THE EFFECT OF USING TISSUE CULTURE TECHNIQUE ON THE CHEMICAL CONSTITUENTS OF SOME OIL SEEDS

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B.Sc. Agric. (Biochemistry) Ain Shams Univ., 1977

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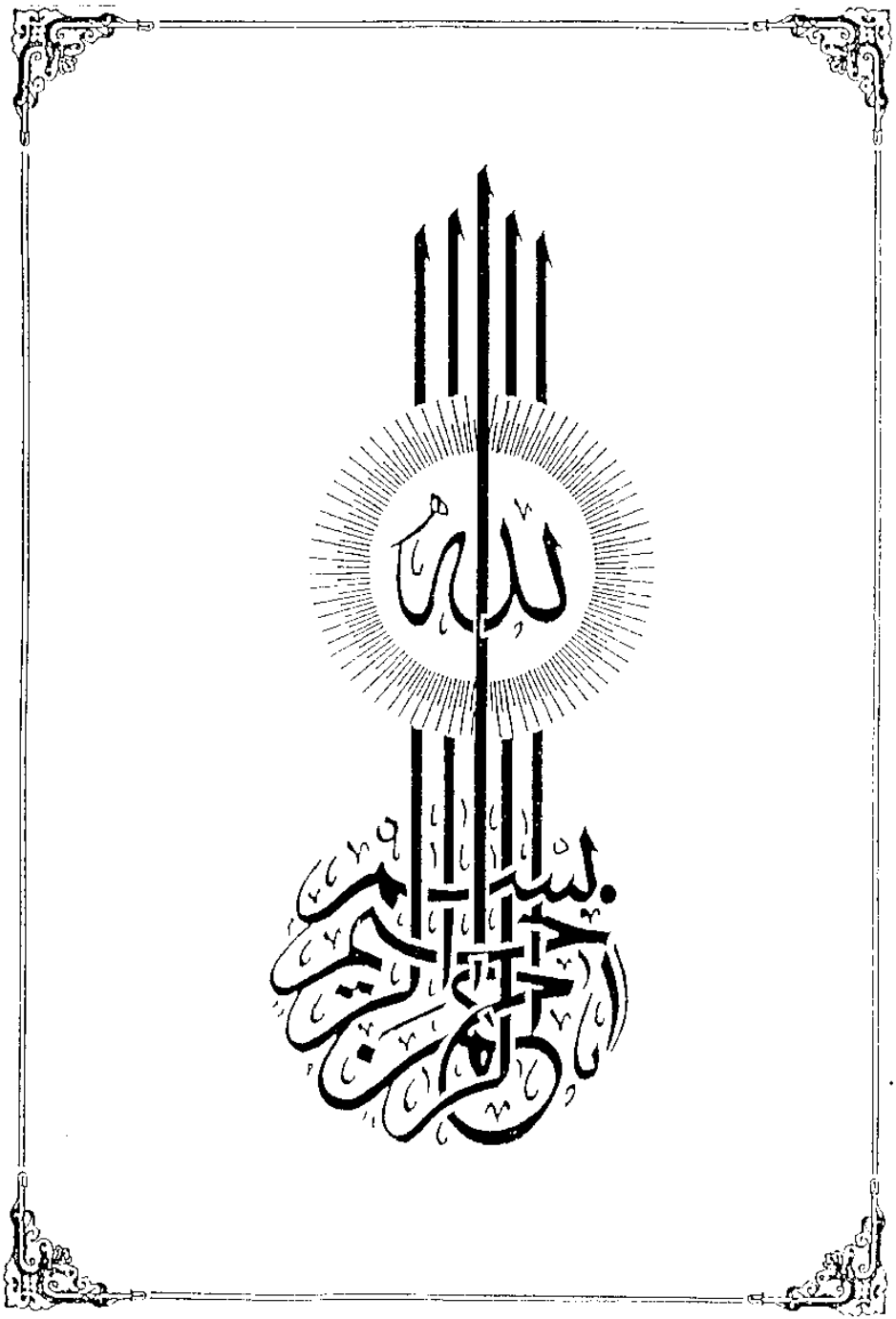

