

INTRODUCTION AND DEVELOPMENT OF *APIUM GRAVEOLENS* AT LAHORE

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The seeds of *Apium graveolene* L. (Celery, Karfas ajowan) are commonly used as Medicine and its essential oil and Oleo-resin are used in the flavour industries and in food preparation. The plant has been successfully cultivated at experimental fields of P.C.S.I.R. laboratories, Lahore and its yield and percentage of oil is up to the international standards. It has an established export foreign exchange earnings. The return per hectare is very high as compared to many other cash crops in Pakistan.

INTRODUCTION

Apium graveolens, commonly known as Celery (Karafs ajowan) belongs to plant family Umbellifereae. This plant is widely cultivated in the temperate zones, where its bleached leaf-stalks are a popular vegetable. Celery seeds find an alternative outlet in the vegetable seed trade as a source of essential oil that finds extensive use in the flavour industries and food preparations. The celery plant is cultivated in many countries such as France, India, Holland, Hungary, China and the United States of America but the seed which enters the international trade for eventual distillation of the essential oil normally originates in India [1].

Apium graveolens is a 1–1.5 m tall biennial or perennial herb. Its leaves are pinnate and leaf-lets ovate to orbicular, usually 3-lobed [2].

Celery is a known preventive of rheumatism and gout [3]. It is described in the local materia medica as deobstruent and resolvent. It is generally used internally as pectoral and as a tonic and carminative adjunct. Its seeds are also administered as stimulant and cardiac tonic. They are used in bronchitis and asthma as antispasmodic and are also applied to some extent for liver and spleen disorders.

The essential oil of celery finds minor utilization in both the perfumery and the pharmaceutical industries [1]. The oleo-resins of celery have attained ever-increasing popularity among food procedures [4].

Celery seeds yields 2.5 to 2.6 % essential oil and its composition has been shown to be α -pinene (1.0, 0.5 %), β -pinene (1.5, 0.8 %), myrcene (3.1, 6.1 %) Limonene (35, 37 %), α -cymene (3.1, 2.5 %), β -elemene (3.5, 1.5 %), β -caryophyllene (4.1, 3.1 %), β -selinene (32.5, 28.5 %), 3-Iso butylidene-3 α , 4-dihydrophthalide (0.7, 1.0 %) carvone and dihydrocarvone (0.4, .0 %), eudesmol (1.0, 0.5 %), γ -terpineol (0.3, 0.5 %), π -butylphthalide (5.0, 7.2 %), and sedanonic anhydride (8.0, 7.9 %) respectively [5].



Fig. 1 Single plant of *Apium graveolens* growing at the Experimental Farm of PCSIR.



Fig. 2 *Apium graveolens* crop growing at the Experimental Farm of the PCSIR Laboratories.

The semi-commercial cultivation of *Apium graveolens* was initiated because of its demand in the Local Market. It has been reported that its seeds are imported especially from India at cost varying from Rs. 1 to 2 million per annum. However its local cultivation will cut down the import of this useful species to certain extent. The species can also be exported because of its great demand in the Western countries.

MATERIAL AND METHOD

(a) *Source of Seeds and Viability Tests*; The seeds used for the cultivation were obtained from Local Market (Imported from India). The seeds were sown in petridishes on moist blotting papers and kept in the germination bath at 25°. It was observed that 90 % of the seeds were viable.

(b) *Cultivation Conditions*. (i) *Method of Sowing*: The seeds were sown in the middle of October (Humidity 66 % max 31 % min., Tem. 30° max., 12° min., Rainfall 000 in nursery beds containing soil mixed with leaf manure and sand. The nursery beds should be under shade, and watered regularly to maintain sufficient moisture. The seed germinated in the middle of November (Humidity 79 % max., 47 % min., Tem. 28° max. 11° min. Rainfall 000). The incubation period for the seeds was about 30 days, when the seedlings were about 10 cm high these were transplanted to the field.

(ii) *Preparation of Field Beds and Transplantation*. Celery cannot withstand extremes of heat and cold so a warm and sunny location with shades was chosen. Field beds covering an area of 1 acre was ploughed very extensively and levelled. Suitable quantity of canal sand and cowdung with equal quantity of leaf manure, was thoroughly mixed to a depth of about 30–35 cm. Parallel ridges 15–23 cm high and 45 cm apart were made on the levelled field.

When the seedlings attained a high of 10 cm. They were transplanted in the field on ridges. The transplantation was done in the late afternoon in the middle of December at a distance of 45 cm apart and then watered. In the beginning, the fields were watered once a week and then fortnightly till the formation of flowers. The flowering started in April. Whereas fruiting started in May (Humidity 62 % ms., 31 min., Temp. 36° max., 22° min.) The field was watered after flowering till fruiting stage once a month.

(iii) *Harvesting, Drying and Yield*. The harvesting was done in June (Humidity 44 % max., 23 % min., Temp. 46° max., 29° min. Rainfall 0.10) on a clear day after the dew has evaporated, so that the moist leaves and seeds would not turn black on drying. As the plants are very susceptible to heat and sunlight the harvested crop was immediately transferred to an open shady place so as to avoid loss of essential oil through evaporation. The yield of seeds per Hectare is about 914 kg.



Fig. 3. Harvesting of the crop of *Apium graveolens*.

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