

Assessing Olive, Palm Kernel, and Groundnut Oils for their Dermatologically-Active Agents

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ABSTRACT

Skin is the largest organ in the human body and plays important role and hence various expensive creams are formulated to care for it. People place much premium in using expensive creams with little or no knowledge of what less expensive creams (olive, palm kernel, and groundnut oils) can offer in respect of skin care. The aim of this research work was to assess and compare the levels of skin care compounds (Myristic acid, 9-octadecenol, stearic acid, oleic Acid, arachidic acid, Erucic acid) in olive oil, groundnut oil, and palm kernel oil by using gas chromatography – mass spectroscopy. The %concentrations of the skin care compounds in the samples were: groundnut oil (4-phenylbut-3-ene-1-yne (5.79), Myristic Acid (8.63), Palmitic Acid (22.51), 9-octadecenol (12.76), Stearic Acid (10.89), Oleric Acid (8.34), Arachidic Acid (18.37), Erucic Acid (7.46); palm kernel oil (4-phenylbut-3-ene-1-yne (5.83), Myristic Acid (9.21), Palmitic Acid (32.04), 9-octadecenol (21.86), Stearic Acid (18.21), Oleric Acid (9.23), Arachidic Acid (11.24), Erucic Acid (0.96); olive oil (4-phenylbut-3-ene-1-yne (5.79), Myristic Acid (8.63), Palmitic Acid (22.51), 9-octadecenol (12.76), Stearic Acid (10.89), Oleric Acid (8.34), Arachidic Acid (18.37), Erucic Acid (7.46). The levels of skin care compounds follow this order: Palm kernel oil > Groundnut oil = Olive oil, except arachidic acid and erucic acid. 1,2,3-trimethylbenzene, p-mentha-1,3,8-triene, and o-cymene were not found in any of the oils. These ingredients delay ageing, eradicate pimples, rashes and other minute diseases and therefore enhance smoothness of the human skin. Therefore, palm kernel oil is the best oil to be applied on human skin as body cream than groundnut oil and olive oil, since it contains the highest % composition of the following skin care compounds; myristic acid, palmitic acid, 9-octadecenol, stearic acid and 2,3-epoxycarane.

Keywords: Skin Care, Palm Kernel, Olive, Groundnut, Oils

I. INTRODUCTION

Oil is a smooth, thick liquid that is made from plants and animals with a pleasant smell that can be rubbed on human skin as body cream, used for frying foods and many other important purposes. The primary constituents of the oils particularly groundnut oil,

olive oil, palm kernel oil are fatty acids, which play a vital role in determining the quality of food, and thus the health of people as pertaining to the production of various skin care products for the eradication of skin diseases [1]. There has been a long variety history in human civilization of the usage of natural

ingredients; such as herbs, roots, essential oils, and flowers for skin care [2].

Nowadays, the most common examples of natural skin care ingredients include; palm kernel oil, sesame seed oil, tea tree oil, and many more ([3], [4], [5])

The botanical ingredients influence the biological functions of the skin, providing the nutrients necessary for a healthy skin ([6], [7]). Generally, botanical products are a rich source of vitamins, essential oils, and other bioactive molecules. The use of herbal medicines by communities of African descent is estimated to be 75% by the World Health Organization ([8], [9]). Skin is the largest organ in the body which protects the internal environment from the external one and adds to beauty too. Beauty is a quality that gives pleasure to the senses, which is desired by many humans.

In general terms, skin disease account for approximately 34% of the diseases encountered worldwide [10]. They affect people of all ages and constitute a major concern for medical consultation. Skin diseases currently exist as a major health burden in both developed and underdeveloped countries [5]. However, mortality rate for skin disease is relatively low, often persistent and are difficult to treat [11].

There are many different ways to protect our skin. The usage of natural ingredients for skincare is very popular today [2].

Medicinal plants have been found to play a major role in the treatment of various skin disorders and these species have been used in many countries around the world where they contribute significantly towards the health care for skin [12].

Moreover, the extensive use of medicinal plants to treat dermatological conditions in traditional system of whole South Africa has already been reported [13].

The search for natural remedies for skin care is ongoing worldwide. A review by [12] focused on the importance of seed oils from six species used in the preparation of cosmetics, also mentioned the traditional and other medicinal usage of seed oils.

Angerosa [14] summarized very systematically the medicinal and cosmetic relevance of the *Aloe ferox*; a fully explored plant of South Africa which is used in cosmetic herbal formulations.

A published work [15], provided a list of African cosmetic species and their usage. Reports by other researchers such as [16], [17] focused on the significance of Indian herbs and spices used in maintaining and enhancing human beauty as well as these herbs in cosmetics.

