

Effects of Argan Oil on Health

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Abstract

In this review, the composition of argan oil, production methods, effects on health and its usage on various kind of illnesses have been investigated. Argan oil compensates 25% of the Moorish peoples daily oil requirement. It is produced from fruits of argan tree (*Argania spinosa* L.) by traditional methods, cold press method and solvent extraction. Argan oil is rich of unsaturated fat acid with its oleic and linoleic acid content which are approximately 44.8% and 33.7% respectively. It is a vegetable fat and the ratio of oleic acid to linoleic acid content is 1.25. With the studies made on argan oil, antithrombotic, providing homoeostasis, antiatherogenic, prevention of cardiovascular diseases, antidiabetic and antihypertensive properties are found. Additionally it is found out that, it decreases the obesities metabolic effects. However the studies made on argan oil which are related with the diseases are limited.

Keywords: Argan oil; composition of argan oil; cardiovascular disease; diabetes; cancer; obesity

Introduction

Argan oil can be obtained from traditional argan tree (*Argania spinosa*) which grows at Morocco¹. Argan tree is the most second tree in Morocco, and it has an essential importance for the food chain². At 1998, argan forest is

dedicated as “Biyosphere Reserve” by UNESCO³. Argan tree is 8 to 10 meters long, with a knurly and needle like stem and long leaves, blossom yellow flowers in Aprils. It’s fruits are 2 to 4 cm in length and 1.5 to 3 cm in width and have a bitter and hard shell. It has a

sweet scent and the argan tree can live around 150-200 years ².

Argan oil is used by the people who live in the southeast of Morocco for hundreds of years. In the 90's it is used in foods, cosmetics and even in medical purposes. Therefore the unknowns can be started to be explained ³. Argan oil is not only in Morocco, but also in Europe and North America started to be distributed by some firms and it has the most expensive oil title in the markets ^{3,4}.

With the studies made, argan oil is antithrombotic, homoeostasis⁵, antiatherogenic⁶, avoiding cardiovascular diseases, and has antidiabetic and antihypertensive effects ⁷. In addition in some studies it is mentioned that, argan oil can decrease the metabolic effects of obesity ⁸.

In this review, the composition of argan oil, its production methods and effects

on health and its usage for different diseases are investigated.

Argan

Maturing of the argan fruit takes 9 to 12 months and it finishes in between June and July ⁹. Generally there are 1, 2 or even 3 seeds which rich of oil inside the shell. The weight of the fruit is 5 to 20 grams and 55-75% of the fruit is pulpy ². Dry and wet part of the pulpy part is rich of carbonhydrates and is used for calf feed. The composition of the pulpy part is given in Table 1 ¹⁰. By the way there argan also has an extract ¹¹. In contrast with the informations related to the argan oil, the informations related to the argan fruit are limited. The seed has oil percentage of 38-62%, overall 50%. All of the seed is used for oil extraction⁹. After extruding the oil, the remaining part has carbonhydrates, proteins and saponins ¹⁰.

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Table 1: The composition of the pulpy part of argan fruit ¹⁰.

Composition	Percentage (%)
Mouisture	20-50
Ash	4.1
Cellulose	12.9
Compounds with Nitrogen	5.9
Lipid	6.0
Glycoside	18.5

Argan Oil

Argan oil meets the 25% of the total oil requirement of the people of Morocco ¹². Generally it is rich of unsaturated fat (80%) with oleic and linoleic acid content (approx. 44.8% and 33.7% respectively). It is a vegetable fat with oleic/linoleic acid ratio of 1.25. Argan oil can not be saponified ¹³. Generally oleic acid decreases LDL levels but increases HDL levels and due to this it is related with the cardiovascular risk factors. In addition to this, oleic acid have a hypotensive effect ¹⁴. Thanks to n-6 oil acids, it improves the lipid profile at cardiovascular diseases, diabetes and cancer. It can be used for avoiding oxidative damage ¹⁵.

