

Okra: Integrated crop management

Okra is an important vegetable crop, also known as lady finger or bhendi and belongs to family Malvaceae. It has its origin in South Africa. Okra vegetable production becomes an income generating enterprise for farmers. Use of local varieties, conventional method of cultivation, inadequate fertilizer management, etc. result in low yield in okra. However, use of improved varieties and hybrids along with integrated nutrient management gives more yields. Application of organic manure, biofertilizers, foliar spray of water soluble fertilizers (NPK) and micronutrients along with recommended dose of fertilizers exhibited an increase in okra yield. Integrated crop management increases okra green pod yield. This article describes the cultivation technology of okra crop.

OKRA or bhendi (*Abelmoschus esculentus* L. Moench) is one of the most used vegetables of the country and provides a good source of income to the farmers.

Climate and soil

Warm and humid climate is favourable for the growth and development of okra. The optimum temperature requirement is 20-40°C. Temperature below 15°C affects seed germination and temperature above 42°C causes flower dropping. Cold temperature for long time during *rabi* season is not favourable for okra cultivation and more humidity favours powdery mildew infections in okra crop. Okra can be cultivated in *kharif* and summer seasons. Sowing time for *kharif* season is middle of June-July and for summer is third week of January-middle of February.

Well drained sandy loam soil rich in organic matter with pH of 6-6.8 is suitable for okra cultivation. Highly saline and calcareous soils are not suitable for okra cultivation. Crop is very much sensitive to the effects of

high water table, so well drained soils are best. Sandy soil (light soil) needs more and frequent irrigation along with additional supplement of FYM or compost.

Cultivation

Land is to be prepared well in advance with ploughing followed by planking to obtain fine tilth. Remove all stubbles, weeds, etc. Seed rate is 7.5-8 kg/ha and differs as per spacing, variety, hybrid, etc. Seed of variety is sown at 45-60 cm × 30-45 cm spacing and hybrid seed at 75 cm × 60 cm spacing. Seed treatment is to be done with Imidacloprid 48% FS @ 5 g/kg seed to manage white fly population and to minimize the infection of yellow vein mosaic (YVM). Seeds can be treated with *Azotobacter* and Phosphorus solubilizing bacteria (25 g each per kg seed). No seed treatment is required for already treated and packed seed. The biofertilizers should not be used with chemicals for seed treatment; it should be done after chemical treatment.



Enrichment of organic manure by biofertilizers



Application of biofertilizers through organic manures



Water soluble 19:19:19 (NPK) and micronutrient mixture (Grade IV) spraying in okra



Effect of 19:19:19 (NPK) and micronutrient mixture (Grade IV) spray at 30 and 45 DAS on okra growth



Effect of 19:19:19 (NPK) and micronutrient mixture (Grade IV) spray at 30, 45 and 60 DAS on okra growth



Control (Without spray)

Varieties and hybrids

Improved varieties and hybrids developed by ICAR-IHR, Bengaluru, other institutes of ICAR and SAU's like Arka Anamika, Arka Abhay (Hybrid), Phule Vimukta, Phule Utkarsha, etc. can be used.

Nutrient management

The dose of manures and fertilizer depends upon the soil health and nutrients content, so it may be changed as per soil test report and region to region. Recommended dose of fertilizers is to be applied when nutrient content of soil (kg/ha) is medium. When nutrient content of soil (kg/ha) is extremely low, 50% more recommended dose of fertilizers (RDF) should be applied. When nutrient content of soil (kg/ha) is low then 25% more dose of RDF to be applied. At the stage of extremely high soil nutrient content, 50% less dose of RDF to be applied and at high soil nutrient content stage, 25% less dose of RDF should be applied. When the nutrient content of soil is average, 20 t of organic manure, 100 kg N, 50 kg P and 50 kg K per hectare is to be applied. Total dose of phosphorus, potassium and half dose of nitrogen are to be applied at sowing as basal dose. Remaining half dose of nitrogen is to be applied at 30, 45 and 60 days after sowing equally as split

doses followed by irrigation. Neem cake @ 250 kg/ha can be applied in soil before sowing. Bio-fertilizers like *Azotobacter* 2.5 kg/ha, Phosphorus solubilizing bacteria 2.5 kg/ha and *Trichoderma* 5-6 kg/ha can be applied with vermicompost or well decomposed farmyard manure.

