Heilwirkung von Blütenpollen

Literaturrecherche wissenschaftlicher Arbeiten

Arbeitsgemeinschaft Bienenforschung
Universität für Bodenkultur Wien
Dipl.-Ing. Dr. nat. techn. Stefan Mandl

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Bee Pollen Improves Muscle Protein and Energy Metabolism in Malnourished Old Rats through Interfering with the Mtor Signaling Pathway and Mitochondrial Activity

Author information

Abstract

Although the management of malnutrition is a priority in older people, this population shows a resistance to refeeding. Fresh bee pollen contains nutritional substances of interest for malnourished people. The aim was to evaluate the effect of fresh bee pollen supplementation on refeeding efficiency in old malnourished rats. Male 22-month-old Wistar rats were undernourished by reducing food intake for 12 weeks. The animals were then refurnished for three weeks with the same diet supplemented with 0%, 5% or 10% of fresh monofloral bee pollen. Due to changes in both lean mass and fat mass, body weight decreased during malnutrition and increased after refeeding with no between-group differences (p < 0.0001). Rats refed with the fresh bee pollen-enriched diets showed a significant increase in muscle mass compared to restricted rats (p < 0.05). The malnutrition period reduced the muscle protein synthesis rate and mTOR/p70S6kinase/4eBP1 activation, and only the 10%-pollen diet was able to restore these parameters. Mitochondrial activity was depressed with food restriction and was only improved by refeeding with the fresh bee pollen-containing diets. In
conclusion, refeeding diets that contain fresh monofloral bee pollen improve muscle mass and metabolism in old, undernourished rats.

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**Bee Pollen: Chemical Composition and Therapeutic Application**

Antifungale, antimikrobielle, antivirale, entzündungshemmende, hepatoprotektive, anticancerogene und schmerzlindernde Wirkung von Bienenpollen. Positive Eigenschaften auch bei Wundheilung.

Katarzyna Komosinska-Vassev, 1, *Pawel Olczyk, 2 Justyna Kaźmierczak, 1 Lukasz Mencner, 1 and Krystyna Olczyk 1

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**Abstract**

Bee pollen is a valuable apitherapeutic product greatly appreciated by the natural medicine because of its potential medical and nutritional applications. It demonstrates a series of actions such as antifungal, antimicrobial, antiviral, anti-inflammatory, hepatoprotective, anticancer immunostimulating, and local analgesic. Its radical scavenging potential has also been reported. Beneficial properties of bee pollen and the validity for their therapeutic use in various pathological condition have been discussed in this study and with the currently known mechanisms, by which bee pollen modulates burn wound healing process.

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Published online 2015 May 4. doi: 10.3892/mco.2015.559
PMCID: PMC4486804

**Bee pollen and honey for the alleviation of hot flushes and other menopausal symptoms in breast cancer patients**
Honig und Bienenpollen verbessert die menopausalen Symptome von Brustkrebspatienten bei antihormoneller Behandlung.

KARSTEN MÜNSTEDT,1 BENJAMIN VOSS,2 UWE KULLMER,3 URSULA SCHNEIDER,2 and JUTTA HÜBNER4

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Abstract

Hot flushes, night sweats, pain during sexual intercourse, hair loss, forgetfulness, depression and sleeping disturbances are common problems among breast cancer patients undergoing antihormonal treatment. The aim of this study was to investigate whether bee pollen can alleviate menopausal symptoms in patients receiving tamoxifen and aromatase inhibitors/inactivators. We compared a pollen-honey mixture with pure honey (placebo) in a prospective, randomized crossover trial in breast cancer patients receiving antihormonal treatment. The menopausal complaints were assessed using the Menopause Rating Scale (MRS). A total of 46 patients were recruited; 68.3% (28/41) of the patients reported an improvement in their symptoms while taking honey, compared with 70.9% (22/31) who reported an improvement with pollen (the difference was non-significant). The results were confirmed by significant improvements in the postmenopausal complaints in the two groups in a pre-post analysis in the MRS and its 3 subscales. This study provided evidence that honey and bee pollen may improve the menopausal symptoms of breast cancer patients on antihormonal treatment. Of note, honey, which was intended to be used as a placebo, produced similar effects as pollen and they both exceeded the extent of a placebo effect in this setting (~25%).

