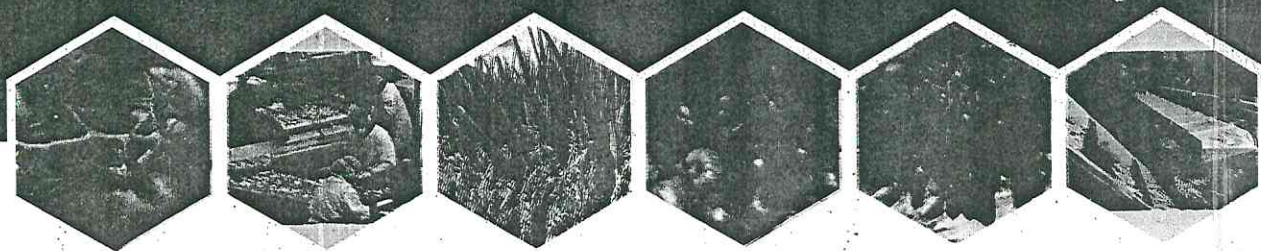




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COMPARATIVE STUDY ON THE PHYSICOCHEMICAL PROPERTIES OF SERENDIPITY BERRY SEED OIL USING N-HEXANE AND EXPRESSION METHODS

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Introduction

Dioscoreophyllum cumminsii diel (serendipity berry) is a tropical dioecious rainforest vine in the family *menispermaceae*. It is native throughout most of the tropical Africa; it grows at low altitude from sea level up to 400 m. It grows during the raining season from July to October [1]. It is an herbaceous grown for its sweet berries, which are used as natural non carbohydrate sweetener substitute. The fruit are red, 1.3 long, in grape-like cluster (50-100 in a cluster), outer skin tough, pulp, semi-solid, and white, mucilaginous. The sweetening principle is a polypeptide soluble in water, but labile at high temperature. The non-sucrose compound responsible for the sweet taste is classified as monellin, a sweet polypeptide. The sweetness of monellin is approximately 3000 times sweeter than sucrose on a weight basis [2]. The fruit can be kept for several weeks if it is stored at room temperature without losing its sweetness. Serendipity berry is abundantly available across most of the tropical African countries during the raining season and it is under-utilized. The berry has been found to be rich in oil (49.80%) [3] but the physico-chemical properties of the oil which will determine its suitability for human consumption or industrial use is yet to be fully reported. This work determines the effect of extraction methods on the physicochemical properties of serendipity berry seed oil.

Materials and Methods

Serendipity berries were obtained from a farm Esa odo, Osun state, Nigeria. The fruits were oven dried for 18 hours. The seeds were then removed from the seed pod and extraction of the oil was done using N-Hexane, expression and combination of N-Hexane/Expression methods. The physicochemical properties of the oil were determined using standard methods.

Results and Discussion

The percentage oil yields are 38.59, 12.34 and 49.57 % for hexane, expression and expression-hexane method respectively. The refractive indices observed for the three samples at 20°C. The obtained value for the expression method is more than that obtained for hexane and expression-hexane. The specific gravity of the oil indicates that the oil is heavier than water and will form an upper layer. The specific gravity was in line with 0.9587 reported by [4]. The viscosities of the oil were 125.8, 128.76 and 126.87 cm³/s for hexane, expression and expression-hexane methods respectively which shows that the oil from expression method is more viscous than the other ones. Expression method had higher viscosity due to particles of the seeds which settled during storage. Saponification value was high in the three oil samples specifically in the oil extracted by expression method (198.62 mgKOH/g). The saponification values obtained for the three extraction methods were higher than those of the common oils such as soy bean (187-196 mgKOH/g), cotton seed oil (189-198 mgKOH/g) [5]. The iodine values of the serendipity seed oil were higher than those of sunflower (110-143 mgKOH/g), castor oil (83.75 mgKOH/g) and soy bean (120-143 mgKOH/g). The acid values observed for the oil extracted were 17.27, 14.22 and 16.96 mgKOH/g for hexane, expression and expression/hexane methods respectively. These values were relatively high compared with the acid value of soy bean oil (1.80). Higher free fatty acid values were detected in the oil ranging from 7.47-8.64% oleic. The peroxide value obtained for serendipity seed oils extracted by expression method was low and this indicated low tendency of the oil to become rancid.

Conclusions

Serendipity berry oil had properties which are comparable to other oil seeds. This oil could be useful in non-food application and also in food industry after refining.

Table 1: Physico-chemical properties of serendipity seed oil

Parameter	Hexane	Expression	Expression/Hexane
Oil yield (%)	38.59±0.17	12.34±0.22	49.57±0.11
Specific gravity (g/cm ³)	0.948±0.04	0.922±0.02	0.952±0.04
Refractive index	1.443±0.09	1.442±0.04	1.478±0.06
Viscosity (cm ³ /s)	125.8±0.23	128.76±0.18	126.87±0.20
Saponification value (mgKOH/g)	186.92±0.12	182.54±0.10	198.62±0.16
Acid value (mgKOH/g)	17.27±0.33	14.86±0.28	16.96±0.22
Peroxide value (mEq/kg)	2.72±0.14	1.94±0.09	3.86±0.11
Iodine value (g/100g)	145.80±0.26	136.70±0.20	168.56±0.25
Free fatty acids (% oleic)	8.64±0.18	7.47±0.11	8.53±0.14

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