

NUTRITIONAL PROPERTIES AND BIOLOGICAL EFFECTS OF BEE POLLEN

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Pollen from bees has been advocated as a nutritional supplement, and it is the most common route for people to pollen products. It is touted as the "sole ideal complete food" and "a miracle food in the world" because of its high nutritional content, which comprises phenol, protein, fatty acids, vitamins and trace elements (Krell 1996). Bee pollen is the most nutritious product consumed and valued by people due to their good nutritional composition (Cornara *et al* 2017). In 17th century, the term 'pollen' was coined from the Latin word for powder form (flour), this plant matter has been known for centuries as "food" (Bogdanov 2017). Honeybee produces the bee pollen that are pollen pellets. It is made up of pollen and honey in the shape of a cone, which is placed on a four-legged pollen cage and brought home to the nest as a source of nutrients.

Recently collected and dried pollen constitutes 20-30% and 6-8% of water respectively and around 200 chemical compounds. Therapeutic properties of bee pollen include like anti-antimicrobial, antiviral, anti-inflammatory, antifungal, immune-stimulating, analgesic and also help in burn wound healing by facilitating the granulation process (Komosinska-Vashev *et al* 2015). Bee pollen is ranked on sixth place among the top ten superfoods evaluated in the food trends 2017.

Chemical Composition	Health benefits
➤ Proteins (amino acids such as methionine, lysine, threonine, histidine, leucine, isoleucine, valine, phenylalanine, and tryptophan, proline and significant amounts of nucleic acids, especially ribonucleic one)	Such amino acids are easily converted into a source of energy and are directly metabolized in the muscles that improve exercise endurance, provides energy energy, BCAA promotes muscle development, repair and reduces post-workout muscle soreness.

➤ Glycine (Gly), Gamma-aminobutyric acid (GABA) and aspartic acid (Asp)	Reduces mental stress and improves bed - ridden states and waking up, implying that consuming it may improve your sleep quality and reduces stress
➤ Polysaccharides	Polysaccharides have anti-diabetic effects, reduced blood pressure and total cholesterol and total triglycerides
➤ Dietary fiber (Soluble & Insoluble)	High dietary fiber is beneficial for weight loss and cholesterol lowering effect
➤ Minerals: <ul style="list-style-type: none"> • Calcium • Potassium • Magnesium • Sodium • Phosphorus • Zine • Iron 	For the proper composition of tissues, bon teeth, muscles and nerves. Important fi maintaining muscle contractions, and nervoi system function and supporting a health cardiovascular system.
➤ Vitamins (Vitamin A, Vitamin B complex, Vitamin C, Vitamin D, Vitamin E, and Vitamin K.)	As an antioxidant- in turns improves immune system. Plays role in mechanics of the brain and the nervous system Responsible for the proper formation of blood and attributes to the process of cell metabolism.

➤ Phenolic content (rutin, kaempferol, quercetin, myricetin and <i>p</i> -coumaric acid)	Anti-hyperlipidemic effects, Anti-oxidant anti- hypertensive, elevate the exercise tolerance and has anti-fatigue activity.
➤ Lipids (archaic, linoleic, and γ -linoleic acids, phospholipids, and phytosterols)	The hypoglycemic activity of pollen is mainly ascribed to the presence of unsaturated fatty acids, phospholipids, and phytosterols. Furthermore, a decreased ability of platelet aggregation and increased fibrinolytic system activity was confirmed in people who take pollen. It indicates the antiatherosclerotic effect which protects from heart diseases and brain strokes.

Allergy tests-

- Skin prick (scratch) test
- Intradermal skin test
- Patch test
- Blood (IgE) test
- Challenge tests

Allergy Symptoms-

- Headaches.
- Itchy, watery eyes.
- Nasal congestion, sneezing or runny nose.
- Shortness of breath, wheezing or chronic cough.
- Sore throat.