



## A REVIEW ON SESAME - AN ETHNO MEDICINALLY SIGNIFICANT OIL CROP

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### ABSTRACT

Herbal medicines are popular in the treatment of many diseases. They are safe and easily available. India produces different oil seeds like groundnut, mustard, rapeseed and sesame seed and substantial quantity of edible oils is consumed here. Sesame is widely known oil crop of Pedaliaceae family with bell shaped purple or white coloured flowers. The fruits of the plant are oblong capsules containing numerous small and oval seeds which show colours like white, red, brown or black. Sesame seeds were thought to have first originated in India and are also mentioned in early Hindu legends. Sesame seeds, oil and other parts of plant have numerous uses from preparations of hair oils to treatments of various ailments in human as well as in cattle. An ethno-botanical review of sesame provides information about therapeutic use of sesame seeds and even other parts of plant for different ailments.

**Keywords:** Sesame, ethno-botany, Pedaliaceae, food, medicines, oil

### INTRODUCTION

Plants are the treasure houses of potential drugs. About 80% of individuals from developed countries use traditional medicines based on compounds derived from plants. According to World Health Organisation medicinal plants would be the best source to obtain variety of drugs. Nowadays there has been an increasing awareness about medicinal plants.<sup>1</sup> In India there are many indigenous medicinal systems such as Siddha, Ayurvedha and Unani. Medicinal plants are the richest sources of folk medicines, traditional systems of medicine, food supplements, neutraceuticals, pharmaceuticals and chemical entities for synthetic drugs.<sup>2</sup> Plants have been utilised worldwide as medicines for thousands of years. They are sources of many potent and powerful drugs. More than 35,000 plant species are used for medicinal purposes. Thorough chemical and pharmaceutical screening of folk medicine and traditional system is responsible for evolution of modern medicine. Herbal medicines have become more popular in the treatment of many diseases as green medicine is safe, easily available and has lesser side effects.<sup>3</sup> Nearly 80%

of world's population relies on traditional medicines for primary health care, most of which involve use of plant extracts.<sup>4</sup> According to Ram (1990) sesame (*Sesamum indicum* L.) is very old cultivated crop and supposed to be originated in Africa.<sup>5</sup> Morris (2002) supported this by noting that African slaves brought sesame seeds (benne seeds) to America and then sesame became a popular ingredient in Southern recipes. He further added that the Chinese burnt sesame oil for light and made soot for their ink blocks. The English term sesame traces back to the Arabic simsim, Coptic semsem and early Egyptian semsent.<sup>6</sup> Oplinger (1990) have indicated it as a highly prized oil crop of Babylon and Assyria about 4000 years ago.<sup>7</sup> Sesame seeds have been grown in tropical regions throughout the world since prehistoric times. It has been cultivated for centuries in Asia and Africa due to its high content of edible oil and protein. It is commonly called as til (Hindi), huma (Chinese), sesame (French), goma (Japanese), gergelim (Portuguese) and ajonjoli (Spanish). India is one of the major producers of many oilseeds and the Indians

consume substantial quantity of edible oil primarily for cooking. *Sesamum indicum* L. is one of the world's important oil crops. The whole seeds, seed oil and meal are its primary marketable products.<sup>8</sup>

## TAXONOMY

Sesame, a plant of Pedaliaceae family is an annual, tropical, herbaceous and self-pollinating plant. It has an erect, pubescent, 0.60 to 1.20 metre tall stem with branches. The leaves are ovate or lanceolate or oblong and are hairy on both the sides. The lower leaves are trilobed and sometimes ternate while the upper leaves are undivided, irregularly serrate and pointed. The older cultivars have smooth and flat leaves and the non-shattering cultivars have cupped leaves with leaf like outgrowths on their lower side. Some cultivars have many branches and others are relatively unbranched. The flowers are tubular, pendulant, bell shaped and two lipped. Their colour varies from pale purple to rose to white and they are 1.9 – 2.5 centimetre long with or without branches. The flowers are borne on short and glandular pedicels. One flower is produced at each leaf axil and the lower flowers usually bloom 2 to 3 months after planting with continuous blooming until the uppermost flowers are open. The fruit is an oblong, mucronate, pubescent capsule of 3 centimetre length containing numerous small, oval and yellow or white, red, brown or black seeds. Each plant may bear 15 – 20 fruits containing 70 – 100 seeds. It matures in 80 – 180 days. The stems are cut and hung upside down to collect the ripe seeds on mats. Seed colour can vary but usually it is beige or creamy white when husked.<sup>8</sup>