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Flavonoids and Age Related Disease: Risk, benefits and critical windows

Positive Wirkung von Flavonoiden
Abstract

Plant derived products are consumed by a large percentage of the population to prevent, delay and ameliorate disease burden; however, relatively little is known about the efficacy, safety and underlying mechanisms of these traditional health products, especially when taken in concert with pharmaceutical agents. The flavonoids are a group of plant metabolites that are common in the diet and appear to provide some health benefits. While flavonoids are primarily derived from soy, many are found in fruits, nuts and more exotic sources, e.g., kudzu. Perhaps the strongest evidence for the benefits of flavonoids in diseases of aging relates to their effect on components of the metabolic syndrome. Flavonoids from soy, grape seed, kudzu and other sources all lower arterial pressure in hypertensive animal models and in a limited number of tests in humans. They also decrease the plasma concentration of lipids and buffer plasma glucose. The underlying mechanisms appear to include antioxidant actions, central nervous system effects, gut transport alterations, fatty acid sequestration and processing, PPAR activation and increases in insulin sensitivity. In animal models of disease, dietary flavonoids also demonstrate a protective effect against cognitive decline, cancer and metabolic disease. However, research also indicates that the flavonoids can be detrimental in some settings and, therefore, are not universally safe. Thus, as the population ages, it is important to determine the impact of these agents on prevention/attenuation of disease, including optimal exposure (intake, timing/duration) and potential contraindications.

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PMCID: PMC2906419

Anti-inflammatory effect of bee pollen ethanol extract from Cistus sp. of Spanish on carrageenan-induced rat hind paw edema

Ethanolextrakt von Bienenpollen zeigt potenzielle entzündungshemmende Wirkung
Bee pollen, a honeybee product, is the feed for honeybees prepared themselves by pollens collecting from plants and has been consumed as a perfect food in Europe, because it is nutritionally well balanced. In this study, we aimed to investigate the anti-inflammatory effect of bee pollen from *Cistus* sp. of Spanish origin by a method of carrageenan-induced paw edema in rats, and to investigate the mechanism of anti-inflammatory action and also to elucidate components involved in bee pollen extracted with ethanol.

**Methods**

The bee pollen bulk, its water extract and its ethanol extract were administered orally to rats. One hour later, paw edema was produced by injecting of 1% solution of carrageenan, and paw volume was measured before and after carrageenan injection up to 5 h. The ethanol extract and water extract were measured COX-1 and COX-2 inhibitory activities using COX inhibitor screening assay kit, and were compared for the inhibition of NO production in LPS-stimulated RAW 264.7 cells. The constituents of bee pollen were purified from the ethanol extract subjected to silica gel or LH-20 column chromatography. Each column chromatography fractions were further purified by repeated ODS or silica gel column chromatography.

**Results**

The bee pollen bulk mildly suppressed the carrageenan-induced paw edema and the water extract showed almost no inhibitory activity, but the ethanol extract showed relatively strong inhibition of paw edema. The ethanol extract inhibited the NO production and COX-2 but not COX-1 activity, but the water extract did not affect the NO production or COX activities. Flavonoids were isolated and purified from the ethanol extract of bee pollen, and identified at least five flavonoids and their glycosides.

**Conclusions**

It is suggested that the ethanol extract of bee pollen show a potent anti-inflammatory activity and its effect acts *via* the inhibition of NO production, besides the inhibitory activity of COX-2. Some flavonoids included in bee pollen may partly participate in some of the anti-inflammatory action. The bee pollen would be beneficial not only as a dietary supplement but also as a functional food.
Integrated Analysis of COX-2 and iNOS Derived Inflammatory Mediators in LPS-Stimulated RAW Macrophages Pre-Exposed to *Echium plantagineum* L. Bee Pollen Extract

