STUDIES ON THE OILS FROM THE LESS EXPLOITED VIRESCENS VARIETY OF ELAEIS GUINEENSIS

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Abstract

Study was carried out on the palm and palm kernel oils from the less exploited virescens-teneru variety of Elaeis guineensis . Although this variety gives a poor edible oil, the industrial parameters of both the palm oil and palm kernel oil of the virescens variety are similar to those of the much exploited nigresces variety. It is therefore, recommend that the virescens variety be exploited to provide vegetable oils for industrial purposes. Introduction

Elaeis guineensis (Jacq). Palmae, the oil-palm tree, is a tropical tree planted mainly for palm oil, palm kernel oil and palm wine (Hartley, 1971, Morah, 1995, 2003 and 2005). The kernel cake left after extraction of the palm kernel oil (PKO) is used for live-stock feed (Hartley, 1971).

Elaesis guineensis is classified based on contained pigment/colour of the excocarp (i.e. fruit type) into rubro-nigrescens, rutilo-nigrescens, virescens and albescence varieties (Janssens, 1927 and Hartley, 1977). Each of these fruit types can be further classified based on fruit forms into three broad groups namely: dura with thick shelled endocarp; tenera with thin-shelled endocarp and pisifera whose endocarp has no shell (Janssens, 1927; Hartley, 1977 and Purseglore, 1972).

The common types of the oil-palm tree in- West Africa are the different sub-divisions of rubro-nigrescens variety. These have deep reddish orange ripe fruits (Fig 2). This type of oil-palm is not common and it has greater use in traditional African medicine. To the best of our knowledge, there is no reported work on the physicochemical properties of the oils from the fruit of the viresens variety. There is, however, much reported work on the palm oil and palm-kernel oil of the nigrescens varieties of the oil-palm tree. The present work is therefore, aimed on the palm oil and palm kernel oil from the *virescens* type of the *tenera* from (fig. 3) of E. guineensis.

Materials and Methods

The fresh ripe fruit bunch *of Elaeis guineensis var viresens-tenera* was collected from an oil-palm plantation in Akpabuyo Local Government Area, Cross River State, Nigeria. The fruits were carefully loosened from the fruit bunch two days after collection. The fruits were washed and heated in boiling water for about one hour. The hot fruits were mashed by pounding in a motar and the palm oil squeezed out from the mesocarp was clarified by heating with about one third of its volume of water. The oil which settled on top of the water was collected, heated for about five minutes in an oven at about 105°, filtered and weighed. The crude palm oil was not purified further before use.

The nuts were collected from the mesocarp by hand picking from the residue left after squeezing out the palm oil. The nuts were air-dried at room temperature for two weeks and weighed. The dried nuts were hand-cracked and the kernel separated out and weighed. The kernel was washed with, air-dried and ground with a mill into fine particles. The ground kernel was extracted with light petroleum (40-60°) and the solvent distilled off. The crude palm kernel oil (PKO) left as residue was heated for about 5min, at about 105°, and filtered to give the PKO used for the analysis. The specification value, peroxide value, iodine value, free fauy acid content, moisture content, fat and oil content, density, viscosity, refractive index, colour and smoke point were determined using the IUPAC (1976), AOAC (1979) and AOCS 1993) methods.

Results and Discussion

Table 1, shows the proximate percentage of nut, kernel, shell and oil from the less exploited *virescens- tenera* variety of *Elaeis* guineensis. The data falls within the reported (Hartley, 1977 and *Cornelius, X911X* range for the commonly exploited *nigrescens* variety which is normally employed in palm oil and palm kernel oil production. Table II shows the physfcaf properties of *the xso fated oils.* The colour of the oils matched by lovibond tinctometer were recorded as 2.8, Red; 5.8 Yellow and 1.7, Blue for palm oil and 1,3, Red; 6.6, Yellow and 0.6, Blue for PKO. The colour appeared as light reddish orange and very pale yellow for palm oil and palm kernel oil respectively. The colour is

expected to be so as the mesocarp of the ripe fruit does not normally contain anlhocyanins but contains carotenoids (Purseglore, 1972). Table II, also, shows the slip melting point, relative density, viscosity, refractive index and smoke point of the palm oil and palm kernel oil. These values agree with those reported for the equivalent oils from the *nigrescens variety* (offor, 1986),

Table 1111 shows the chemical parameters of the isolated oils. The saponification value of 201.59 for the palm oil agrees with the recorded value for the Malaysian palm oil (Slew and Berger, 1981), while the value for the PKO also agrees with the specification value Malaysian PKO (Tan and Oh, 1981). Since the saponification value is inversely proportional to the relative molecular mass of the consistent fatty acids, the PKO has a predominance of low relative molecular mass fatty acids. The PKO is therefore, better suited for soap making than the PKO. The iodine value of 5254 for the POK agrees with the literature value at 51.055.1 for Malaysian PKO while the value of 17.67 for the PKO agrees with the iodine iterative value of 13-23 for the Malaysian PKO (Tan and Oh, 1981). The low degree of unsatuartion for the PKO makes it suitable for soap and imparine manufacture. It will also be less prone to oxidative rancidity (Incobsberg , 1983). This is further supported by the lower peroxide exhibit similar industrial parameters with those of the much exploited nigeresens type. The PO and PKO of this loss exploited varescents verity of the oil palm can therefore, serve as good industrial raw material. The foaming and other undesirable characteristic of the oil during frying or cooking is attributable to the non-glyceridal portion of the lipid.

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Table 1 Proximate Parentage nut kernel and Oils from Elaeis Guineensis oils

Nut to fruit ratio %	Kernel nut to ratio %	Kernel to fruit ratio%	Palm oil to fruit ratio %	PKO to kernel ratio %	Shell fruit to ratio %
19.50	32.42	6.21	20.85	23.60	13.29

Tablell: Physical Properties of *the Elaeis Guineensis Oils*

Oil Type Parameter	Palm oil	Palm Kernel Oil
Colour	2BR.5.8Y, 1.7B	1.3R, 6.6 y, 0.6 B
Slip melting point	30-34°	20-26°
Density at 20°	0.92	0.90
Viscosity at 28°	1.25	2.23 x 10"'
Refractive index at 40°	1.4610	1.4516
Smoke Point (°C)	40	280

Table 111: Chemical Parameters of the Kinesis Guieensis Oils

Moisture content, %	0.10	0.25
Specification value (MgKOH/gofoil	203.59	239.53
Iodine value (gKOH/ lOOg of oil	52.54	17.67
Free fatty acid, %	2.14	0.06
Peroxide value (Meg/kg of oil)	2.53	0.78
Fat content, %	52.0	61.0
Oil content, %	17.7	39.1

Fig.1: Unripe *Virescens* fruit
Source: Hartley, 1977

Fig. 2: Ripe *virescens* fruit
Source: Hartley, 1977

Fig. 3: *Tenera* fruit type
Source: Hartley, 1977