Sesame is grown for the rich oil content of the seeds. Pods are harvested mechanically. Seeds have variety of colours from creamy-white to charcoal black. Its total annual worldwide production is almost four billion pounds.<sup>6</sup> Arinathan and his co-worker (2007) mentioned that the paler varieties of sesame seeds are more valued in West and Middle East while black varieties are praised in the Far East. Sesame is found in tropical, subtropical and southern temperate areas of the world mainly in India, China, South America and Africa. Due to its utmost economic importance it is primarily grown by small farmers in developing countries. The plant shows the best growth in tropical climates, sandy, well drained soil with hot climate and moderate rainfall. Its propagation is through seeds in spring and takes about four months for the full ripening of seeds. Ethno-botanical review of sesame provides information about therapeutic use of sesame seeds

and even other parts of the plant for different ailments.<sup>9</sup>

## HISTORY

Anilkumar (2010) reported in the review on sesame that according to Assyrian legend, the Gods drank wine made from sesame seeds when they met to create the world. These seeds were supposed to be first originated in India as their mention is found in early Hindu legends where they represent a symbol of immortality. From India then sesame seeds were introduced throughout the Middle East, Africa and Asia. Sesame was one of the first crops processed for oil and one of the earliest condiments. During the late 17<sup>th</sup> century sesame seeds were brought to the United States from Africa. Today India is the largest commercial producers of sesame seeds along with China and Mexico.<sup>8</sup> He further added that sesame seeds add a nutty taste and a delicate and invisible crunch to many Asian dishes. Tahini (sesame seed paste) is made from sesame seeds. Sesame seeds may be the oldest condiment known to man dating back to as early as 1600 BC. They are highly valued for their oil which is exceptionally resistant to rancidity. The well-known phrase from the Arabian Nights "Open Sesame" is based on the peculiar feature of the sesame pods which burst open on maturity. Besides cooking, sesame oil has certain industrial applications like hair oil preparations, hydrogenated oil and certain medicines.<sup>8</sup>

## ETHNO – MEDICINAL REVIEW

### A Staple Food

Sesame is consumed as a staple food locally in Nigeria especially in south-west and middle belt areas and it is richly cultivated by local farmers. This may account for the high fecundity of the people especially among the adult male population. In Tiv and Idoma areas of Nigeria's Benue state, two breeds of sesame seeds are usually cultivated the *Sesame radiatum* and *Sesame indicum* mainly for their seeds and leaves.<sup>10</sup> According to Srivastava and co-workers (2010) edible sesame seeds are ground and mixed with vegetables is taken as food.<sup>11</sup> In Togo, the young leaves are eaten as vegetable.<sup>12</sup>

### Ethnomedicinal Value

Sesame is a reputed folk medicine in Africa and Asia where all parts of the plant are used.<sup>10</sup> In 2006 Parle already had reported about use of oil in

cooking, as a tonic, nutrient, aphrodisiac, diuretic and in the treatment of dry cough, asthma, lung diseases, inflammation, ulcers, urinary diseases, migraine and vertigo.<sup>13</sup> In the same year (2006) Jadeja found the use of seed extracts to treat haemorrhoids and Tayade mentioned use of crushed seeds for the treatment of abdominal pain.<sup>15,16</sup> Gupta (2009) described the compounds present in the sesame such as sesamin, sesamolin, vitamin A, B, C, fixed oils, phenolic compounds and their pharmacological activities like analgesic, tonic and anticolic.<sup>17</sup>

Ogunsola and his co-worker (2014) mentioned presence of phenols and lignan glycosides in sesame seeds and the antihypertensive effect of sesamin (a lignan from sesame oil). Seeds of both plants *S. alatum* Thonn. and *S. radiatum* Schum. & Thonn. are edible and *S. indicum* is used as food flavour.<sup>12</sup>

