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THE PHYTOCHEMICAL AND PHYSICO-CHEMICAL PROPERTIES OF THE SEED AND SEED OIL OF *PERSEAGRATISSIMA* MILLER AND *CHRYSOPHYLLUMALBIDUM*G. DON.

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ABSTRACTS

Phytochemical and physico-chemical properties of the seed and seed oil of *Perseagratissima* and *Chrysoplylumalbidum*, were assessed by standard methods. Phytochemical analyses of *Perseagratissima* lipid extract showed the presence of alkaloids, saponins, tannins, steroid and peroxides. Equally, the analyses of *Chrysophyllumalbidum* showed the presence of alkaloids, saponins, terpenes, steroids and peroxides. The physico-chemical properties of the seed oil of *Perseagratissima* revealed a saponification value of 194.6 ($mgKoHg^{-1}$ oil), unsaponification matter of 1.16%, an acid value of 6.5 ($mgKoHg^{-1}$ oil), acetyl value of 5.5 ($mgKoHg^{-1}$ oil), ester value of 188.1 ($mgKoHg^{-1}$ oil), viscosity of7.049 x 10-4 ($kgm^{-1}S^{-1}$), solidification point of 15.025° c, melting point of 160.9°c and pH of 7.05 at 30°c while those of *Chrysophyllum* showed asaponification value of 168 ($mgKoHg^{-1}$ oil), unsaponification matter of 6.6%, an acid value of 2.5 ($mgKoHg^{-1}$ oil), Acetyl value of 1.0 (mgKoHg1 oil), Ester value of 165.5 (mgKoHg1 oil), viscosity of 2.403 x 10^{-3} ($kgm^{-1}5^{1}$), solidification point of 15.1°c, melting point of 140°c and pH of 8.0 at30°c. With these bioactive and physico-chemical properties, the seeds oil of *P. gratissima* and *C. albidum* have great potentials to be used in pharmaceuticals and in medicines and as well industrial purposes.

KEYWORDS: Phytochemical, physicochemical, seed oil, *Perseagratissima* and *Chrysophyllumalbidum.*

INTRODUCTION

Perseagratissima belongs to the family Lauraceae. Almost evergreen, being shed briefly in raining seasons at blooming time, the leaves are alternate, dark green and glossy on the upper surface, whitish on the underside, variable in shape (lanceolate, elliptic, oval, ovate or obovate), 3 to 16cm long (Morton, 1987). Thirty percent of the avocado crop is processed for oil, 2/3 of which is utilized in soap 1/3 in cosmetics (Hong *et al,* 1996). Oil extracted from the seeds has astringent properties, and an oral infusion of the leaves is used to treat dysentery (Etukudo, 2003). *Chyrsophyllumalbidum* belongs to the family sapotaceae. It is cultivated for its fruits. The source of fruits has potential as an ingredient of soft drinks and can be fermented for wine or other alcohol production (Ajewole and Adeyeye, 1991).

Phytochemicals are biologically activecompoundsfoundin plants such as vegetables and grains in low,moderate and high amounts; these compounds are not established nutrients, but significantly protect the development of lots of degenerative diseases in animals and humans (Dreosti, 1998; Abo *et al.*, 1991).

Researchers are increasingly turning their attention to natural plant products such as flavonoids, saponins, tannins and others to look for new products to develop better drugs against cancer, as well as mycotic, viral and microbial infections (Hoffmann *et al.,* 1993; Srinivasan *et al.,*2001).Bacteria have the genetic ability to transmit and acquire resistance to drugs (Cohen, 1992). In the last three decades, numbers of new antibiotics have been produced, but clinical efficacy of these existing antibiotics is being threatened by the emergence of multi drug-resistant pathogens (Bandow *et al.,* 2003). According to World Health Organization (WHO), medicinal plants would be the best source to obtain a variety of drugs (Santos *et al.,* 1995).

Plants are the sources of such diverse products as textile fibres, gum, resins, waxes, perfumes, dyes, tannin materials, drugs, carbohydrate, protein and oils. The technological use of seed and seed products is among the most important activities of modern society. Specialization of seed structure and composition provides rich sources for Industrial exploitation apart from direct use as food (Sybil, 1997). Because of the diverse seed bearing plants existing in nature recent research services in Nigeria have turned attention towards the discovery of unusual plant seeds whole. Constituents should not only satisfy current or anticipated need and serve as an import substituent but should be an essential part of an industrial inputs (Ogbobe, 1985). However, only few of these plant

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species have found use in medicine and manufacturing industries. Little or no literature exists on their biological activities (Trease and Evans, 1989). This study is therefore aimed at investigating the essential oils of *Perseagratissima* and *Chrysophyllumalbidum* for their bioactive potentials.

MATERIALS AND METHODS

Seeds from matured fruits were collected from a local farmer at Uyo, tested and found to be viable and disease free at the Science laboratory of the Akwa Ibom State University. The seeds were air-dried and ground. The oil content was exhaustively extracted in the Plant Physiology/Phytochemistry laboratory of the Akwa Ibom State University by grinding 50g each of the samples with l00ml of propanol in a sterile mortar and pestle and the seeds were homogenated using l00ml of chloroform -methanol mixture (2:IV/V). The total lipids in the homogenate in each case were extracted with choloroform-methanol (2:IV/V) and purified (Folch and Stanley, 1975). Butylatedhydroxytoluene (0.005%) was added as antioxidant to protect polysaturated fatty acids. The mixtures were filtered and the filtrates were evaporated to dryness in a rotatory evaporator at 50°C. Total lipids were determined gravimetrically in aliquot of the purified extracts. The extracts were then subjected to phytochemical and physico-chemical tests. Preliminary phytochemical test were done for alkaloids, steroids and saponins according to Sofowora (1993) while terpenes, flavonoids and tannins were carried out according to Trease and Evans (1989). The physico-chemical properties of the seed oil were assessed by standard methods of African pharmacopoeia (1986) and Fiona (1972).

