can be controlled by spraying the crop with 0.2% Mancozeb at weekly intervals

Harvesting, yield and processing

- After about 8 months, the leaves are ready for harvest. While harvesting, the plants can be removed manually. The broken rhizome parts left in this soil throws new sprouts to raise the succeeding crop. Aloe plantation gives commercial yield from second year and upto 5 years. Thereafter, it needs replantation for economic yields. An average crop yield of about 10,000 to 12,000 kg on fresh weight basis may be obtained from on hectare.

Processing

- The mucilaginous pulp from the leaf parenchyma, which is mainly carbohydrate in nature, is used in skin disorders. For the purpose of isolation of aloe gel, the portion of leaves remaining after the removal of their exudates is cut open and their mucilage is scraped out with a blunt edged knife. This mucilage is stirred vigorously in a blender to make it into a uniform solution and is strained through a muslin cloth and filtered. The gel is precipitated from the extract by slowly adding acetone. The gel is obtained by centrifuging and re-dissolved in slightly warm water. It is dried at high temperature and weighed.