# EFFECT OF SOME AGRICULTURAL TREATMENTS ON THE BIOCHEMICAL CONSTITUENTS OF SAFFLOWER SEED OIL.

BY

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B.Sc. Agriculture

Thesis

Submitted in partial fulfilment of the requirements

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# C O N T E N T S.

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# I N T R O D U C T I O N

# INTRODUCTION.

Cottonseed is still considered the main source for edible oil in the U.A.R. The oil produced locally amounts to about [illegible].000 tons per annum. The average local consumption of oils and their products is more than 200,000 tons. There is a shortage in local edible oils production from cottonseed or oleagenous seeds which are produced in the country in comparatively very small amounts.

This shortage in the oil production will be more with the great increase in consumption of edible oils and their modern products and substitutes, besides, the large increase of population.

For this reason, it is necessary to search for other sources of oily seeds that could be grown in the country to help the supply of the edible oil production.

Safflower (Carthamus tinctorius) is an oilseed crop and

has been known for centuries in India, Middle East and North Africa, where it is the source of dye and edible oil. In this connection, it is interesting to mention that India has grown safflower as an oil crop for probably more than hundred years, it still has the largest area of production and the oil of safflower seed is preferred in cooking.

Safflower was introduced experimentally as an oil crop in the United States in 1925, and nowadays safflower oil is the fastest growing of the edible oils, largely because of its high percentage (68%) of the polyunsaturated fatty acid (linoleic) which is very useful as antiarteriosclerosis.

Because very little or no linolenic acid is in its composition, the oil does not yellow with age, it can be used in colourless varnishes and light coloured paints,(Knowles and Miller "1965").

Meal or seedcake made from safflower seed is a rich protein feed supplement for cattle, sheep and poultry. Meal from unhulled seed contains 18 to 24% of protein and meal from hulled seed, 28 to 50% of protein (U.S. Dept., Agric., 1961).

In U.A.R. safflower seed is grown in Upper Egypt, but

unfortunately, in very small areas till now, and the oil which is extracted by primitive mechanical methods is used for edible purposes and known as "Zeit El Helw". Furthermore, as far as the writer is aware, there is no available data concerning local studies on this oil.

The effect of cultural or fertilizer treatments upon the yield and quality of oil are not yet investigated in U.A.R. Thus, attention should be paid to increase the area of safflower to increase the edible oil production in the country.

The work embodied in this dissertation is concerned with the study of the effect of some plant spacings in the field, and different fertilization treatments upon:-

1. Vegetative growth of the plant.
2. Biochemical constituents of the seeds.

# S E C T I O N  I.

## Description of the plant.

## DESCRIPTION OF THE PLANT

Safflower is an annual plant of the Thistle Family. It develops sturdy tap-roots. The coarse stems reach a height of about 1.5 meter. Branching begins from the central stem when the plant is 20 to 45 cm., height. The plant produces many branches with heads at their ends. Each head consists of numer - ous flowers, and each flower potentially produces a single seed. (cf. fig. I). Each head may produce from 20 to 100 seeds (cf. fig. II). The flower colour varies with variety from red through orange and yellow to white. Leaves are simple, spiny and oblong. The spines do not develop until the plants form heads.

Two varieties of safflower grown in U.A.R. are commercially known under certain names such as "Dakar, means male corresponding to the variety typicus, which is thorny with the outer involuere bracts spinous, and "El-Netaya" (female) which

is smooth or nearly so with outer involuere bracts spinless.In this connection, safflower plant was known as "White Sunflow - er" (cf Vizern & Guillat "1925").

Figure (1)

Safflower Head

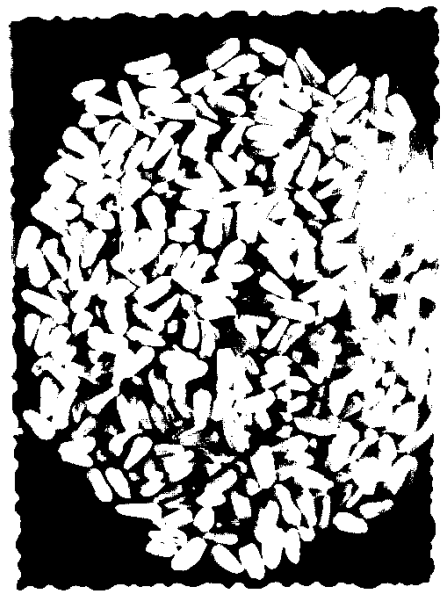

Figure (2)

Safflower Seeds

# S E C T I O N  II.

## REVIEW OF LITERATURE

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Tamhare (1923) reported that the chief reserve materials in safflower seed are oil and protein. Belyave (1931) found that the oil content and crude protein in some varieties of safflower seed amounted to 11.95-15.35% and 10.69-14.08% respectively. On the other hand, Spozywezy (1957) noticed that seeds of safflower grown in Poland, contain 19.24% oil and the yield of oil per hectar was 350 kg. Milner et al (1945) and Nunn (1961) found that the amount of oil in some varieties of safflower seeds reached to 30-35%. Kohler (1967) found that safflower seeds are of high quality in both oil and protein.

In this connection, Parker et al (1955) reported that the oil of safflower seed can be used as an edible oil or in the foundation of paints and the manufacture of nonyellowing alkyd resins.