SAFFLOWER

Botanical Name: *Carthamus tinctorius*

Family: Compositae

Origin: According to Vavilov India, Afganisthan and Ethiopia and according to De Candolle place of origin is Arabia.

Economic Importance:

- It is one of the important edible oilseeds cultivated in India.
- Safflower is mainly cultivated for extraction of oil.
- It is also grown for extraction of **dye** from flower.
- The oil content varies from 24-36%.
- The oil is golden yellow and largely used for cooking as well as making soap.
- Safflower oil is as good as Sunflower oil; it has enough amount of linoleic acid (78%) and is very useful for heart patient.
- Due to good dyeing properties safflower oil is used in manufacturing paints and varnishes.
- Black and sticky oil is obtained by hot dry distillation is used for greasing purpose.
- The oil is also used for preparation of 'Roghan' which is used in preservation of leather and production of waterproof cloth.
- The seeds are edible and eaten after roasting.
- The oil cake particularly decorticated seeds used for cattle feed it contains about 40-45 % protein.
- The oilcake obtained for un-decorticated seeds used for manure it contains 5% nitrogen, 1.44 P_2O_5 and 1.23% K_2O.
- Green safflower crop can be used as a green fodder for cattle as it is relished by cattle.

Area and Distribution:

The major Safflower producing countries of the world are the India, Mexico, USA, Australia and Spain. India rank first in respect of total acreage in world.

Maharashtra is the highest producer of safflower (72%) followed by Karnataka, Andhra Pradesh, Orissa and Bihar.

Climatic Requirement:

Safflower is considered as a cool season crop. Optimum temp for germination is 15.5^0C while day temp $24\text{-}32^0$C at flowering are moderate for higher yield. High as well as low temp at flowering cause poor seed setting and reduction in yield frost is harmful to crop at all growth stages. Also the crop is not suitable to heavy rainfall regions. Optimum rainfall is about 60-90 cm.

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Soil Requirement:

Safflower being a drought resistant crop, it is cultivated on all types of soils including sandy but best suited to deep loam, well drained, fertile with higher water holding capacity and neutral in reaction.

Land Preparation:

It requires clod free seed bed with firm sub soil and adequate moisture at sowing for good germination. Usually one ploughing with MB plough followed by two to three harrowing are sufficient, followed by planking is desirable.

Seed and Sowing:

1. **Seed Treatment**: a. Treat the seeds with 3 gm. of Thiram or captain per Kg of seeds. b. Azotobactor and PSB @ 250 gm/10 Kg of seeds.
2. **Season and sowing time**: **Rabi**- First fortnight of October to First fortnight of November.
3. **Spacing**: 45 cm. between R x R.
4. **Seed rate**: 15-20 kg ha^{-1}.
5. **Sowing depth**: 5-6 cm.
6. **Sowing method**: Sowing is done drilling method.

Manures and F ertilizers:

For sandy soils apply 15-20 tons/ha of FYM or compost and 8-10 tones for heavy soils before 15-20 days of sowing at the time of land preparation. Fertilizers are applied based on soil test values, if values are not available apply fertilizer dose of 40 Kg N, 40 Kg P_2O_5 & 20 Kg K_2O per ha. Apply whole dose of P &K and half dose of N at the time of sowing. Remaining quantity of Nitrogen should be top-dressed at 30 days after sowing.

Water Management:

Safflower is mostly grown in rainfed condition without irrigation water but highest yield are obtained from irrigated condition. The flowering and grain filling stages are most sensitive to water stress condition, so apply irrigation water at that growth stages.

Weed management:

Weeding at early growth is essential because slow initial growth makes them poor competitors with more vigorous weeds. First weeding should be done at 20 DAS & 2^{nd} weeding at 40 DAS. Weeds can also be controlled effectively by the use of herbicides. Use of Alachlor or Pendimethalin @ 1.5 kg a. i. per ha applied as a pre-emergence spray.

Insect pest and Diseases:

Commonly observed diseases are Rust, Cercospora leaf spot, Alterneria leaf spot, wilt while safflower fly, aphids, Catter-piller, stem fly are commonly observed insects.

Harvesting and Threshing:

Safflower seeds are matured in about 120-140 DAS. Harvest the crops when leaves and stem colour changes from green to yellow. Harvesting is carried out at morning hours to avoid breakage of plant parts and trouble due to spines. Ripe plant harvested by either pulled out or cut close to ground level. Harvested plants staked for few days and threshed by beating with sticks followed by winnowing operation carried out to clean seeds.

Yield:

If all improved package of practices are followed, it should be possible to obtain in Un-irrigated condition **6-7 Qtls/ha** while in irrigated condition **15-20 Qtls/ha**.

Varieties: Girna, Bhima, Kusuma, SSF-658, SSF-708, Phule Kardai, Phule-Chandrabhaga, Nira, Nari-6, PBNS-12, Nag-7, Tara.
Hybrid: Nari N.H. 1, DSH-129.