



## WATER MELON SEED OIL- A POTENTIAL SKIN HYDRATING AGENT

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**ABSTRACT:** Moisturizer plays a vital role in keeping skin nourished, soft and supple. Skin health depends on maintaining the balance between skin surface lipids and water content of stratum corneum. Various moisturizers are available under the category of natural, herbal and organic focusing on emolliency and hydrating properties. Natural products are preferred over synthetic ones by the consumers due to their minimum side effects.

Watermelon is one of the unexplored seed left after consuming the fruit. Watermelon seed oil consist of high concentration of unsaturated fatty acids such as linoleic, oleic and omega 3,6 and 9 fatty acids. The oil is effective for skin care as it is light, easily absorbed and penetrates deeply into the skin. It also consists of vitamins, protein and minerals.

Watermelon seeds were procured, authenticated and oil was extracted by Cold Press method. For analysis of compounds present in oil, Gas Chromatography technique was used. The analysis showed a high content of unsaturated fatty acids having 22.7% oleic acid and 57.66% linoleic acid which proved to have excellent moisturizing property.

**Key words:** - Moisturizer, Gas Chromatography, Fatty Acid, hydration, linoleic acid

### INTRODUCTION :

Skin covers the entire body and protects it from various types of external stimuli and damage as well as from moisture loss<sup>1</sup>. The horny layer of the skin must have a water content of 10%-20% to maintain its normal functions and to sustain a healthy condition. The main factor determining the water content of the horny layer is the natural moisturizing factor (NMF), especially amino acids, the production of which is closely related to the keratinization process<sup>2</sup>. NMF is a mixed complex of water soluble low molecular weight complex which gets produced within corneocytes<sup>3</sup>. Proper moisturization of outermost layer of skin is very important for smoothening of skin.

Exposure of skin to detergents, soaps, alcohol, hot water can remove the lipids present in the skin surface. Moisturizing agent aids in maintenance of skin hydration resulting in

supple skin<sup>4</sup>. Fatty acids from plant and animal origin are widely employed in the skin care formulations. Oils with high content of linoleic acid and palmitic acid helps in moisturization of skin<sup>5</sup>.

Medicinal plants are used for treating various diseases due to their pharmacological effects. Herbal drugs are preferred by the consumers due to their minimum side effect, no scarcity and easy availability. There is a need for research and documentation of work carried out on medicinal activity of herbal drugs. It is necessary to make efforts for standardization of plant materials which can be used as medicines<sup>6</sup>. Green products are described as the products which protect and benefit the environment during their manufacture, use or disposal by conservation of resources and reduction of waste, pollution and release of toxic elements.

Fruit processing industry generate heavy percentage of waste daily. The waste material from fruits such as seeds consists of substantially higher amount of bioactive compounds which can be further studied for their mechanism of action on skin. Watermelon is one of the unexplored seed left after consuming the fruit.

Watermelon is a vine-like flowering plant, is a member of the family of cucumber (*Cucurbitacea*). It is a drought tolerant crop which is cultivated chiefly in tropical, semi tropical and rigid regions of the world. Different varieties of watermelon are available and some of the varieties are: sugar baby, golden midget, star light, jubilee, yellow baby etc. They not only vary on their size but also in their shape and colour of the flesh (red, orange and yellow)<sup>7</sup>.

Watermelon seed oil (*Citrullus lanatus*) consist of high amount of unsaturated fatty acids such as linoleic acid, oleic acid, palmitic acid and Omega 3,6 and 9 fatty acids.

Watermelon seed oil enhance the skin hydration and deliver nutrients and active ingredients by penetrating through deeper layers of skin. Besides fatty acids, watermelon seed oil contains sterols, diglycerides, monoglycerides, phospholipids, Vitamin A, E, B, minerals, magnesium, potassium, iron and phosphorus<sup>8</sup>. The seeds possess a high lipase activity comparable to that of wheat germ, in addition to high lipoxygenase, urease and trypsin-inhibitor activities. Aqueous extract of the seeds also exhibits amylase inhibitor activity. The seed oil is used as a substitute for almond oil<sup>9</sup>.

#### **MATERIAL AND METHODS:**

The watermelon seeds were procured from local market. (Krishi Krant Kendra, Nagpur)

#### **Authentication of watermelon seeds:**

The seeds were authenticated from Department of Botany, RTM Nagpur University, Nagpur.

#### **Extraction:**

Extraction of watermelon seeds was carried out by Cold Press Method. It is one of the methods of mechanical extraction of oil wherein pressure is applied to the sample to extract oil from a range of matrices. High quality oils can be produced with low temperatures using cold press method<sup>10</sup>. This method ensures 100% purity level of oil obtained and also retains all the essential properties of the material. In this technique the oil is separated from the material by centrifugation<sup>11</sup>.

