Chemical studies on jojoba oil

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V. SUMMARYThe present investigation was conducted in the analytical Laboratory of the Farm of the Medical and Aromatic Plants in ElKanater El-Khairia, Horticulture Research Institute (HRI), and at Agriculture Research Center (ARC) during 1998 to 2001. The objective of this work is to study the effect of different methods and periods of extraction on the oil content of Jojoba seeds, its physiochemical properties, and the chemical composition of the oil. In addition to study, the effect of Jojoba oil as antimicrobial and antioxidant.The obtained results were as follows:1- The effects of extraction methods on oil content of Jojoba seeds and physicochemical properties of extracted oil and itscomposition were:a)The results indicated that, the most effective solvents were chloroform and hexane, while petroleum ether (40-60°C) was the least in this respect.b)Increasing the extraction period 5 hours resulted in an increase in the obtained oil content of Jojoba seeds.2- Accordingly, it could be recommended that, jojoba seeds extraction by chloroform for 5 hours to obtain the highest yield of oil, reveal better physiochemical properties, and the best components, in extracted oil.3- It was found that, the oil obtained by mechanical press at room temperature of Jojoba seeds was less by about 19.92% than the oil extracted by chloroform.4-The results showed that, physical properties mainly (refractive index at 20°C, specific gravity at 25°C, melting point, color and solubility) of the oil samples obtained by the different extraction methods were found to be on line with the standard values.5-Also, as for the chemical properties (acid value, peroxide value, iodine value, saponification value and unsaponifiable matter), it was found that the obtained values met those standards.6-The chemical composition of the Jojoba oil was determined by gas liquid chromatography analysis, where 10 components were identified. These identified components namely lauric acid, myristic, palmatic, palmitoleic, stearic, oleic, linoleic, linolenic, eicosenoic and docosenoic, however the main components were eicosenoic, docosenoic and oleic.7-Jojoba oil as antibacterial agent was tested against group of bacteria including Escherichia coli, Pseudomonus aeruginosa, Bacillus subtilis and Staphylococcus aureus. The results revealed that Staph. Aureus and B. subtilis were highly sensitive, while P. aeruginosa and E. coli were highly resistant. It has been concluded with no doubt that Jojoba oil has antimicrobial effect but its growth promotor is under question because it requires a further investigation.8-The Jojoba oil was tested for antimicrobial activity by using filter paper disc diffusion method and the results were as follow:a) All tested oils had antibacterial activity against growth of positive bacteria while gram-negative had no effect. Thegram-positive bacteria were more sensitive towards the tested Jojoba oil than gram-negative ones.b) All tested oils had antifungal activity against growth of fungi and yeasts under study. Jojoba oil has no effect onfungi.9- Effects of Jojoba unsaponifiables on refined palm oil rancidity during flying 180+5°C for 5 hours.Jojoba unsaponifiable matters (SUM) were mixed with palm oil at 0.02, 0.04, 0.06 and 0.08% along with TBHQ at 0.02%. The lipid rancidity was followed by measuring free fatty acids, peroxide value and U.V. absorbance tests. JUM caused non significant effect on palm oil rancidity. JUM at 0.08% mixed with refined palm oil produced an antioxidant power nearly similar to that produced by TBHQ-JUM suppressed refined palm oil oxidative rancidity possibly through the intervention of triglycerides molecules of palm oil by the long chains of JUM which act as oxygen reduction agent through their single double bonds.10-The determination of oil stability by using oven test on 60°C for 36 hours and for both peroxide value and acidity every 3 hours showed that the oil sample which was added with J.U.M. 0.08% was more better than others increasingstability of palm oil.11-The extraction of Jojoba seeds by chloroform for

3 hours and treated with Fusarium moniliform was carried out and the obtained results were 28.6% oil percentage 3.14 acid value and 1.470 refractive index.These results are not satisfied. Also the seeds treated by Aspergillus flavus were 20.88 oil percentage, 4.94 acid value and 1.470 refractive index and the oil color changed from bright yellow to pale yellow by causing of A. flavus toxine production.So, We should keep the seeds of Jojoba under good storage conditions.Recommendation:•Extraction of Jojoba oil is recommended by chloroform for 5 hrs because the oil amount increased by 19.9% compared with the extraction by pressing. This is also recommended because the extracted oil by solvent is less subjecting to microbic pollution, analysis by lipase, reducing the quantityof oil in meal, and the physiochemical properties become better.•Storing Jojoba mature seeds in good storage conditions (i.e. adequate temperature, humidity, ventilation) prevent theseeds from fungal infection that causes in turn low yield and quality of the extracted oil.•Natural antioxidant (unsaponifiable matter) is recommended as a healthier substitute of TBHQ.