Argan oil is named as high antioxidative capacity, due to its high tocoferol, polyphenol antioxidative molecule content. Argan oil is rich of CoQ10 and melatonin, but there is no evidence of CoQ9 content ¹⁶. Due to its phytochemical and unsaturated oil sit

content, it has a potential to be used for cardiovascular and cancer diseases ^{13,17}. Argan oil which is produced by roasted or unroasted cold press method can be used as food or cosmetic purposes. Argan oil has tocopherol, phenol and maillard products. It can balance the oxidative stability with its phospholipid content ¹⁸. The properties of heated extra virgin argan oil at 180°C for 24 hours is investigated and as a result argan oil is stable at high temperatures. In addition to this, after 24 hours, the polar compound levels stay low ¹⁹.

In a study related to cosmetics with the stability of argan oil, two samples are held at 40°C and 25°C for a year. The quality of the one which is held at 40°C has decreased drastically. As a result, for the Morocco standards argan oil can be kept for 1 year at 25°C and for the industrial standards it can kept as long as 6 months ²⁰.

Argan oil is classified related to its properties as virgin, extra virgin, food, cosmetic and enriched argan oil ².

Production methods of Argan Oil

Traditional Method

In traditional method, argan oil is produced by Moroccan women ². Argan oil produced by this method has weak chemical composition and its shelf life is short. With 58 hours of work, by using 100 kilograms of dried fruit, a person can produce 2-2.5 liters of argan oil ²¹. Firstly the shell and the pulp part of a matured fruit is removed. Then the seed is crushed. After that, it is put in a pot and dried with heat. Then it is cooled on the floor. The cooled particles are crushed with a specially made tools and the oil is extracted ².

Cold Press Method

With cold press method, a person can obtain 4-6 liters of argan oil within 13 hours by using 100 kilograms of dried argan fruit.

Solvent Extraction Method

By using lipophilic solvent which could be used for industrial or laboratory purposes, argan oil can be obtained from argan seeds. After evaporation with one or two extraction cycles, argan oil is produced with 50-55% efficiency. Argan oil produced by this method is insufficient in organoleptic properties

and generally it is used for cosmetic purposes with additions of some other different ingredients (2).

Comparison of Argan Oil with other oil types

In a study argan oil's properties are similar to walnut oil, sesame oil and flax seed oil. It has less similarity with olive oil, avocado oil and almond oil ²². Argan oil content is compared with olive oil in table 3 ¹⁵. With regards to oil acid content, argan oil is rich of palmitic oleic and linoleic acid and oleic acid is more effective inside these. In a comparison made, oleic acid content is 36.5-47.7% and is more than sunflower seed oil (15-85%) and soya oil (20-35%) and less than rapeseed oil (60.7%), canola oil (50-65%), peanut oil (58.3%) and olive oil (67.2%). With regards to saturated fat acid content, it is similar or higher to other vegetable oils ¹⁴.

The main vitamin in argan oil is γ -tocopherol and the main vitamin in olive oil and sunflower seed oil is α -tocopherol. Total tocopherol content of argan oil is more than olive oil's (Table 3) ². The squalene content of argan oil and olive oil is similar and more than sunflower seed oil. Total phenolic compound content of argan oil is less than olive oil ¹⁵. Sterol content of olive oil is more than argan oil (Table 3) ². In a study, CoQ10 content of virgin soya oil is more than virgin argan oil's ¹⁶. In another study, the trace element

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content of argan oil is compared with other oil types. Calcium and sodium content of argan oil is more than olive

oil and pumpkin oil, however, zinc content of argan oil is less than some other oil type ²³.

Table 2: Argan oil compositions for different kinds ²¹.

	Traditional	Edible	Cosmetic
Material	Roasted kernels	Roasted kernels	Unroasted kernels
Process	Hand malaxing	Press	Solvent/press
Preservation	7-14 days	Several months	Several months
Taste	Not reproducible	Hazel-nut like	Bitter
Color	Yellow to brown	Copper-like	Gold-like
Quality	Low	Very high	Very high
Moisture	Variable	Low	Some amount
Antioxidants	Variable	High	High

Table 3: Comparison of argan oil with olive oil and moringa oleifera oil ^{15,24}.

