



Preliminary studies on different extracts of some honey bee products

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Abstract: The aim of present study was to compare the phytochemical composition of different extracts of bee pollen, propolis and honey and to analyse the best solvent for maximum phytochemicals extraction. These preliminary studies are significant in locating the pharmacological bioactive compounds in different extracts of bee products. The tests showed greater number of constituents present in bee pollen and propolis as compared to honey. The concentration of these bioactive constituents was greater in ethanolic extract of propolis and water extract of bee pollen and honey. Ethanolic extract of propolis showed higher concentration of tannins and glycosides. Bee pollen had more concentration of saponins, flavonoids and proteins in water extract. Reducing sugars and carbohydrates were present in larger amount in water extract of honey. These studies will be useful to select the best solvent for honey, pollen and propolis for various research purposes.

Keywords: Honey, Phytochemical, Pollen, Propolis

INTRODUCTION

Phytochemicals are non-nutritive plant chemicals that have health-promoting properties. They are natural bioactive compounds that can protect man from several diseases and help in risk reduction for a variety of chronic conditions (Russo, 2007). In recent years, phytochemicals, previously with unknown pharmacological activities, have been extensively investigated as a source of medicinal agents (Krishnaraju *et al.*, 2005). Since time immemorial, man has used various parts of plants in the treatment and prevention of various ailments (Tanaka *et al.*, 2002).

Bee pollen is collected by worker honey bees from flowering plants and stored in their hives. The bees only select and collect those pollens which are rich in nutrition (Szczesna, 2006). Pollen helps to regulate and stimulate metabolism in humans by providing certain missing factors that other foods lack and neutralizes the catabolic effects of various toxins and synthetic drugs thereby producing healthier cells, improved health and a longer life-span (Sramkova *et al.*, 2013).

Propolis is referred to as bee glue because it is used for construction and to seal the cracks in the bee hive. It is the sap or resin collected from plants by honey bees and combined with their own enzymes.

Propolis has some medicinal properties and is known for its antimicrobial, antitumor and antioxidant activities. It is also used in cosmetics. A honey bee collects nectar from plants and mixes it with the enzymes to convert it into honey. Honey's ability to heal wounds and treat infections is well established. It is also known for its antioxidant, antibiotic and antiviral capabilities (Ferreira *et al.*, 2009). The present study was designed to understand the difference in the constituents present in ethanolic and water extracts of bee pollen, propolis and honey in relation to their medicinal capabilities.

MATERIALS AND METHODS

Collection of bee pollen, propolis and honey: These bee products of *Apis mellifera* were collected from Langstroth hive placed in the field of *Brassica campestris*. Bee pollen was collected by installing a pollen trap at the entrance of hive. Propolis was collected by scrapping it from the frames with the help of hive tool. Honey was collected by tilting the hive comb which was filled with honey.

Preparation of extract of different bee products: Water and ethanol were used as solvent for the preparation of extracts. Extract of bee pollen was prepared by following the method of Nagai *et al.* (2004) with slight modification. 3g of fresh bee pollen was suspended and extracted by shaking with 10 volumes of solvent at 20°C for 1 day and the extract was centrifuged at 5000 rpm for 1 h. The

supernatant was collected, filled up to 30 ml with solvent. Extracts of propolis was prepared by following the method of Kumar *et al.* (2008). The sample (10 g) was cut into small pieces, ground and subsequent solvent extraction was done using ethanol and water. The volume was made to 40ml and it was kept for 5 days with occasional shaking. It was filtered through a Whatman No. 41 filter paper and then dried. Extracts of honey was prepared by the method of Mohapatra *et al.* (2011) with suitable modification. 10g raw honey was taken in test tube and 25 ml of solvent (ethanol and water) was added. Later, the solutions were mixed with constant shaking and centrifuged at 3000 rpm for 10 min at 25°C. The supernatants were collected and transferred to stopper test tubes for phytochemical analysis.

Phytochemical evaluation: Extracts of different bee products were subjected to qualitative chemical analyses to detect the presence of various phytoconstituents (Misra *et al.*, 2011, Vijayalakshmi *et al.*, 2012).

RESULTS AND DISCUSSION

Plants are the primary source of supply of many important drugs. Since there are so many of these naturally occurring substances of plant origin, it is obvious that the plant kingdom offers a better opportunity of providing useful medicinal compounds for the treatment of various diseases. The phytochemical research based on ethno-pharmacological information is generally considered an effective approach in the discovery of new anti-infective agents from higher plants (Duraipandiya *et al.*, 2006).

Therefore, illuminating the phytochemical nature of bioactive components of bee products makes space for synthetic modifications for better pharmacokinetic profiles. Isolation of medicinally important compounds from bee products is depends on the solvent that is used for the extraction. Each solvent used in the extraction procedure had varied concentration of different phytochemical constituents. The recovery of chemical components was best in case of ethanol (Kalia *et al.* 2013) Ethanolic extract of propolis showed greater amount of tannins and glycosides whose presence favours the antibacterial and antioxidative properties of Propolis (Banskota *et al.*, 2001). Water extract of bee pollen had maximum amount of saponins, flavonoids (Kaur *et al.*, 2013). Tannins, saponins, alkaloid, phlobatannins, flavonoid and anthraquinone were absent in honey extract. The phytochemicals detected have previously been shown to exhibit biological activity, such as antibacterial, antitumour and antihelminthic activity (Harborne, 1973). Of the three products *viz.* pollen, propolis and honey tested during the investigating, it was observed that ethanolic extract of propolis and water extract of bee pollen and honey were best on the basis of the recovery of chemical constituents (Table 1).

Conclusion

The study revealed that the maximum constituents were extracted from bee pollen and honey with water as a solvent, from propolis with ethanol. These studies can be valuable for research and drug development in the field of pharmacy.

Table 1. Results of phytochemical analysis of water and ethanolic extract of bee products.

S.No	Tests	Propolis		Pollen		Honey	
		Water	Ethanol	Water	Ethanol	Water	Ethanol
1	Tannins	+	+++	++	++	-	-
2	Saponins	+	+	++	+	+	-
3	Carbohydrates	+	+	+	++	+++	++
4	Alkaloids	+	++	++	+	-	-
5	Resins	+	+++	++	+++	+	+
6	Phlobatannins	+	+	+	-	-	-
7	Flavonoids	+	++	+++	++	-	-
8	Carbonyl	+	+	+	++	+++	++
9	Anthraquinones	+	+	++	-	-	-
10	Coumarins	+	+++	+++	++	+	+
11	Reducing Sugars	+	+	+	++	+++	++
12	Quinones	+	+++	+++	++	++	++
13	Glycosides	+	+++	++	++	+	+
14	Terpenoids	+	+++	+++	+	++	++
15	Proteins	+	++	+++	+++	+	+
16	Steroids	-	+	+++	+++	+++	+++

+ = slightly present, ++ = Moderate, +++ = Abundant, - = Absent

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