Entzündungshemmende Wirkung von *Echium plantagineum* L. Pollen

Eduarda Moita,1 Angel Gil-Izquierdo,2,* Carla Sousa,1 Federico Ferreres,2 Luis R. Silva,1 Patrícia Valentão,1 Raúl Domínguez-Perles,2 Nieves Baenas,2 and Paula B. Andrade1,*

Sayuri Miyamoto, Editor

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Abstract

Oxidative stress and inflammation play important roles in disease development. This study intended to evaluate the anti-inflammatory and antioxidant potential of *Echium plantagineum* L. bee pollen to support its claimed health beneficial effects. The hydromethanol extract efficiently scavenged nitric oxide (\(\cdot\)NO) although against superoxide (\(O_2^{-}\)) it behaved as antioxidant at lower concentrations and as pro-oxidant at higher concentrations. The anti-inflammatory potential was evaluated in LPS-stimulated macrophages. The levels of \(^\cdot\)NO and L-citrulline decreased for all extract concentrations tested, while the levels of prostaglandins, their metabolites and isoprostanes, evaluated by UPLC-MS, decreased with low extract concentrations. So, *E. plantagineum* bee pollen extract can exert anti-inflammatory activity by reducing \(^\cdot\)NO and prostaglandins. The extract is able to scavenge the reactive species \(^\cdot\)NO and \(O_2^{-}\) and reduce markers of oxidative stress in cells at low concentrations.
Chemical analysis of Greek pollen -
Antioxidant, antimicrobial and proteasome
activation properties

Griechischer Pollen ist reich an Flavonoiden und phenolischen Stoffen. Positive Wirkung auf Fibroblasten und sowie antimikrobielle Eigenschaften wurden beobachtet.

Konstantia Graikou, Suzanne Kapeta, Nektarios Aligiannis, George Sotiroudis, Niki Chondrogianni, Efstatios Gonos, and Ioanna Chinou

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Abstract

Background

Pollen is a bee-product known for its medical properties from ancient times. In our days is increasingly used as health food supplement and especially as a tonic primarily with appeal to the elderly to ameliorate the effects of ageing. In order to evaluate the chemical composition and the biological activity of Greek pollen which has never been studied before, one sample with identified botanical origin from sixteen different common plant taxa of Greece has been evaluated.

Results

Three different extracts of the studied sample of Greek pollen, have been tested, in whether could induce proteasome activities in human fibroblasts. The water extract was found to induce a highly proteasome activity, showing interesting antioxidant properties. Due to this activity the aqueous extract was further subjected to chemical analysis and seven flavonoids have been isolated and identified by modern spectral means. From the methanolic extract, sugars, lipid acids, phenolic acids and their esters have been also identified, which mainly participate to the biosynthetic pathway of pollen phenolics. The total phenolics were estimated with the Folin-Ciocalteau reagent and the total antioxidant activity was determined by the DPPH method while the extracts and the isolated compounds were also tested for their antimicrobial activity by the dilution technique.

Conclusions

The Greek pollen is rich in flavonoids and phenolic acids which indicate the observed free radical scavenging activity, the effects of pollen on human fibroblasts and the interesting antimicrobial profile.
Assessment of anti-mutagenic, anti-histopathologic and antioxidant capacities of Egyptian bee pollen and propolis extracts