	Extra virgin argan oil (%)	Extra virgin olive oil (%)	Moringa oleifera oil (%)
Fatty acid			
C16:0	13.4	10.4	6.04
C18:0	5.1	2.76	4.14
C18:1	44.8	71	73.6
C18:2	35.7	12.9	0.73
C18:3	0.1	1.04	0.22
Sterol		mg/100 g oil	
Schottenol	142	0	-
Spinasterol	115	0	-
β -Sitosterol	0	156	50.07
Campesterol	0	12	15.13
Stigmasta-8,22-dien-3 β -ol	9	0	16.87
Others	29	151	-
Total	295	319	-
Tocopherol vitamer		mg/kg oil	
Alfa	35	190	98.82
Beta	122	42	27.9
Gamma	480	26	71.16
Total	637	358	-
Phenolic Compound		mg/kg oil	
Vanilic acid	67	359	-
Syringic acid	37	0	-
Ferulic acid	3147	51	-
Tyrosol	12	19.573	-
Others	-	773.000	-
Total	3.263	792.983	-

Argan Oil's effects on diseases

The interest of argan oil has increased in recent years. Due to this reason scientists start to investigate argan oil's effects on diseases.

Obesity

Obesity is a multifactorial disease. Some special diet compounds have antioxidative and antinflamatur properties and avoids complications of obesity²⁵. Argan oil is a cofactor on the modulation of obesity and provides efficiency with the fat acid distribution and the phytosterols, phenolic compounds and tocopherol contents²⁶. In an experiment made on rats, argan oil has a positive effect on obesities metabolic results⁸.

Cardiovascular Diseases

Cardiovascular diseases have top mortality on a worldwide scale²⁷. Diet has a positive effect on cardiovascular diseases, such as, dyslipidemia platelet hyperactivity²⁸. Oil content and quality of diet has an effect on cardiovascular diseases and type 2 diabetes¹³. Intake of monounsaturated and polyunsaturated fat acids is related with low cardiovascular risk and mortality²⁹. In a study, argan oil is included to diet of rats with highly energetic and highly cholesterol. As a result, the rats which intake argan oil has less triglyceride, total cholesterol and LDL levels than the rats which did not take argan oil.

This effect is due to the unsaturated fat content of argan oil³⁰. In another study, 40 adult person took argan oil and it shows positive effects on cardiovascular risk factors²⁶.

According to a study made with 86 patients (40-80 years old) which have type 2 diabetes and dyslipidemia. A group takes argan oil of 25 ml/day and the other group takes butter of 25 gr/day. After 3 weeks the lipid profile of argan oil has improved and has an antiatherogenic effect^{6,31}. It is supposed that the argan oil consumption of Moroccan healthy males will affect the serum lipids and decrease the cardiovascular disease risk. As a result, it is found that argan oil has an influence on decreasing triglyceride¹⁷. In another study, it is found that it can decrease the LDL levels³². Argan oil which is enriched with lycopene can provide a natural protection on hyperlipidemia and hypercholesterolemia³³. In a study made on hemodialysis patients, malonaldehyde level of serum is increased less in the group which consumes argan oil. As a result of this, hemodialysis patients, argan oil consumption decreases oxidative stress and maintains lipid profile³⁴.

Argan oil improves the plasma paraoxanase (PON1) activity and antioxidant posture on healthy males. As a result of this PON1 level increased

and argan oil can be included to diets in order to decrease cardiovascular disease risks³⁵. According to a cell study, argan oil has an effect on schottenol and spinasterol mitochondrial membrane potential. Also it has an effect on gene expression module of X receptor of liver gene (LXR). As a result, this two phytosterol can be count as new LXR agonist and it can provide a protection on stabilizing metabolism of cholesterol³⁶.