### **Treatment for Respiratory Diseases**

In the paper published in 2008 Patil noted about folk medicines against respiratory disorders in Jalgaon district of Maharashtra. The mixture of sesame seeds with *Trachyspermum ammi* Linn. is used to treat dry cough, asthma, lung diseases and common cold.<sup>18</sup> Ogunsola O. K and Fasola T. R in 2014 reported use of the young leaves are used as medicine for respiratory diseases and the soothing effect of seed oil for chest complaints.<sup>12</sup>

### **Treatment for Prostatic Diseases**

Noumi and Bouopda (2014) reviewed phytotherapy at Yaounde suggesting sesame for the prevention and treatment of prostatic ailments. For the treatment of prostatitis a spoonful of oil is given to twice a day for 2 – 3 months.<sup>19</sup>

### **A Wound Healer**

Sesame seed oil has been used as healing oil for thousands of years and used by humans from the beginning of civilization.<sup>10</sup> According to Ahmad (2008) sesame fruits can be effectively used for healing wounds when fried in mustard oil.<sup>20</sup> In the survey of mid-west Ethiopia, Teferi (2009) noted use of sesame oil by healers along with ground leaves of *Acmella caulirhiza* Del. (Asteraceae) (Gutecha) to put on the affected areas.<sup>21</sup> Report on use of leaf, root and fruit paste on wounds by Bodo tribe in Assam was published by Saikia (2010).<sup>22</sup>

### **Treatment for Gynaecological Problems**

The use of sesame in gynaecological problems by rural population of Haryana was described by

Yadav (2006). Sesame seeds (Jangli Til) are half ground, mixed with ghee and sugar and taken with hot milk to abort. In menstruation half ground seeds are mixed with gud (jaggery) and ghee and are taken with milk to relieve amenorrhea.<sup>23</sup> Kanwar (2011) suggested that decoction of bay leaves, dates, small cardamom (*Ellataria cardamomum* (L.) Maton), sesame seeds and desi ghee in milk is given for initiation of labor pain.<sup>24</sup>

### **For Pre-Natal and Lactating Women**

Kanwar (2011) further added about pre-natal food decoction of dates (*Phoenix dactylifera* L.), sesame seeds and fenugreek seeds (*Trigonella foenum-graecum* L.) reduced to half glass and desi ghee followed by a glass of milk is added.<sup>24</sup> Few years before this, Sayed (2007) mentioned use of sesame in gynaecology in the form of roasted and pounded seeds which are taken twice a day by nursing mothers.<sup>25</sup> In other areas of Andes, Froemming (2006) studied use of ajonjili (sesame seeds; *Sesamum indicum* L.), brezo (heath; *Erica vulgaris* L.) and a broth of beef lung to help a lactating woman.<sup>26</sup>

### **Treatment for Urinary Troubles**

A study in Pakistan by Hayat (2008) and co-workers says that few grams of sesame seeds when roasted for five minutes in ghee and administered to the children of age five to six night wetting can be cured.<sup>27</sup> Punjani (2010) reported a folk medicine for urinary complaints in tribes of northeast Gujarat. The seeds of sesame are acrid with a sharp bitter sweet taste and have a cooling and diuretic effect, hence useful in urinary concretions, strangury and burning sensation while micturition.<sup>28</sup> Mixture of equal quantities of sesame seeds and jaggery is useful once in a day for a week to treat burning sensation and to cure night wetting in children. Seed oil is given twice a day in case of urinary troubles as mentioned by Shukla (2010).<sup>29</sup>

### **Aids for Digestive Problems**

Sesame oil is effective against many forms of intestinal disorders especially diarrhea and dysentery. Warm water leaves infusion is used to gargle and treat inflamed membranes of the mouth.<sup>10</sup> Ogunsola O.K and Fasola T.R seconded the use of oil as a purgative in 2014.<sup>12</sup>

### **A Relief for Earaches and Eye Pains**

Kala (2005) suggested further use of sesame oil for the treatment of ear ache and secretions from ears. It is heated with lahsun (*Allium sativum* Linn.) and

4 drops of this are poured in the ears before going to bed.<sup>30</sup> In the next year (2006) Shittu, L. A. J. et al. reported use of decoction of the leaves for the treatment of catarrh and eye pains in the South-Western Nigeria.<sup>10</sup>