Baccouri [18] and [19] reviewed common types of plants used for skin care and concluded that the oxidative stress is one of the major mechanisms for skin aging and dermatological conditions.

The aim of this research work was to assess and compare the levels of skin care compounds (Myristic acid, 9-octadecenol, stearic acid, oleic Acid, arachidic acid, and Erucic acid) in olive oil, groundnut oil, and palm kernel oil. Hence, the objective of this research work was to determine the % composition of organic compounds contained in groundnut oil, olive oil, and palm kernel oil using Gas chromatography/Mass spectrometry technique.

II. METHODS AND MATERIAL

Groundnut oil, palm kernel oil and olive oil were purchased from Amassoma local market situated at Southern Ijaw Local Government Area in Bayelsa State, Nigeria on the 23rd of March, 2018, Chloroform, gas chromatography-mass spectroscopy.

The 3 samples (groundnut oil, palm kernel oil and olive oil) were analyzed with the same procedure via the use of GC/MS.

III. RESULTS AND DISCUSSION

GC-MS analytical results are presented in this section. Figures 1, 2, and 3 respectively show the chromatograms of groundnut oil, palm kernel oil, olive oil. The %concentrations of organic compounds are shown in Table 1. The %concentrations of the skin care compounds in the samples were: groundnut oil (4-phenylbut-3-ene-1-yne (5.79), Myristic Acid (8.63), Palmitic Acid (22.51), 9-octadecenol (12.76), Stearic Acid (10.89), Oleric Acid (8.34), Arachidic Acid (18.37), Erucic Acid (7.46); palm kernel oil (4-phenylbut-3-ene-1-yne (5.83), Myristic Acid (9.21), Palmitic Acid (32.04), 9-octadecenol (21.86), Stearic Acid (18.21), Oleric Acid (9.23), Arachidic Acid (11.24), Erucic Acid (0.96); olive oil (4-phenylbut-3-ene-1-yne (5.79), Myristic Acid (8.63), Palmitic Acid (22.51), 9-octadecenol (12.76), Stearic Acid (10.89), Oleric Acid (8.34), Arachidic Acid (18.37), Erucic Acid (7.46).

The %composition of 4-phenylbut-3-ene-1-yne, Myristic Acid, Palmitic Acid, 9-octadecenol, Stearic Acid, and Oleric Acid in palm kernel oil were higher than the levels in groundnut and olive oils. However, 2,3-epoxycarane and O-ethyl toluene were not detected in olive oil and 1,2,3-trimethylbensene, p-mentha-1,3,8-triene, and o-cymene were not detected in palm kernel oil and olive oil. These organic compounds have been known to be skin care agents (Table 2).

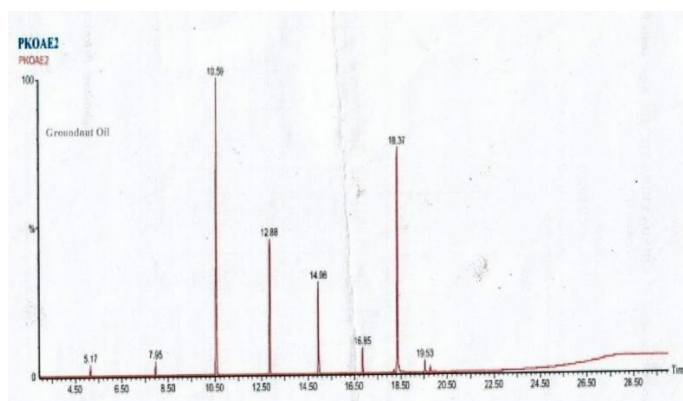


Fig. 1: Chromatogram of Groundnut oil.

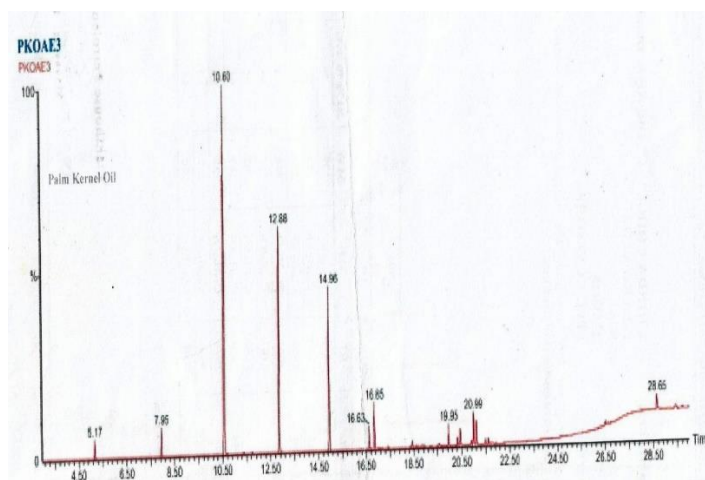


Fig. 2: Chromatogram of Palm Kernel Oil.