RESULTS

The results for the bulk extraction of total lipids in seeds of *Perseagratissima* and *Chrysophyllumalb*idum are presented in table 1. The results show that the seeds of *P.gratissima* and *C.albidum* contain 10.8% and 77% total lipids respectively.

Table 1: Total Lipid Contents of *Peaseagratissima and Chyrsophyllumalbidum*

Seed used	Weight of the total lipid (g) 50g of seed	Total lipid expressed a percentages
Perseagratissima	5.40	10.8 ± 0.1
Chrysophylllumalbidum	3.83	7.7± 0.14

Values are mean±standard deviation of triplicate determinations

The phytochemical analyses of *P. gratissima* and *C. albidum* seeds are presented in Table 2. The results show that alkaloids, saponins, tannins, steroids and peroxides were present in both plants but at varying concentrations. Flavonoids and glycerol were absent in both plants while terpenes was absent in *Chrysophyllumalbidum* and present in *Perseagratissima.*

Table 2: Results of Phytochemical Analyses of *Perseagratissima*

Tests		*Perseagratissima*	*Chrysophyllumalbidum*
Alkaloids			
(i)	Dragendorff's reagent	+	+
(ii)	Mayer's reagent	+	+
Saponins			
(i)	Frothing test	+	+
(ii)	Fehlings test	+	+
Tannins			
Ferric Chloride		+	+
Flavonoids			
Magnesium metal And conc. HCL acid		-	-
Terpenes			
Chloroform and conc. Sulphuric acid		+++	-
Steroids			
Chloroform and Conc. Sulphuricacid		+	++
Peroxides			
Chloroform and glacial acetic acid		+++	++
Glycerol			
Acrolein test		-	-

Key

+	-	Slightly present
++	-	Moderately present
+++	-	Highly present
-	-	Absent

Table 3 shows some physical and chemical properties of the extracted oil. The results show that the physicochemical properties of *Perseagratissima* were higher than *Chrysophyllumalbidum*

Table 3: Result of Physico-Chemical Properties of *Perseagratissima* and *Chrysophyllumalbidum* Seed oil.

Assay	*Perseagratissima*	*Chrysophyllumalbidum*
Saponification value (mgKoHg-1 oil)	194.6	168
Unsaponification matter (%)	0.16	6.6
Acid value ($mgKOH^{-1}$ oil)	6.5	2.5
Acetyl value ($mgKOHg^{-1}$ oil)	5.5	1.0
Ester value ($mgKOHg^{-1}$ oil)	188.1	165.5
Viscosity ($Kgm^{-1}S^{-1}$)	7.049×10^{-4}	2.4036×10^{-3}
Solidification point (^oC)	15.025	15.1
Melting point (^oC)	160.9	140
pH (at 30^oC)	7.05	8.0

DISCUSSION

Perseagratissima and *Chrysophyllumalbidum* contain some bioactive compunds such as alkaloids, saponins, tannins and steroids. The usefulness of the active constituents of plants, as the main sources of drugs has made serious in road into the medical profession (Okeke and Elekwa, 2006). The chemical compositions of *P. gratissima* and *C. albidum* have contributed to the treatments of certain diseases in Nigeria. For instance, the seeds of *P. gratissima* are used in tea preparation for the treatment of heart diseases and other related problems (Okafor, 1989). Alkaloids are important compounds as many of them possess significant pharmacological activity (Ross and Brain, 1977). The presence of alkaloids confirms the fact that these plants can work on the nervous systems of human body, and can be used as analgesic because they are capable of relieving pains. The presence of saponins confirms that these plants could be used for ritual baths and concoctions.

The low unsaponlflable matter content (1.16), ester values (188.1 and 165.5) point to the possible uses of *P. gratissima* and *C.albidum* in soap making and for cosmetic purposes. The low acid value (3.5) recorded for *C.albidum* oils are indicators of their ability to resist lipolytic hydrolysis and oxidative deterioration. Also, the low unsaponifiable matter suggested low cholesterol levels in the oils and thus, they may satisfy the consumption need of arthrosclerosis patients. The viscosity in *C. albidum* is lower at high temperature and at high shear ratios, making it appropriate as a thickening agent (Joseph, 1995). Similar observations were made by Umoren *et al* (2001) who reported the physico-chemical properties of the seed and seed oil of *Huracrepitans*.

The oil of *P. gratissima* could be used commercially and used by the cosmetic industry for the preparation of soaps and skin moisturizers. Also, since substantial quantity of vegetable oils are used worldwide in protective coating formulation *P. gratissima* and *C. albidum* seed oil could be a source of raw material for plastic formulation and protective coating for certain industries.

CONCLUSION

These investigations revealed that *P. gratissima* and *C.albidum* have high oil content hence can be classified as oil seeds. The seed oils have properties similar to some known edible and industrially established oils. Therefore, *P. gratissima* and *C.albidum* may be potential sources of industrial oil when properly extracted.

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