EFFECT OF SOME FERTILIZER TREATMENTS ON THE BIOCHEMICAL CONSTITUENTS OF PEANUT SEEDS

By
AZZA BARAKAT MOHAMED

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Name of the Candidates : AZZA BARAKAT MOHAMED

Approved by :

Dr. .....

Dr. .....

Dr. .....

Committee in Charge

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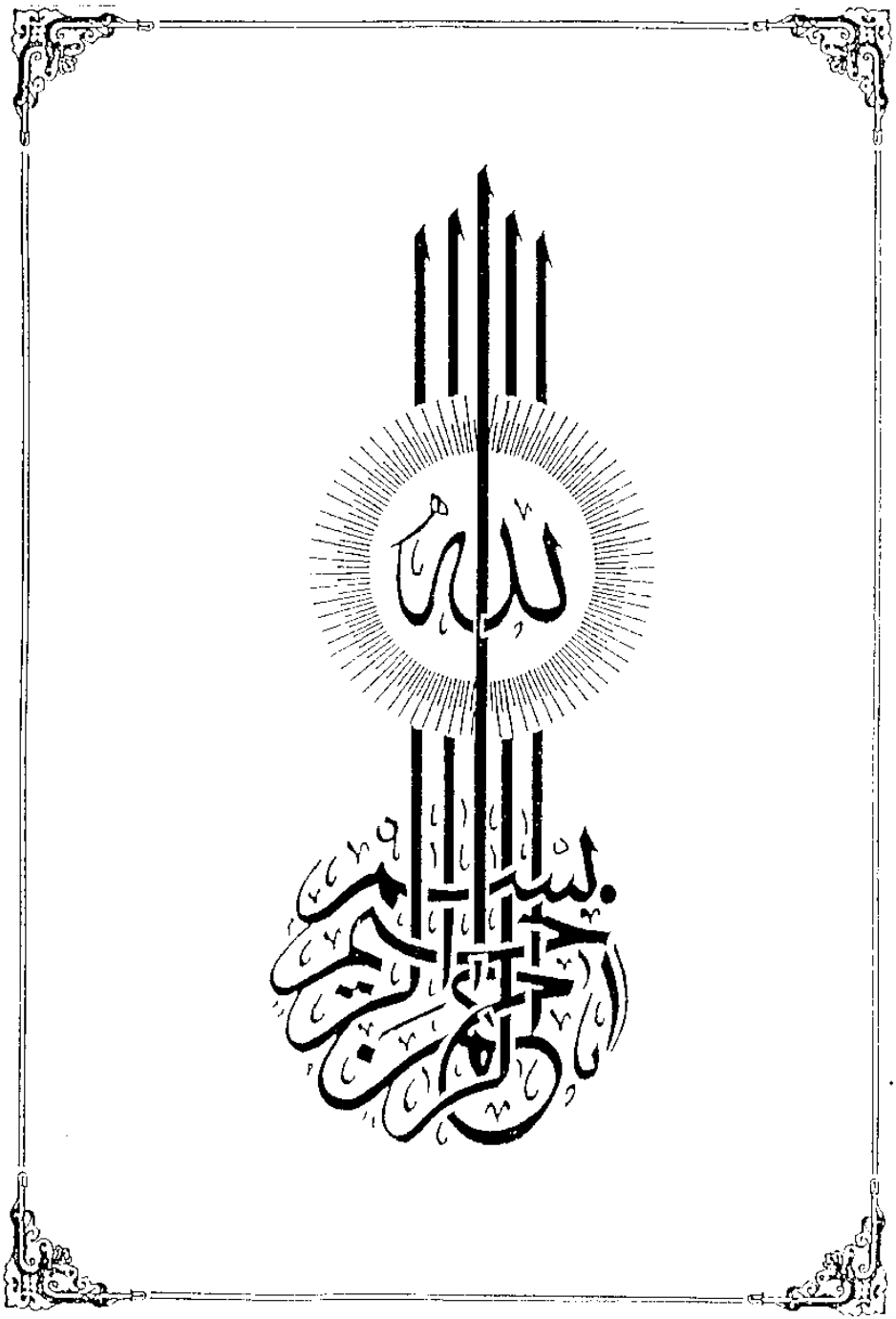

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-(I- INTRODUCTION)-

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The peanut or groundnut (Arachis Hypogea) is generally recognized as one of the important crops in the world. It is commonly known as a roasted nut for eating and in confections, but in many countries peanut is cultivated as a source of fats and oils.

Peanut oil is one of the best known source of vegetable oils; it is considered as a semi dry oil which could be used for human nutrition.

The peanut kernels, are of a high nutritive value, the accompanying summary of the average analysis of peanut kernels mentioned by (Bailey 1966) show the percentage of the main components of peanut kernels which were : 7.85 % water; 29.47 % protein; 4.29 % fiber, 14.27 % nitrogen free extract; 49.20 % fat; 2.77 % ash; and 4.26 % nitrogen.

The total world production in 1971 was 18,840 ,000 metric ton in an area of about 18,480,000 hectars, and in Egypt, the amount of peanut produced was 46,000 metric ton in an area of about 21,000 hectars with an average yield of 2100 kilogram/ hectar while the world average was 980 kilogram/hectar (F.A.O. production year book 1971).