Amany A. Tohamy, Ehab M. Abdella, Rasha R. Ahmed, and Yara K. Ahmed

Abstract

Bee pollen and propolis are popular, traditional health foods. The objective of the current study was to investigate the anti-mutagenic, anti-histopathologic and antioxidant effects among water extracts of Egyptian bee pollen (WEBP) and brown powder of water-soluble derivative propolis (WSDP) on cisplatin (CDDP) induced hepatic, renal, testicular and genotoxicity in male albino mice (Mus musculus), in addition to their effects on the oxidant/antioxidant status in the tested organs. Hepatic, renal and testicular dysfunctions were evaluated histologically; while genotoxicity and cytotoxicity were evaluated by the bone marrow chromosomal aberration assay and mitotic index, respectively. Moreover, oxidative stress was explored via determination of lipid peroxidation, catalase activity and the concentration of the reduced form of glutathione. The treatment of mice with WEBP and WSDP at doses 140 and 8.4 mg/kg b. wt./day, respectively for 14 days simultaneously with CDDP (2.8 mg/kg b. wt.) resulted in significant protection. The positive control animals taken CDDP alone showed toxic histological and genetical manifestations (at $P < 0.05$) accompanied with an elevated content of peroxidized lipid and lowered catalase activity and glutathione concentration in the homogenate of liver, kidney and testis tissues (at $P < 0.001$). These toxic side effects in all tested organs were greatly ablated with a significant reduction in lipid peroxidation level and elevation in catalase activity and glutathione concentration ($P < 0.001$) when using both WEBP and WSDP. On the basis of the present assays, Bee pollen appears more potent in exerting an ameliorative effect and this effect was more pronounced in testis.
Effects of an Herbal Medication Containing Bee Products on Menopausal Symptoms and Cardiovascular Risk Markers: Results of a Pilot Open-uncontrolled Trial

Objectives

Fifty-five postmenopausal women with menopausal complaints were treated with the food supplement *Melbrosia* for 3 months. Menopausal symptom evaluation scales and psychological questionnaires were administered, and cardiovascular disease markers in blood were analyzed at the beginning and the end of the trial.

Setting

The perimenopausal care unit of Second Obstetrics and Gynecology Hospital, Sofia, Bulgaria
Design

The study was an open, multicenter, uncontrolled, prospective observation study. The subjective symptoms questionnaires administered before *Melbrosia* treatment and after 3 months of treatment were Kupperman Score, Zerssen Symptom List, Zung Depression Score, and Frankfurt Self-concept Scale (self-assessment test, problem-solving test, self-esteem test, and irritability test). The blood levels of high-density lipoproteins (HDL), low-density lipoproteins (LDL), triglycerides (TG), total cholesterol (TC), vascular cell adhesion molecule-1 (VCAM-1), and C-reactive protein (CRP) levels were measured in a subgroup of patients.

Results

Treatment of postmenopausal women with *Melbrosia* led to a statistically significant reduction in the Kupperman score, Zerssen's Symptoms List, and Zung Depression Score. The Frankfurt Self-concept Scale revealed significant improvement in problem-solving, no change in self-assessment and self-esteem, and worsening of irritability. Treatment with *Melbrosia* significantly reduced TC and LDL and significantly elevated HDL and TG. There were nonsignificant changes of serum VCAM-1 and CRP levels in patients treated with *Melbrosia*.

Conclusions

The presented data suggest that *Melbrosia* may offer a potential alternative to hormone therapy for the treatment of menopausal symptoms. However, because of this study's uncontrolled, open-label methodology, no cause-and-effect inferences can be drawn until a larger, longer-term, blinded, placebo-controlled, randomized clinical trial is performed.

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PMCID: PMC3819792

Hepatoprotective Potential of Chestnut Bee Pollen on Carbon Tetrachloride-Induced Hepatic Damages in Rats

Kastanienpollen ist eine sichere Alternative bei der Behandlung von Leberschäden.

Oktay Yıldız, 1 Zehra Can, 2 Özlem Saral, 2, 3 Esin Yuluğ, 4 Ferhat Öztürk, 6 Rezzan Aliyazıcıoğlu, 6 Sinan Canpolat, 7 and Sevgi Kolaylı 2, *

