Pharmaceutical and medicinal applications of Olibanum gum and its constituents: A review

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Received on: 27-11-2009; Revised on: 16-12-2009; Accepted on: 15-02-2010

ABSTRACT

Various species of boswellia plant contains mainly olibanum gum resin, resin acid, and volatile oils. The ether extracted gum resin as it is obtained from natural origin considered as non toxic, biocompatible, cheaper, and reported to have a large pharmaceutical applications. The other constituents of this plant possess numerous medicinal applications. The ether extracted resin fraction is reported as one of the best microencapsulating and release retardant material in the design of controlled release formulations. In addition, this gum and its constituents also have anti-inflammatory, anti-asthmatic properties and also used in the treatment of rheumatism, gastrointestinal problems and in the relive of depressions. This aromatic resin specially used in incense as well as in perfumes. This gum-resin has been widely used for thousands of years in many parts of the world for burning as incense in religious ceremonies. In this present review, an attempt was made to discuss the versatile applications of olibanum gum-resin, special attention was given on its pharmaceutical and medicinal uses.

Keywords: Olibanum gum resin, Frankincense, Pharmaceutical and medicinal applications.

INTRODUCTION

Frankincense, also called Olibanum, is an aromatic resin obtained from trees of the genus Boswellia. Boswellia is a genus of trees known for their fragrant resin. Frankincense is an extract from the resin of the tree. There are four main following species of Boswellia which produce true frankincense and resin is available in various grades. The grades depend on the time of harvesting. And it is in hand sorted for quality.

1. Boswellia Serrata, Roxburgh, a leafy forest tree of the coromandel coasts and other parts of India.
2. Boswellia Papyrifera, Richard, yields a transparent resin, probably destitute of gum, though thought to contain a volatile oil. It grows in western Abyssinia.
3. Boswellia Frereana, the Yegaar of the Somalis, yields a fragrant resin of a lemon odour, it contains no gum, and is employed in the east as a masticatory.
4. Boswellia Sacra, is used in incense, perfumes and the resin has many pharmacological uses particularly as anti-inflammatory agent.

Historical background

Frankincense, or Olibanum, is obtained from the genus Boswellia, family Burseraceae tree. Its extracted resin, salai guggal, is produced predominantly by four species, including Boswellia serrata in India, Boswellia carteni in East Africa and China, Boswellia frereana in Somalia and Boswellia sacra in Arabia. Olibanum has been traded on the Arabian peninsula and in North Africa for more than 5000 years. This Olibanum was found in the tomb of Ancient Egyptian king Tutankhanen, who died in 1323 B.C., about 3332 years ago. Olibanum was introduced to Europe by Frankish Crusaders, and it is better known as “Frankincense” to westerners. The term Olibanum is derived from the Arabic al-lub-n, means “that which results from milk-ing”. Some have also postulated that the name comes from the Arabic term for “oils of Lebanon” since Lebanon was the place where the resin was sold and traded with Europeans. The word olibanum may be from the Arabic word for the resin “Laben” or “Luban” which is a word that also means cream. The trees are found in East Africa(Somali country), South Arabia, and India. (For an account if the several species consult pharmacographic, 2nd., p.p.133 and 139).

Chemical composition

Structure of β-boswellic acid, one of the main active components of frankincense. These are some of the chemical compounds present in frankincense:

- Acid resin (56 per cent), soluble in alcohol and having the formula C_{20}H_{32}O_4
- Gum (similar to Gum Arabic) 30–36%
- 3-Acetyl-beta-boswellic acid (Boswellia sacra)
- Alpha-boswellic acid (Boswellia sacra)
- 4-O-methyl-glucuronic acid (Boswellia sacra)
- Incensole acetate
- Phellandrene

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Quality

Frankincense comes in many grades, and its quality is based on colour, purity, aroma, and age. Silver and Hojari are generally considered the highest grades of frankincense. The Omani themselves generally consider Silver to be a better grade than Hojari, though most Western connoisseurs think that it should be the other way round. This may be due to climatic conditions with the Hojari smelling best in the relatively cold, damp climate of the Europe and North America, whereas Silver may well be more suited to the hot dry conditions of Arabia.

Local market information in Oman suggests that the term Hojari encompasses a broad range of high-end frankincense including Silver. Resin value is determined not only by fragrance but also by color and clump size, with lighter color and larger clumps being more highly prized. The most valuable Hojari frankincense locally available in Oman is even more expensive than Somalia’s Maydi frankincense derived from B. frereana.

