

Chapter 16

Therapeutic Importance and Application of Boswellic Acid From the Plant *Boswellia serrata*

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ABSTRACT

*Traditionally, the gum resin produced from the *Boswellia serrata* plant has been used in as a therapeutical compound. The gum that contains a chemical known as boswellic acid, AKBA (3-O-acetyl-11 keto- β -boswellic acid), and widely in ayurvedic medicines. This is used to treat the disease like reduction in various inflammatory conditions of the skin, eye, as well as respiratory disorders such as asthma, bronchitis, and laryngitis. The boswellic acids were also found capable to inhibit both hemolysis and chemotaxis of leukocytes and were shown to work by inhibiting C3-convertase, a key enzyme of the classical complementary pathway. In addition to this, the compound shows beneficial effects in various pharmacological properties like immunomodulation activity, polyarthritis, activity against Hepatitis C-virus and other harmful microbes, Colitis and Crohn's disease, and so on. The boswellic acid is also used to treat patients with memory disorders. In this chapter, the chemical nature and isolation of boswellic acid and its therapeutic importance have been highlighted.*

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INTRODUCTION

The ecosystems of the earth are rich in biodiversity consisting of both plants and animals groups that make other form of life dependent on each other. From the ancient age, the human has relied on natural products especially from the plants to maintain good health by fighting with sickness, pain, and disease. The current allopathic medicines are having many side effects, therefore due to greater awareness in many cases, the allopathic medicines are replaced by the herbal traditional drugs. In the current scenario, there is a search in worldwide to obtain a novel therapeutically important plant product is considered as eco-friendly, non-toxic and economically viable to be used against various harmful diseases (Hoareau & DaSilva, 1999; Cordell, 2000). A plant usually produces two types of metabolites such as primary metabolites, the substances can be used subsequently in metabolic pathways and directly entered to the growth and metabolism process of the organism e.g. carbohydrates, proteins, and lipids. On the other hand the secondary metabolites do not enter to the normal growth and metabolism, however widely used for the defence mechanism in case of plants against the predators, parasites, and diseases (Said *et al.*, 2002; Arora *et al.*, 2005).

Boswellia Serrata Roxb (Burseraceae)

B. serrata is native to both Pakistan and India. The tree having the average height of 9-15 m and a diameter of 40-60 cm. The flowers greyish in nature. Flowering occurs during February to April and the ripening of the fruit occurs in the month of May to June. The flower colour is whitish in nature and each fruit bears three seeds. The product of the plant is boswellic acid, chemically consists of aromatic, multi-ringed organic compounds that contribute to anti-rheumatic properties has been studied. Also, the boswellic acids inhibit the enzyme 5-lipoxygenase, which is a key enzyme for the production and formation of leukotrienes in the body. Therefore this compounds is having anti-inflammatory responses hence used against the critical illnesses such as arthritis and asthma. The extract of the plant gum resin consists of three types of compounds, viz. terpenoids, essential oils, and gum. However, the active constituents in *Boswellia* are terpenoid and boswellic acids that corresponds to 37.5–65% of the total extract. Since from the ancient times, the natural resin product of plant are collected and used to produce the gum resin, popularly known as olibanum. The gum resin is usually harvested by making a cut on the trunk of the plant (Singh & Atal, 1986; Al-Harrasi *et al.*, 2014; Ahmed *et al.*, 2014).

This chapter deals with the experimental methods for characterization of boswellic acid and its potential therapeutic nature and application including, anticancer and

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