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Abstract

Bee pollen has been used as an apitherapy agent for several centuries to treat burns, wounds, gastrointestinal disorders, and various other diseases. The aim of our study was to investigate the hepatoprotective effects of chestnut bee pollen against carbon tetrachloride (CCl₄)-induced liver damage. Total phenolic content, flavonoid, ferric reducing/antioxidant power, and DPPH radical activity measurements were used as antioxidant capacity determinants of the pollen. The study was conducted in rats as seven groups. Two different concentrations of chestnut bee pollens (200 and 400 mg/kg/day) were given orally and one group was administered with silibinin (50 mg/kg/day, i.p.) for seven days to the rats following the CCl₄ treatment. The protective effect of the bee pollen was monitored by aspartate transaminase (AST) and alanine transaminase (AST) activities, histopathological imaging, and antioxidant parameters from the blood and liver samples of the rats. The results were compared with the silibinin-treated and untreated groups. We detected that CCl₄ treatment induced liver damage and both the bee pollen and silibinin-treated groups reversed the damage; however, silibinin caused significant weight loss and mortality due, severe diarrhea in the rats. The chestnut pollen had showed 28.87 mg GAE/g DW of total phenolic substance, 8.07 mg QUE/g DW of total flavonoid, 92.71 mg Cyn-3-glu/kg DW of total anthocyanins, and 9 mg β-carotene/100 g DW of total carotenoid and substantial amount of antioxidant power according to FRAP and DPPH activity. The results demonstrated that the chestnut bee pollen protects the hepatocytes from the oxidative stress and promotes the healing of the liver damage induced by CCl₄ toxicity. Our findings suggest that chestnut bee pollen can be used as a safe alternative to the silibinin in the treatment of liver injuries.
Abstract

Enzymatic hydrolysates of honeybee-collected pollen were prepared using food-grade proteinase and aminopeptidases entirely of plant origin. Bromelain from pineapple stem was applied (8 mAU/g substrate) in the first hydrolysis stage. Aminopeptidase (0.05 U/g substrate) and proline iminopeptidase (0.03 U/g substrate) from cabbage leaves (Brassica oleracea var. capitata), and aminopeptidase (0.2 U/g substrate) from chick-pea cotyledons (Cicer arietinum L.) were involved in the additional hydrolysis of the peptide mixtures. The degree of hydrolysis (DH), total phenolic contents, and protein contents of these hydrolysates were as follows: DH (about 20–28%), total phenolics (15.3–27.2 μg/mg sample powder), and proteins (162.7–242.8 μg/mg sample powder), respectively. The hydrolysates possessed high antiradical scavenging activity determined with DPPH (42–46% inhibition). The prepared hydrolysates of bee-collected flower pollen may be regarded as effective natural and functional dietary food supplements due to their remarkable content of polyphenol substances and significant radical-scavenging capacity with special regard to their nutritional-physiological implications.

BMC Complement Altern Med. 2009; 9: 4.
Published online 2009 Feb 26. doi: 10.1186/1472-6882-9-4
PMCID: PMC2664783

Comparison of bee products based on assays of antioxidant capacities

Pollen zeigt starke antioxidante Wirkung.

Yoshimi Nakajima, #1 Kazuhiro Tsuruma, #1 Masamitsu Shimazawa, #1 Satoshi Mishima, #2 and Hideaki Hara #1

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Abstract

Background

Bee products (including propolis, royal jelly, and bee pollen) are popular, traditional health foods. We compared antioxidant effects among water and ethanol extracts of Brazilian green propolis (WEP or EEP), its main constituents, water-soluble royal jelly (RJ), and an ethanol extract of bee pollen.
Methods

The hydrogen peroxide (H$_2$O$_2$)-, superoxide anion (O$_2^-$)-, and hydroxyl radical (HO$^-$)-scavenging capacities of bee products were measured using antioxidant capacity assays that employed the reactive oxygen species (ROS)-sensitive probe 5-(and-6)-chloromethyl-2',7'-dichlorodihydrofluorescein diacetate, acetyl ester (CM-H$_2$DCFDA) or aminophenyl fluorescein (APF).

Results

The rank order of antioxidant potencies was as follows: WEP > EEP > pollen, but neither RJ nor 10-hydroxy-2-decenoic acid (10-HDA) had any effects. Concerning the main constituents of WEP, the rank order of antioxidant effects was: caffeic acid > artepillin C > drupanin, but neither baccharin nor coumaric acid had any effects. The scavenging effects of caffeic acid were as powerful as those of trolox, but stronger than those of N-acetyl cysteine (NAC) or vitamin C.

Conclusion

On the basis of the present assays, propolis is the most powerful antioxidant of all the bee product examined, and its effect may be partly due to the various caffeic acids it contains. Pollen, too, exhibited strong antioxidant effects.

ABOUT BEE POLLEN

By Steve Schecter, N.D.

