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Mini Review

The Structural Diversity of Flavonoid Present in Chilean Propolis Determines their Biological Activity

Jorge Veloz*, Felipe Cabezas, Carolina Fernández and Mónica Lespinasse

Department of Biological and Chemical Sciences, Faculty of Medicine and Science, Universidad San Sebastian, Los Leones Campus, Chile

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***Corresponding author:** Jorge Veloz, Department of Biological and Chemical Sciences, Faculty of Medicine and Science, Universidad San Sebastian, Los Leones Campus, Lota 2465, Providencia, Santiago, Chile

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Abstract

Biological properties of Chilean propolis have been described and include antimicrobial, antioxidant, anti-angiogenic and immunomodulatory properties. Chemical composition in propolis samples and its content of total polyphenols and total flavonoids can change with the season or zone of collection. In Chilean propolis were quantified total polyphenols, total flavonoids and other compounds such as tannins and anthocyanins. The differences in biological properties of propolis samples reported regarding could be explained by the changes in the chemical composition and individual polyphenolic groups. News studies to evaluate the composition of propolis are a valuable source of information for the study of its biological properties.

Keywords: Flavonoids; Chilean propolis; Polyphenols; Biological activity

Introduction

Plants can synthesize different secondary metabolites molecules are implicated in many in physiological processes of vegetables. The phenolic groups of compounds have been mentioned in many publications, approximately 4000 plant phenols were identified. Various types of flavonoids such as flavonols, flavones, flavanones, flavanonols, isoflavones, anthocyanidins and tannins were quantified in Chilean propolis. Phenolic substances are characterized by the presence of more than one aromatic ring (phenol unit) or building block per molecule [1].

Propolis is collected by honeybees (Apis mellifera) from different parts of the plants and by mandibular secretions and use it to embalm dead insects and to prevent the proliferation of microorganisms in the colony. Several biological activities have been reported for propolis such as antibacterial, antifungal and/or antiviral, immunomodulatory properties, immunoregulatory effect, cytotoxicity, hepatoprotection and free-radical scavenging activity [2,3].

Discussion

Chemical composition in propolis samples and its content of total polyphenols and total flavonoids can change with the season or zone of collection. The diversity in phenolics compounds identified in the samples has been related in numerous research studies. Poplar-type propolis has a specific chemical composition where flavonoids and phenolic acid esters are the predominating groups of compounds. The main flavonoids described were flavones, flavonols (quercetin derivates), flavanones (pinocembrin derivates) and isodihydriflavones as daidzein [4,5]. In Chilean propolis were quantified tannins and anthocyanins, but their content was low in comparison with total polyphenols [2]. Moreover, other bee products as honey and royal jelly are highly rich in bioactive compounds such as essential and nonessential compounds and vitamins with pharmacological properties. These molecules can be included in nutraceuticals and functional food and will allow health benefits [6].

Individual flavonoids such as apigenin, galangin, pinocembrin, quercetin and Caffeic acid phenethyl ester (CAPE) and another compound were identified in Chilean propolis [7]. Caffeic Acid and Caffeic Acid Phenethyl Ester (CAPE) have been studied in some investigations to evaluate their biological characteristics. Caffeic acid phenethyl ester (CAPE) has been found to play an important role in cancer cells apoptosis and cellular cycle [8,9]. Quercetin-3-glucuronide and isorhamnetin were related with pro-inflammatory activity and the transduction process of nuclear factor NF-kB [10]. Besides other flavonoids such as pinocembrin and apigenin can act on breast cancer cells, antioxidant and anti-angiogenic properties [11,12].

Conclusion

The differences in biological properties of propolis samples reported regarding could be explained by the changes in the chemical composition and individual polyphenolic groups. News studies to evaluate the composition of propolis are a valuable source of information for the study of its biological properties.

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