Studies en the constitution of the Egyptian eucalyptus volatile Girls volatile oils eucalyptus

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Eucalyptus citriodora oil is one of the most important essential oils used in soaps, perfumen, medicinal purposes, anu as a source of citronella)for the manufacture of citronellol hydroxy citronella) ana menthol. A small proportion of oil added to ger-micides and disinfectants made from other eucalyptus oil greatly improves their odor. vata in this work could be used as a base for the evaluation of volatile oil from Egyptian E. citrio-dora oil.1. The yield of the oil was determined monthly along the year. It decreased in winter at December , January and Febreuary. On the other hand the volatile oil content increased in spring and summer and reached its maximum at September and October. The yield of oil varried from 0.34 to 0.96 percent. The moisture content was determined monthly and varried from 54.5 percent in September, to 66.5 percentin May. This may be due to dormancy period at late autumn and winter, and the climate.2. The physico-chemical properties of theoil distilled from green and dry leaves and terminal branchlets in winter, and spring were determined. The moisture content of the dry leaves and terminal bran-chlets before distillation ranged from 11.0 to 14.0 per-cent. The properties determined were: specific gravity, refractive index, optical rotation, evaporation residue, solubility. in 70 percent ethyl alcohol, acid number, ester number, saponification number, ester number after acetylation, ester as citronellyl acetate, and total aldehydes as citronellal•Specific gravity at 20/20°C, refractive index at 20°C solubility in 71) percent ethyl alcohol, acid number, and total aldehydes as citronella) were within the limits reported in the literature. It is worthy to mention that the lower optical rotation of BgyptianE. citriodora oil, -10.80°, -9.95°, -11.90°, and -9.10° for the oil distillea from green and dry leaves in winter, ana spring , may be due to the fact that the obtained oil has unsymmetric molecules which have optical acti-vity.Lack of data concerning the evaporation resiaue of Eucalyptus oils, the present investigation was carried out to fined the suitable weight and time required to determine the evaporation residue of Egyptian E. citrio-dora oil where 4 grams are recommended to evaporatefor 4 hours. The obtainea values were 12437, 11.87, 12.16 and 12.04 percent for the oil distillea from green and dry leaves in winter and spring respectively.The physical and chemical properties of oil aistilled from green leaves in winter, generally, showea higher values of specific gravity, evaporation residue, solubility in 70 percent ethyl alcohol, acid number, ester number, ester number after acetylation anu total aldehydes as citronella]. than those of oil distilled in spring. This may be due to climate , plant maisture content and plant activity of growth.3. Yield and physico-chemical properties of the Egyptian flower bud E. citriodora oil was determined.The yeild was 0.55 percent. The specific gravity and ester number were within the limits reported in the literature. Total aldehydes as citronella) was higher. Refractive index, pptical rotation and acid number werelower than those reported in the literature.4. The ultraviolet and infrared absorption properties of the Egyptian E. citriodora oils could be taken as a truly characteristic ”finger -print” of the oils. The maximum ultraviolet absorption, its absorbance and transmittance percent and the frequenc-ies as wavenumber cm-1 of the different infrared abso-rption bands: their absorbance and transmittance per-cent of these oils were determined. Besides, infrared spectroscopy might be used as guide for the qualitative analysis of eucalyptus oils. The infrared spectrum of Egyptian E. citriodora oils included the characteristic absorption bands of some functional groups, i.e. the characteristic bands ”carbonyl compounds ” group which gave the highest absorbance in the infrared spectrum.It was noticed that the Egyptian

E. citriodora oil frcm dry leaves distilled in spring contained more carbonyl compounds. The infrared spectrum of oil included also the characteristic absorption bands of ”aromatic deriv-atives”, the charateristic band of ”cl.o” group which indicates the presence of esters in oils and the charac-teristic bands of the ”OH” group (free and bonded) in these oils.5. Gas liquid chromatographic analysis vies carried out for the qualitative ana quantitative determinations of the constituents of Egyptian E. citriodora oils. The following components were iaenti-fied: citronellal (the principal constituent) 35.08%, iso valeraldehyde 0.05% iso pulegol 3.97%, linalool 0.81%, borneol 0.28%, menthol 3.03% , citronellol7.97% , geraniol 3.44%, benzyl acetate 0.40%, citrone-llyl acetate 6.59%, geranyl acetate 0.90%, citronellyl propionate 1.15%, phyllandrene 10.47%, lemonene 0.37%, dipentene 2.25% and terpenolene 0.43%.The gas liquid chromatographic analysis of Egyptian flower bud E. citriodora oil showed the followingcomponents: citronellal (the principal conatituent)25.60%, iso valeraldehyde 0.39’70, iso pulegol 2.43%, borneol 1.18%, menthol 13.44%, citronellol 15.62% , geraniol 1.86%, benzyl acetate 1.82%, citronellyl acetate 2.15%, phyllandrene 14.98%, lemonene 0.79 and dipentene 1.71%.menthol and citronellol showed remarkable increase in the flower buu oil than those of the leaves oil,P-cymene, linalool, geranyl acetate and citronellyl acetate disappeared in the flower bud oil.6.Fraction distillation of the Egyptian E. citriodora oil gave 13 fractions. The temperature program of the fractional distillation ranged from 79°C to 130°C. Vapor temperature of oil ranged from 69°C to 96°C. The fractions percent were 6.4, 10,11.6,9.6, o.8,3.6 , 3.2,3.2,o,3.2,2.4,1.6 and 27.2 percent respec-tively. Citronella) percent was 84.4, 4:57.9 86.3 and 84.2 in fractions 3,4,5 and 6 reepictively.7.For purification of crude citronella), 33.6 grams obtained from mixing the fractions 3,4,5 and 6 were placed in the reaction vessel and purified by bis-ulfite method where 26 grams of pure citronella) were obtained. The infrared absorption spectra of citronellal isolated from Egyptian E. citsioaora oil showed a band at wave number 1715 cm 1 within the limits of the characteristic band of the carbonyl compounds.8.iaenthol was produced from isolated citronella) by acetylation with acetic acid anhydride, then cyclized to iso-polegol acetate to produce menthol acetate byreaction with HI acid. Saponification and hydrolysis of menthol acetate were carried to produce menthol. where 20 grams of citronella) produced 16 grams of menthol acetate that gave 9.6 grams of menthol.The infrared absorption spectra of obtained menthol was in agreement with the ”finger print” of this component reported in the literature.The two characteristic bands at wavenumbers 2960and 3630 cm-1 in the infrared spectrum might prove the presence of the ”OH” group in the oil. Gas liquiu chromatographic analysis shuwed that menthol percentage was 94.75