APPROVAL SHEET

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ABSTRACT

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This study was carried out at the Tissue Culture Lab., Tissue Culture Unit, D.R.C., Mataria, Cairo, to study the possibility of *in vitro* production of jojoba liquid wax from tissues formed *in vitro* from culturing jojoba embryos, and comparing the composition of the liquid wax extracted from seeds to that extracted form *in vitro* formed tissues.

Jojoba embroys isolated from fruits collected after two months from pollination, after 6 months from pollination and full maturation were examined for producing callus under the effect of 0.4 mg/L NAA, 1.5 mg/L BA and 0.1 mg/L 2,4-D added to MS media. The results showed that jojoba embryos isolated from fruits collected after 6 months from pollination superiority to both percentage for callus formation.

Three nutrient media were chosen from the twenty ones studied in relation to amount, viability and texture of formed callus. Callus weight was the best by increasing the NAA concentration from 0.15 to 1.5 mg/L and the BA concentration from 0.1 to 1.0 mg/L. Elimination of growth regulators from the nutrient medium or addition of only low concentration of NAA (0.15 mg/L) resulted in the least response for both percentage of callus formation and average weight of callus per explant. The addition of 2,4-D showed good response both for formation and the weight of callus formed from culturing jojoba embryos. The combined treatments of NAA, BA and 2,4-D show that the best treatment in mg/L was 0.4 NAA, 1.5 BA and 0.1 2,4-D followed by that containing 1.5 BA and 0.1 2,4-D, produced the highest callus formation percentage. Rate of increase in weight of callus reached ten times the initial weight after four sub cultures. These results reveals how the weight of callus can be obtained at a certain time then this can help us to estimate wheather it is economic to use *in vitro* technique to produce jojoba wax as a secondary product. By incubation of jojoba embryos at different temperatures (20, 25 and 30°C), 25°C was the best for producing the highest callus weight. The 25°C temperature was suitable

for both growth of jojoba embryos and formation of callus. Different concentrations of sucrose were tested (3, 10, 20 and 30%). The 3% sucrose concentration resulted in higher increase in callus formation. The following are the main results obtained.

The physical and chemical properties of jojoba liquid wax extracted from seeds and that extracted from *in vitro* formed tissues revealed that there is no significant difference between the two liquid wax.

The refractive indices of jojoba seed liquid wax, and liquid wax of callus were nearly similar and ranged between 1.4634 and 1.4644.

The specific gravity of jojoba liquid wax and callus liquid wax were nearly similar ranged between 0.8031 and 0.8977.

The acid value of jojoba liquid wax and callus liquid wax were in between 1.89 and2.29.

The saponification value of jojoba liquid wax and callus liquid wax were nearly the same value (91.967 and 92.446).

Jojoba liquid wax and callus liquid wax had the same iodine value (82.0215 and 82.4213).

Composition of jojoba liquid wax extracted from *in vitro* formed tissues was similar to that isolated from seeds. The nutrient media containing MS + 1.5 mg/L BA + 0.1 mg/L NAA and repeating sub culturing of jojoba callus did not affect the quality or the composition of the liquid wax. This study indicates how far the tissue culture can be used for isolation and production of the secondary or by products to enhance the quality of the liquid wax or may be used in its production for special purposes in industry.

Culturing jojoba embryos *in vitro* in medium containing MS + 1.5 mg/L BA + 0.1 mg/L 2,4-D + 0.4 mg/L NAA to avoid any change in the hydrocarbon structure.

Key Words

Tissue culture, Jojoba, Embryo culture, Callus induction, Physiological age, Temperature, Sucrose concentration, 2,4-D, 6-BA, α-NAA, physical and chemical properties, GLC, Fatty acids, Hydrocarbons.

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