Aooording to the F.A.O. year book (1971), the principal world growing countries of peanut were :

	Area (1000 heot.)	Production (1000 metric tons)	Average yield (kgm./hect.)
India	6,900	5,800	840
China	2,150	2,700	1,260
U.S.A.	5,920	1,357	2,290
Nigeria	1,214	1,100	910
Senegal	1,010	960	950

The present investigation was designed to study some of the biochemical constituents of the local peanut kernels at the different stages of growth under different levels of fertilizers hoping to improve the quality of the local peanut seeds needed for nutritional and industrial purposes in Egypt

II- REVIEW OF LITERATURE

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The yield of any crop is in fact the end product of different metabolites synthesized by the plants during their growth periods.

I- Effect of Some Fertilizers on Some Biochemical Constituants of Peanut Seeds :

In a study on the effect of fertilizers on the oil of peanut kernels Trepachev (1953) found that nitrogen fertilizers decreased the oil content of seeds and the yield of oil per / ha. On the other hand Seeger (1961) showed that nitrogen fertilizers increased the oil content of peanut kernels.

Mazzani (1968) in a study on the effect of nitrogen fertilizers on the oil content of peanut kernels found that heavy doses of nitrogen fertilizers had a slightly negative effect on the oil content of kernels.

Mohsein (1968) in an experiment designed to study the effect on the biochemical components of peanut seeds found that nitrogen fertilizers had no influence on the soluble and protein nitrogen contents of the kernels , but had a very slight depressing effect on the oil

percentages in peanut seeds. He also added that nitrogen applications did not affect the percentage of total carbohydrates in the seeds.

Rahman and Khan (1968) found that the percentages of oil of peanut seeds increased with increasing rates of phosphorus up to 40 lb / ac. On the other hand Mohsein (1968) pointed out that phosphorus fertilizers did not exert any influence on the oil percentages and the oil properties of peanut oil.

Omuetti and Oyenuga (1970) studied the effect of phosphorus fertilizers on the proteins of peanut kernels and found that phosphorus fertilizers at the rate of 0, 22 and 44 kg P_2O_5/ha. affected the protein content of kernels. In particular, crude protein in groundnut was raised by 35 % when 44 kg P_2O_5/ ha. were applied as compared with the control.

Arora et al. (1970) found that phosphorus fertilizers when applied at the rate of 0, 15, or 30 kg P_2O_5 / ha. increased the oil and protein content and decreased the total soluble carbohydrates content of the kernels but did not affect the free fatty acid content of peanut seeds. Singh et al. (1972) showed that the application

of 15, 30 and 60 kg. of superphosphate / ha. did not affect significantly the shelling percentage and oil content of peanut.

Nijhawan (1962) showed that the application of ammonium sulfate and superphosphate at the rate of 11 and 22 kg /ha. respectively did not affect the oil percent in peanut seeds but increased only the protein content. Moreover, the acid number, iodine number and refractive index of peanut oil produced were not affected by fertilization.

Walker and Carter (1971) in an experiment on groundnuts using all combinations of 0 - 120 lb / ac. nitrogen, 0 - 115 lb/P_2O_5 and 0.150 lb K_2O / ac. stated that increasing phosphorus rates up to 23 lb/ ac. increased the oil content of seeds from 42.8 % to 43.2 % only but no further increase in the oil content was noticed at the high rates of phosphorus. Nitrogen contents of seeds were decreased with decreasing rate of phosphorus fertilizer and increased with increasing the rate of the fertilizer. Nitrogen fertilizers at different rates did not affect the oil content and the nitrogen content of the peanut seeds. Potassium fertilizers followed the same trend as phosphorus fertilizers, when the

nitrogen content of the seeds was taken into consideration.

Georgiev (1974) studied the effect of nitrogen and phosphorus fertilization on the dry matter accumulation in peanut, and found that the largest amount of dry matter accumulated in the vegetative mass and nuts when 200 kg N/ha. and 135 kg/ ha. were applied.

2- Effect of Fertilizer Treatments on the Peanut Yield :

Wahab and Muhamed (1958) found that when nitrogen fertilizers were applied alone to peanut plants increased the yield of nuts significantly.

Nijhawan (1962) reported, that low rates of nitrogen fertilizers i.e. 11 kg N/hectare was sufficient for the peanut even in the soils poor in nitrogen , the same author added that the addition of little quantities of nitrogenous fertilizers made the peanut plant able to produce noticeable quantities of symbiotic nitrogen. On the other hand the addition of great quantities of nitrogen fertilizers reduced the percentage of nitrogen fixed by the plant.

Goldsworthy and Heathcoote (1963) reported that nitrogen fertilizers conferred no benefit because the groundnut plant appears to be able of fixing all the nitrogen that is required.

It was reported by Gillier (1964), Katarki and Banahatti (1965) that the application of nitrogen fertilizers increased peanut yield.

Prabakara and Sanyasi (1965) found that nitrogen fertilizers in the form of ammonium sulfate at the rate of 22 kg/ ha. decreased the yield of peanut.

In a trial of 3 levels of nitrogen Arroyo et al. (1967) found that peanut yield and certain characters of pods and kernels showed response to nitrogen fertilizers Puntamkar et al. (1967) reported that 20 kg nitrogen/ ha. increased the pods yield of the peanut.

Acuna and Sanchez (1968) working on peanuts cultivated in light sandy soil found that no appreciable effect , due to nitrogen applications, on the yield of kernels.

It has been noted also by Dalal et al. (1968) who used gradual doses of nitrogen i.e., 14 kg., 28 kg., 42 kg/ ha. in the form of ammonium sulfate together with plots