

## **Determination of antioxidant of *Moringa oleifera* seed oil and its use in the production of a body cream**

**E. N. Ojiako and C. C. Okeke**

*Pure and Industrial Chemistry Department, Anambra State University, Uli*

### **ABSTRACT**

*There has been a current issue on the use of *Moringa oleifera* as a medicinal plant for curing many diseases. Oil was extracted from *Moringa* seed using Soxhlet extraction. The oil characterized was, used for cream formulation and Uv-visible spectrophotometer was used to carry out the antioxidant activity of the oil. The results showed that the oil had a percentage yield of 26.9%, specific gravity of 1.1827, Saponification value 187.5, Acid value 5.038620mg/KOH/g, free fatty acid 2.51mg/KOH/g, peroxide value not observed. The cream produced had a good moisturization and conformed to the standard. The antioxidant inhibition results of the free radical showed inhibition above average which was an indication of high antioxidant advantage. The oil was found to be good commercially, and its production and consumption is highly recommended.*

**Key words:** antioxidant, inhibition, body cream.

### **INTRODUCTION**

*Moringa oleifera* seeds also known as “Drumsticks” are produced annually in the tropical and subtropical countries of Asia and Africa (Fuglie L.J 1999). The seeds can be used in a variety of ways including as medicinal and herbal remedies, nutritional supplements, and for industrial and Agricultural purposes. The seeds contain 19 to 47 percent oil (Ahmad *et al* 1989, Khan *et al* 1975). Known commercially as “ben oil”, it is similar to Olive Oil and is rich in Palmetic, Stearic, Behenic and Oleic Acids (Nautiyal *et al* 1987, Verma *et al* 1976). The oil is clear, Odorless and resists rancidity (Ferro *et al* 1970, Ramachandran *et al* 1980).

These oil posses about 75% Oleic acid, a monounsaturated fatty acid that is less vulnerable to oxidative stress than unsaturated fats. Oleic acid has the ability to reduce inflammation in the system, since oleic acid appears to be one of the main protective agents in reducing the levels of cardiovascular disease, breast and skin cancer (Pauwels E. K, 2011). The oil has high antioxidant properties, making it a valuable source of vitamin A, C and E. It is one of the highest naturally occurring sources of antioxidants (Dogra *et al* 1975). The oil is good for skin formulation product because of its potent antioxidant inhibition which prevents bacterial infections, reduce inflammation and provide a smooth and healthy tone to the arms, legs and face.

These oil possess the following properties of antiinflammatory, antihypertensive, antiepileptic, antioxidant, antibacterial, antifungal, antipyretic (Rajib Singha, 2010). It is used in all kinds of cosmetic products and soap (Delaveau *et al*, 1980, Ramachandran *et al* 1980). It is used for treatment of venomous bites, rheumatism and gout (Parrotta *et al*, 2001).

In this work we determined the antioxidant activity of *Moringa* seed oil and the utilization of the oil in the production of body cream.

### **SAMPLE COLLECTION AND PRETREATMENT**

*Moringa* seeds were collected from sheda science and Technology complex (SHESTCO) located at Kwali in Abuja.

The seeds were dried for some months under room temperature. The soft kernels were ground and dried under room temperature for extra one month.

### MATERIALS AND METHODS

Soxhlet extractor was used to extract the oil from *Moringa oleifera* seed using petroleum ether as the solvent. The physical and chemical characterization of the oil was determined. The free radical scavenging activity of the extract/fractions of *Moringa oleifera* oil was evaluated using 1,1-diphenyl-2-picrylhydrazil using the patel method. 0.5ml of different concentrations of the sample (*Moringa oleifera* oil) and 0.5ml of DPPH solution was taken, which was made up to 5ml with solvent. The mixture was left in a dark cupboard for 30mins. The absorbances of the different concentrations at 520nm or 517nm was taken using Uv-visible spectrophotometer then extrapolated the inhibition concentration at IC50. Ascorbic acid was used as standard and measurements were done in triplicates.