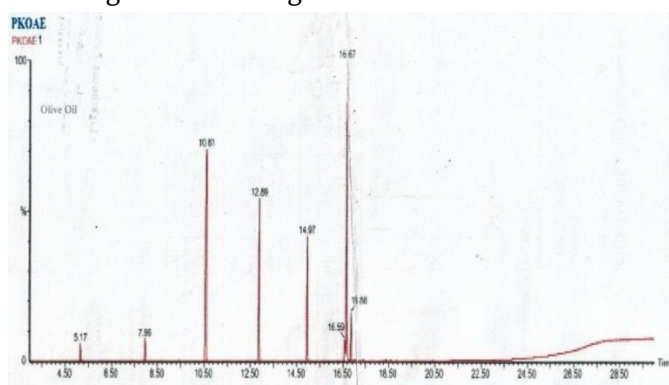


Fig. 3: Chromatogram of Olive oil

Table 1. Organic compounds in the oil samples

S/N	Components	% Composition		
		Groundnut oil	Palm kernel oil	Olive oil
1.	4-phenylbut-3-ene-1-yne	5.79	5.83	5.79
2.	Myristic acid	8.63	9.21	8.63
3.	Palmitic acid	22.51	32.04	22.51
4.	9-octadecenol	12.76	21.86	12.76
5.	Stearic acid	10.89	18.21	10.89
6.	Oleric acid	8.34	9.23	8.34
7.	Arachidic acid	18.37	11.24	18.37
8.	Erucic acid	7.46	0.96	7.46
9.	2,3-epoxycarane	0.84	5.11	
10.	O-ethyl toluene	0.24	4.23	
11.	1,2,3-trimethylbensene	0.11		
12.	p-mentha-1,3,8-triene	0.14		
13.	o-cymene	0.18		

Table 2. Dermatological role of analytes

S/N	Organic compounds	Benefits on human skin	References
1	Myristic acid	<ul style="list-style-type: none"> • It delays ageing. • It is used in the production of shaving products and other skin care products to eradicate pimples, rashes and other minute diseases on human skin. 	[20]
2	Palmitic acid	<ul style="list-style-type: none"> • It delays ageing. • It is also used in the production of cosmetics and other beautifying products that aids in the glittering of the human skin. • It is used in the production of soaps which enhances the smoothness of the human skin. 	[21]
3	9-octadecenol	<ul style="list-style-type: none"> • It helps to strengthen the lipid barrier of epidermis. • It helps to protect the skin against trans epidermal loss of 	[22]

S/N	Organic compounds	Benefits on human skin	References
		water. • It normalizes the skin metabolism.	
4.	Stearic acid	• It helps to remove dirt, sweat and excess sebum from the skin.	[12], [13]
5.	Oleric acid	• It makes the skin look smooth and properly moistened. • It activates regeneration of damaged lipid barrier of the epidermis. • Heal inflammations and stabilize skin metabolism. • It catalyzes trans epidermal water loss to improve skin moistening.	[12], [13]
6.	Arachidic acid	• It also catalyzes trans epidermal water loss to improve skin moistening. • It serves as an important immunomodulatory role to the skin. • Heal inflammations and stabilizes skin metabolism.	[23]
7.	Erucic acid	• It helps to relieve some skin conditions such as pimples. • It also helps to protect the skin against free radical damage from ultraviolet light and pollution. • However, it is also used to ease pain on the human body system when applied on the skin.	[12], [13]
8.	2,3-epoxycarane	• It delays skin ageing. • Softens the skin. • Catalyzes metabolic changes that can improve skin nutrition metabolism.	[24]
9.	o-cymene	It helps to protect the human skin against most bacteria and fungi infections.	[25]

IV. CONCLUSION

Myristic acid, palmitic acid, 9-Octadecenol, stearic acid, oleic acid, arachidic acid, 2,3-epoxycarane are important ingredients of shaving products, cosmetics, soaps, skin care and beautifying products. These ingredients delay ageing, eradicate pimples, rashes and other minute diseases and therefore enhance smoothness of the human skin. Therefore, palm kernel oil is the best oil to be applied on human skin as body cream than groundnut oil and olive oil, since

it contains the highest % composition of the following skin care compounds; myristic acid, palmitic acid, 9-octadecenol, stearic acid and 2,3-epoxycarane.

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