Preparation of resin and carbohydrate fractions of Olibanum:

Powdered Olibanum (10 gm) was extracted repeatedly with 4×50 ml quantities of solvent ether. The ether extracts were collected in a porcelain dish and concentrated to dryness at 40 °c to obtain the resin fraction. The dry mass was powdered and the size was reduced to 200 mesh. The carbohydrate fraction remained after ether extraction of resin was collected, dried at 60 ºc for 4 hrs and the size was reduced to 200 mesh.

VARIABLES APPLICATIONS OF OLIBANUM

Medicinal uses

The chemical structure of frankincense is similar to that of other pantacyclic triterpines, which closely resembles that of anti-inflammatory steroids. It has been shown to exhibit immuno-stimulant activity. And in the ayurvedic Indian tradition, inflammatory polyarthritids and other forms of rheumatism have been successfully treated with mixtures containing Boswellia resins or extracts6,7.

Boswellia Serrata Roxb, also called Indian olibanum, is a moderate to large branching tree native of India, North Africa and the middle East. A gum resin, is widely used in Ayurvedic medicine for the treatment of Inflammatory diseases, including those affecting the gastro intestinal tract. The anti-inflammatory activity of gum resin has been confirmed by experimental and clinical studies6,7.

A purified extract of the resin is actually used in modern herbal preparations to treat a number of inflammatory conditions including inflammatory bowel disease. Clinical studies have shown that, the gum-resin is effective in patients with ulcerative colitis8,9. As a result of the clinically established symptomatic improvement of inflammatory bowel disease symptoms including the reduction of the diarrhoea, other authors also studied and reported its effect on intestinal motility in rodents and inhibition of diarrhoea without constipation10. In India, this resin is widely used in the treatment of asthma11. Boswellia extracts showed some promise in Crohn’s disease12, knee osteoarthritis13 and collagenous colitis14.

Pharmaceutical uses

Olibanum is a gum-resin obtained from Boswellia Serrata, consists15 of chiefly an acid resin (56-60%), gum (30-36%), and volatile oil (3-8%). The resin contains16 mainly a resin acid (Boswellic acid) and a resene in equal proportions. Ether soluble resin can be extracted from olibanum gum. And this resin exhibited excellent release retarding properties in matrix tablets for controlled release due to its hydrophobic water repellant properties. Preliminary studies indicated that the resin has good film forming properties when dried from chloroform solution. Because of its film forming properties this resin extracted from the olibanum was evaluated as a coat in microencapsulation. The resin forms an excellent coat material in the resin coated microcapsules and exhibited good controlled release characteristics. Hence, the resin can be utilized as a matrix forming substance in the formulation of matrix tablets and film forming coating polymer for designing the microcapsules which can facilitate to attain once a day oral controlled release products17.

Frankincense: A traditional medicine

Frankincense is edible and often used in various traditional medicines in Asia for digestion and healthy skin. Edible frankincense must be pure for internal consumption, meaning it should be translucent, with no black or brown impurities. It is often light yellow with a (very) slight greenish tint. It is often chewed like gum, but it is stickier because it is a resin. In Ayurvedic medicine Indian frankincense (Boswellia serrata) has been used for hundreds of years for treating arthritis. Burning frankincense repels mosquitoes and thus helps protect people and animals from mosquito-born illnesses, such as malaria, West Nile Virus and Dengue Fever.

Miscellaneous uses

Frankincense is used in perfumery and aromatherapy. Olibanum essential oil is obtained by steam distillation of the dry resin. Some of the smell of the olibanum smoke is due to the products of pyrolysis.

The Egyptians ground the charred resin into a powder called kohl. Kohl was used to make the distinctive black eyeliner seen on so many figures in Egyptian art. The aroma of frankincense is said to represent life and the Judaic, Christian and Islamic faiths have often used frankincense mixed with oils to anoint newborn infants and individuals considered to be moving into a new phase in their spiritual lives.

Frankincense essential oil

The essential oil of frankincense is produced by steam distillation of the tree resin. The oil’s chemical components are 75% monoterpenes, sesquiterpenes, monoterpenoless, sesquiterpenoless and ketones. It has a good balsamic and sweet fragrance, while the Indian frankincense has a very fresh smell.

Perfume

Olibanum is characterized by a balsamic-spicy, slightly lemon
and typical fragrance of incense, with a slightly conifer-like undertone. It is used in the perfume as well as cosmetics and pharmaceuticals industries.

Dose

The pharmacokinetics and optimal dose of B. serrata extracts are largely unknown; usually 600-3000 mg gum resin per day or equivalents are recommended for oral intake18.

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Source of support: Nil, Conflict of interest: None Declared