In the production of body cream, the water phase methyl paraben, Propylene Glycol, Glycerin, water, borax and Oil phase croda wax, cetyl alcohol, paraffin oil, petroleum Jelly and moringa oil were allowed to melt for about 70 – 80<sup>0</sup>c in separate beakers. The aqueous phase was poured into the oil phase gradually. This was stirred to ensure proper mixing and texture then other additives were added. NAFDAC method of standard analysis Test was carried out using the body cream to ensure the safety and performance of the body cream.

TABLE I: RESULT ON THE CHARACTERIZATION OF THE OIL

Percentage yield	26.9%
Specific gravity	1.1827
Free fatty acid	2.51mg/KOH/g
Saponification value	187.5
Acid value	5.038620mg/KOH/g
Peroxide value	Not observed

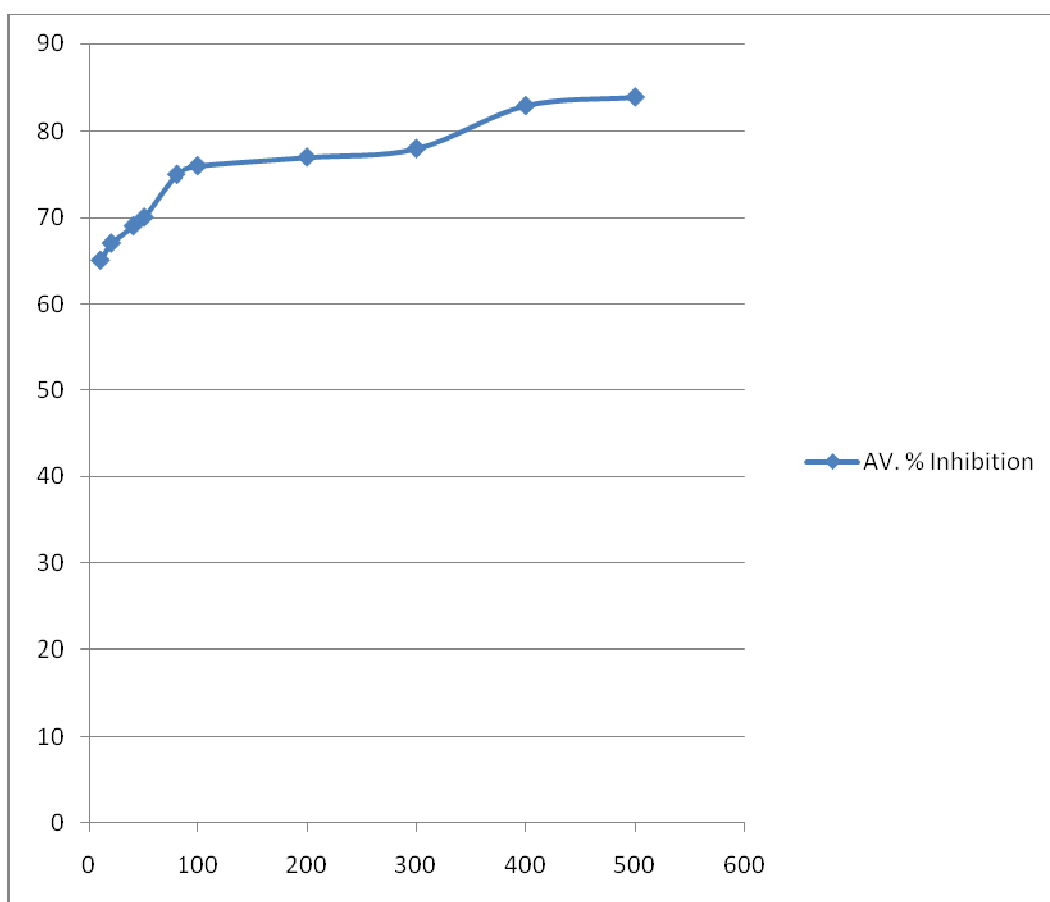


Fig. 1 UV – visible showing percentage average inhibition

TABLE II: RESULT FOR ANTIOXIDANT ASSAY

CONCENTRATION ug/ml	AVERAGE % INHIBITION
10 ug/ml	65
20 ug/ml	67
40 ug/ml	69
50 ug/ml	70
80 ug/ml	75
100 ug/ml	76
200 ug/ml	77
300 ug/ml	78
400 ug/ml	83
500 ug/ml	84

TABLE III: ANALYSIS TEST CONDUCTED ON THE CREAM BY USING TWO OTHER BODY CREAM AS A STANDARD.