### ***A Boon for Skin and Hairs***

In the year 2003 and 2004 Mitaliya and Sakarkar respectively described the effect of oil on regular application on scalp and massaged well to prevent hair fall and for long life of hairs.<sup>31,32</sup> In addition to this Kapoor (2005) mentioned the use of oil as one of the major sources of hair oils and even seed extract is useful for skin protection and rejuvenation.<sup>33</sup> In the South-Western Nigeria decoction of the leaves is used for the treatment of bruised or erupted skins.<sup>9</sup> Mehta (2007), Ghosh (2008) and Ahmad (2008) reported use of seeds of sesame with white sarisha when crushed in 1:1 ratio and made a paste which is then externally applied on scalp for alopecia and on face for acne whereas decoction of fruits of sesame (*Sesamum indicum* L.), retha (*Sapindus orientalis* L.) and amla (*Phyllanthus emblica* L.) is used for washing hairs to make them silky and beautiful while leaves of sesame are crushed and rubbed on wet hairs and body skin to produce bathing quality lather respectively.<sup>34, 35, 20</sup> Use of black sesame by Taiwanese and Chinese immigrants in Atlanta, Georgia, USA was reported by Jiang and Quave (2013) to improve skin complexion and as a tonic for the blood.<sup>36</sup>

### ***An Antidote***

Raut (2006) asserted use of sesame oil as a local antidote for Bhallatak toxicity.<sup>37</sup>

### ***An Aid for Deficiency***

In the study of Tamil Nadu, Newmaster (2011) mentioned that leaves of *Halophila ovalis* (R.Br.) Hook.f. and *Halophila gaudichaudii* J. Kuo are toasted with three drops of sesame oil and consumed for three days to treat iron deficiency.<sup>38</sup>

### ***An Anti – Viral***

In 2006, Shittu, L. A. J. and his co-workers mentioned antiviral and antifungal activities found in sesame. The decoction of both leaves and roots found to be effective against chicken pox and measles (anti-viral) and used as hair shampoo for *Taenia capitis* (antifungal).<sup>10</sup>

### ***Significance in Etho-Veterinary***

Pande (2007) described use of sesame in treatments of skin diseases, constipation, eczema, scabies, mastitis, paralysis, sprain, muscular pull, sunstroke, dysentery, tympany, flatulence also for retention of milk and as a tonic for the strength.<sup>39</sup> The paste of *Musa paradisiaca* L. fruits, *Papaver somnifera* L. seeds and sesame oil is given orally for a week to cure bronchitis and in the treatment of bloating problems whole plant of sesame is mixed with *Tamarindus indica* L. fruit juice and given orally three times a day whereas to treat foot and mouth disease, infusion of dry fish with sesame oil is used. This study on the sesame further described that sesame oil is useful for curing tympany and yoke gall and paste of whole plant of sesame and *Borassus flabellifer* L. and sugar is orally given to the cattle once in a day.<sup>40</sup> Jadeja (2006 a) suggested use of dry and powdered seeds mixed with ghee to treat the same.<sup>14</sup> Oral use of powdered gingelly (*Sesamum indicum* L.) with palm jaggery for treating retention of placenta in cattle as ergometric alkaloid present in the mix helps in the contraction of uterus was explained by Karthickeyan and Gajendran (2005).<sup>41</sup>

## **CONCLUSION**

Hence people have been exploring plants since ancient times for the new drugs. Knowledge about chemical constituents of plants is desirable and valuable for the synthesis of complex chemical substances. In indigenous medicinal systems plants have been used in different forms. Plant products can be derived from different parts of the plant like bark, leaves, flowers, seeds etc. This has led to the use of large number of medicinal plants which provide curative properties to treat various diseases.<sup>3</sup> In traditional medicinal systems a single plant or combinations of many plants are used to prepare different formulations. The efficacy of the compound or the formulation depends upon the use of proper plant part and its biological potency.<sup>2</sup> Hence different medicinal plants must be investigated for the better knowledge of their properties, safety and efficiency. Drugs of the plant origin are easily available, less expensive, safe and efficient and rarely have side effects.<sup>1</sup> This article gives ethno medicinal review on sesame and points the need for further investigation on the phytochemical profile of the same. This kind of the study can increase the use of sesame in health care and in its other applications.

## SESAME PLANT



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