Diabetes

In 1980, there was 108 million diabetes patients worldwide. In 2014, this number reaches up to 422 million³⁷. According to the predictions of International Diabetes Federation (IDF), in 2040, the number of diabetes patients will be around 9 billion³⁸. Type 2 diabetes is one of the most situated diseases around the world. Disease is related with the loss of cellular antioxidant, hyperglycemia, hyperinsulinemia and insulin resistance³⁹. Healthy nutrition, regular physical activity and having normal body weight is protective against diabetes³⁷.

With tocopherol, phenolic compounds and unsaturated fat acid content of virgin argan oil, antidiabetic and antihypertensive affects are obtained^{7,40,41}. Different extracts produced from argan fruit are tested on hepatic originated HTC hepatoma cells for

cellular insulin respond. Consequently; argania spinose products have therapeutic affects for proliferative patients¹¹.

Hypertension

Hypertension is determined on the 26.4% of adult population in the year of 2000. In 2025, this percentage is predicted to be 60%⁴². According to a study, argan oil treatment is applied to hypertensive rats. As a result, not only inhibition on the increase of blood pressure is provided, but also endothelial function is improved⁴³. In another study, rats which fed with glucose, a decrease in blood pressure is observed with the argan oil which has high antioxidant capacity. In addition to this, there are positive results obtained related to hyperglycemia and insulin resistance. Therefore, argan oil can be used as a therapeutics for diabetes and hypertension⁴⁴. Saponins in argan oil are strong antioxidants. Rats which consume argan oils, show low blood pressure⁴⁵. In a cell study, antithrombotic effects of argan oil is originated from anticoagulant effects rather than antiplatelet effects⁵.

Cancer

Epidemiologic, pre-clinic and clinic studies shows that, phytochemical rich diets decrease the risk of cancer⁴⁶. Argan oil has protective properties against cancer with its Y-tocopherol,

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squalene and oleic acid content¹⁵. Argan oil has phytosterol content and phytosterols are related with cancer, cardiovascular diseases and inflammatory diseases⁴⁷. In another study, sterols and polyphenols in argan oil, exhibits antiproliferative effects on prostate cancer⁴⁸. In addition argan oils topical usage on second degree burns are investigated on 30 adult rats. As a result argan oil can heal second degree burns on rats⁴⁹.

Cosmetic usage

Argan oil is used as beauty oil in Morocco for many years. Also used as, juvenile type acne, pimple and dry skins⁵⁰. Argan oil has antioxidant, hydration and anti-aging properties, hence it is used for cosmetic purposes as a natural oil⁵¹ and consumption and/or topical application of argan oil on 60 postmenopausal women in investigated. The results proved that, argan oil has anti-aging properties⁵². In another study, argan oil consumption and topical application improves barrier function and increases water holding capacity, therefore hydration can occur⁵³.

There are some cases related to allergenic issues, due to usage of argan oil as a cosmetic product. In two of these cases, argan oil is used to heal the lesions on the skin these patients. However, the disease went worse. Also, smelling of argan oil causes rhinitis and

conjunctivitis in one patient and oral intake of argan oil causes epigastralgia and hypersalivation in one other patient^{54,55}.

Conclusion

Usage of argan oil has increased in recent years. Similarly the studies on argan oil has also increased. Unfortunately, these studies are not enough. The composition of argan oil are clear enough, but its relation with diseases are not well known yet. In the studies made, even though argan oil has positive effects on diabetes, cardiovascular diseases, hypertension, obesity and cancer, these are not enough for fulfilling the concluding results.

It can be used as orally or topically. This situation increases its usage area and its preferability. Generally is exhibits positive results but sometimes it can cause allergenic problems.

The studies made with argan oil are generally experimented on adults. There are very few investigations of argan oil related with babies, children, pregnant and nursing mothers, old people. Therefore, there is a need for more studies in this area.

Some important data such as, daily intake and suggested amount are still not measured. This situation could be related with the argan oil's consumption is limited for some people.

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