Analysis Test	Cream with Moringa oil
Dermatological Test	Absence
Lead	Absence
Mercury	Absence
Hydroquinone	Absence
pH Test	5.70
Emulsion Type	Water in oil

### DISCUSSION

The results of the quantity characterization of the Moringa seed oil are recorded in Table I. It can be seen that the Moringa seed oil has a percentage yield of 26.9%, specific gravity 1.1827, free fatty acid 2.51mg/KOH/g, Acid value 5.038620mg/KOH/g, saponification value 187.5 and peroxide value was not observed because it does not undergo oxidation and can be steady for a very long time. The result of the extraction showed that *Moringa oleifera* seed had 26.9% oil content. This percentage yield is appreciable compared to other edible oil known. The saponification value is 187.5 which is low, this indicates that it has long carbon chain and can be used in making soap. The free fatty acid is 2.51 which is an indication that its rancidity is low and it should have a long shelf life. The oil is good in making cosmetics.

In Table II, the antioxidant inhibition result showed that concentration increases with increase in the average percentage inhibition of the free radical or oxidation of the molecules. At the 10ug/ml where 0.5ml of the free radical gave the average inhibition of 65% while for 500ug/ml 0.5ml of free radical gave inhibition of 84%. In all 0.5ml of the oil was use and diluted to different concentration with petroleum ether. The Uv. Visible analysis of antioxidant average inhibition of the free radicals has revealed the importance of antioxidant activity of the oil. This has also shown the use of the plant seed in curing many diseases such as cancer, lung disease, malaria, hypertension, arthritis, Diabetes and others infectious diseases. The result on Table III has shown no case of itching or irritation after 48 hours of usage. This showed that this cream is perfectly okay and can be used for years without problem. Lead, mercury and Hydroquinone were absence in the cream produced with moringa seed oil. This is an evident that its use in cream formulation is perfectly good for the body as it smoothens and moisturizes the skin. Emulsion type test has shown that the cream is good for dry skin as it contains oil and leaves the skin moist.

The pH of the cream with Moringa seed oil is 5.70 which is moderate and close to the range. The standard pH is between 5.5 – 7 for a moisturizing body cream.

### CONCLUSION

From the result of extraction, it was obvious that *Moringa oleifera* seed contain oil which could be useful to man. The high yield of oil made it recommendable for commercial use with the help of the physical and chemical characterizations of moringa oil which justify moringa oil as a non-drying oil in other words it is good for human consumption.

The oil showed a higher antioxidant activity determined with free radical scavenging of DPPH. The result strongly suggests that moringa oil may be a potential candidate in the area of natural anticancer. Antioxidants are believed to play an important role in the body. They are known to (not only) decrease serum low-density-lipoprotein (LDL) level, but also prevent oxidation of LDL. It is a good antioxidant and can be used in curing.

Plantation of this seed should be encouraged by the government and individuals. Government should mount up serious routine to check on the oils and to ensure that vegetable oils consumption by people meets the standard for the health of the consumer. Individuals should be encouraged to do research work on this plant especially its antiseptic, antipyretic, antihypertensive, antiepileptic, antifungal and antibacterial properties to improve human health of man.

This oil should be introduced in all cosmetic product and National Agency for food and Drug administration and control (NAFDAC) should ensure and find out those companies that are still using hydroquinone in body cream production and quickly recommend its replacement with Moringa seed oil. Finally commercial production of this oil should be encouraged through motivational means.

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