Bio-fertilizers in liquid form can be applied through drip irrigation after one week of recommended dose of fertilizers application. If soils are deficient in micronutrients then particular micronutrients application can rectify the problem. Application of ferrous sulphate (20 kg/ha), zinc sulphate (20 kg/ha) and borax (5 kg/ha) at sowing as basal dose rectifies the ferrous, zinc and boron deficiency problem. Apart from major nutrients application through soil application, water soluble fertilizers and micronutrients can be given to enhance growth and yield in okra crop. Around 30, 45 and 60 days after sowing (DAS), 0.5% spray of 19:19:19 (NPK) can give good results. If soils are deficient in micronutrients or plant shows deficiency symptoms of particular micronutrients then particular micronutrients to be sprayed. It can be managed by spraying of ferrous sulphate (0.5%), zinc sulphate (0.5%), manganese sulphate (0.5%) and boric acid (0.2%) or foliar application of micronutrients mixture Grade IV (Zn 6%, Fe 4%, Mn 1%, Cu 0.5% and B 0.5%) at 0.2% at 30 and 45 days after sowing.



Germination in okra (1) and gap filling stage (2)



Tender okra pod at harvesting



Over matured and fibrous okra pods

Aftercare

Line sowing at prescribed spacing should be done. Germination starts 6-7 days after sowing. Gap filling with same variety seed should be done at 10-12 days after sowing.

Irrigation schedule varies from region to region. First irrigation is to be given immediately after sowing. Irrigation should be adjusted in accordance with prevailing weather and soil conditions. The lifesaving second irrigation is advocated at 3rd-4th days of sowing and subsequent irrigations are to be done at 5-7 days interval for light soil whereas, at 7-8 days interval for heavy soil or depending on soil moisture levels and weather condition. Drip irrigation is also possible due to which water and fertilizers can be saved.

In summer season, with drip irrigation, flood irrigation should be given once in 12-15 days to retain sufficient soil moisture. In summer, organic mulching (dried straw mulch) should be done between two rows to retain sufficient soil moisture.

Weeds compete with crop for space, water, nutrients, etc. hence, the weed free condition in the okra crop must be ensured. Intercultural practices to be done as per the need and weed infestation. About 2-3 weedings at 15-20 days interval are to be done. Crop is to be earthed up at fruiting stage. Naphthalene Acetic Acid (NAA) 20 ppm at 40 days after sowing (DAS) can be sprayed to obtain more fruit yield.

Harvesting and yield

Pod yield in okra vary depending on the cultivar/ hybrid, planting density, agro-climatic conditions, crop management practices, etc. Generally, flowering begins from 45 days after sowing and fruiting starts one week after flowering. Since, okra grows very fast, it should be harvested every two days or even daily as per situation. The pods should not be allowed to mature on the plant because this will inhibit more pods from developing and reduce the productivity of the plant. About 3-5 inches long pods are harvested at the stage when pods are still tender at morning and evening time. Generally 16-18 pickings can be taken in okra. Handling of okra should be done carefully because the pods bruise easily. Over matured okra pods will tend to be tough and fibrous.

Average yield under normal condition is about 10-15 t/ha. Along with RDF, foliar spray of water soluble fertilizer NPK 19:19:19 (0.5%) and micronutrients mixture (Zn 6%, Fe 4%, Mn 1%, Cu 0.5% and B 0.5%) Grade IV (0.2%) at 30, 45 and 60 DAS exhibited an increase in okra pod yield by 21.52% over those without spray.

For further interaction, please write to:

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