Yield obtained after extraction of watermelon seed oil was 2.5%.

#### **Analysis of Active:**

The analysis of fatty acid composition in watermelon seed oil was carried out by Gas Chromatography method (Graph no.1). Gas chromatography technique is widely used to separate the active chemical constituents from the material. The component of a material is dissolved in a solvent and vaporized in order to separate the analytes by distributing the sample between two phases, a stationary and mobile phase<sup>12</sup>. Seed oil contain high amount of unsaturated fatty acid with linoleic and oleic as the major acid as mentioned in Table no.1

Following graph shows the percentage of fatty acids present in watermelon seed oil.

#### **Standardization of Watermelon seed oil**

Oils and fats are triglycerides of higher chain fatty acids. To explore the quality of oil, following tests were carried out<sup>13</sup>.

#### **Determination of Saponification Value:**

Saponification value is the number of milligrams of potassium hydroxide neutralizing the fatty acids present in one gram of oil or fat resulting from the complete hydrolysis<sup>14</sup>.

Procedure: 2gm of the sample was weighed into 200ml flask of borosilicate glass fitted with reflux condenser. 25ml of 0.5M ethanolic KOH was added and boiled under reflux on water bath for 30min. 1ml of phenolphthalein solution was added and titrated immediately with 0.5M

HCL. The operation was repeated without sample<sup>15</sup>. Sap value was calculated using following formula.

$$\text{Saponification value} = 28.05(b-a)/w$$

Where w= weight in gm of substance

a= volume in ml of standard hydrochloric acid required for the sample

b= volume in ml of standard hydrochloric acid required for the blank

Sap value was calculated to be 195.01.

#### **Determination of Acid Value:**

Important parameter in the qualitative analysis of fats and oils is Acid value<sup>16</sup>. The acid value is defined as the number of milligrams of Potassium hydroxide required to neutralize the free fatty acids present in one gram of fat. It is a relative measure of rancidity as free fatty acids are normally formed during decomposition of triglycerides<sup>17</sup>.

Procedure: 10 gm of the sample was dissolved in 50ml of a mixture of equal volume of ethanol (95%) and ether previously neutralised with 0.1M KOH to phenolphthalein solution. 1ml of phenolphthalein solution was added and titrated with 0.1M KOH until the solution remains faintly pink after shaking for 30sec. Acid value was calculated using following formula.

$$\text{Acid Value} = 56.1N v/w$$

Where v= number of ml of 0.1 M KOH required

N= normality of KOH

w= weight of sample<sup>18</sup>

Acid value was found to be 2.86

#### **Determination of Refractive Index:**

The refractive index of a medium is the ratio of the speed of light at a definite wavelength in vacuum to its speed in the medium. The refractive index of a given substance varies with the wavelength of the light and with the temperature. Refractive index of watermelon seed oil was calculated using Abbe's Refractometer<sup>19</sup> which was found to be 1.4643.

#### **RESULT AND DISCUSSION:**

The aim of research work was to investigate the chemical composition of water melon seeds. The seeds were procured from Krishi Krant Kendra, Nagpur. The seeds were authenticated from Department of Botany, RTM Nagpur University. Watermelon seed oil was extracted using Cold Press Technique. Yield of watermelon seed oil after extraction was calculated to be 2.5%. Experimental analysis of watermelon seed oil was carried out. Fatty acid composition in the oil was detected by Gas Chromatography technique. Linoleic acid 57.66%, Oleic acid 22.7%, Palmitic acid 11.85%, Stearic acid 4.5% was detected in the oil sample. For the detection of quality of oil, standardization procedure was carried out. Saponification value of oil was found to be 195.01 and Acid value was calculated to be 2.86. Refractive index of oil was found to be 1.4643. It is reported that watermelon seed oil can be used as a substitute for almond oil which acts as a good moisturizing agent as it consists of various unsaturated fatty acids, Omega 3,6 and 9 fatty acids, high lipase activity comparable to that of wheat germ, in addition to high lipoxygenase, urease and trypsin-inhibitor activities. The analysis of watermelon seed oil showed a high content of unsaturated fatty acids having 22.7% oleic acid and 57.66% linoleic acid which can act as excellent moisturizing agent.

#### **CONCLUSION:**

Watermelon seed oil contains high amount of linoleic acid, oleic acid and Omega 3,6 and 9 fatty acids, which on topical application can give great moisturizing effect on skin. It can help protect skin, enhance and retain its moisture levels which will lead to improved softness and elasticity.

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**Table no.1 Composition of fatty acid in watermelon seed oil**

Fatty Acid	Percentage (%)
Palmitic acid	11.85
Stearic acid	4.5
Oleic acid	22.7
Linoleic acid	57.66

**Graph 1: Percentage of fatty acids present in watermelon seed oil**