Zusammenfassung von Steve Schecter

Bee pollen is the male seed of a flower blossom which has been gathered by the bees and to which special elements from the bees has been added. The honeybee collects pollen and mixes it with its own digestive enzymes. One pollen granule contains from one hundred thousand to five million pollen spores each capable of reproducing its entire species.

Bee pollen is often referred to as nature's most complete food. Human consumption of bee pollen is praised in the Bible, other religious books, and ancient Chinese and Egyptian texts. It has long been prescribed by traditional health practitioners - including the fathers of Western medicine Hippocrates, Pliny the Elder, and Pythagoras - for its healing properties.

More than 40 research studies document the therapeutic efficacy and safety of bee pollen. Clinical tests show that orally ingested bee pollen particles are rapidly and easily absorbed--they pass directly from the stomach into the blood stream. Within two hours after ingestion, bee pollen is found in the blood, in cerebral spinal fluids, and in the urine.

Bee pollen rejuvenates your body, stimulates organs and glands, enhances vitality, and brings about a longer life span. Bee pollen's ability to consistently and noticeably increase energy levels makes it a favorite substance among many world class athletes and those interested in sustaining and enhancing quality performance.
Bee pollen contains most of the known nutrients, including all of those necessary for human survival. When compared to any other food, it contains a higher percentage of all necessary nutrients. Bee pollen is approximately 25% complete protein containing at least 18 amino acids. In addition, bee pollen provides more than a dozen vitamins, 28 minerals, 11 enzymes or co-enzymes, 14 beneficial fatty acids, 11 carbohydrates, and is rich in minerals, the full spectrum of vitamins, and hormones. It is low in calories.

Several nutrients in bee pollen, such as proteins, beneficial fats, vitamins B, C, D, E, and beta-carotene, calcium, magnesium, selenium, nucleic acids, lecithin, and cysteine, are scientifically well documented for their ability to strengthen immunity, counteract the effects of radiation and chemical toxins (which are the two most severe stressors to your immune system), and generate optimal health and vitality.

Bee pollen provides anti-oxidants that scavenge free radicals caused by exposure to radiation, chemical pollutants, and other intense physical or emotional stressors. Radiation and chemical pollutants are known as the two most severe stressors to your immune system. According to the Centers for Disease Control and the Environmental Protection Agency, the two premier health monitoring organizations in the world, this year you will be exposed to over 200 different forms of radioactive toxins and over 60,000 different chemical toxins.

Toxins by definition stress your immune system, harm other parts of your body, and cause a wide range of common health problems. All forms of radiation, and most chemical pollutants, also produce cumulative side-effects. Any substance that effectively protects your body from the side-effects of exposure to radiation or chemical pollutants is considered a strong immune stimulant and generator of health.

Exposure to radiation and/or chemical pollutants adversely decreases a number of vital body substances. These include antibodies and other white blood cells (your immune response), red blood cells, and nutrients in blood and mother's milk, such as protein and the antioxidant vitamins C and E.

Bee pollen is documented to counteract the effects that radiation and chemical pollutants have on these important barometers of health. Equally important, bee pollen has been proven clinically to generate health.1)

Bee pollen significantly reduced the usual side-effects of both radium and cobalt-60 radiotherapy in twenty-five women who had been treated for inoperable uterine cancer. 2)

The women who took the pollen were considerably healthier and had stronger immunological responses. These women registered beneficial increases in a number of areas, including red and white blood cell counts and serum protein levels. The women also reported feeling an improved sense of well-being. Bee pollen proved beneficial for nausea, poor appetite after radiation treatments, sleep disorders, urinary and rectal disorders, and for general decline and weakness after treatment. The dosage of bee pollen received by these women was twenty grams, which is about 70% of an ounce, or approximately two teaspoons, taken three times per day.

X-rays, radiation, and many environmental pollutants break down some of your body's proteins, thus producing histamine, which then causes several allergic responses. Various laboratory analyses, and the patients' subjective reports, confirmed that bee pollen counteracted these responses, including weakened immune system and sickness.3)

Researchers found that bee pollen strengthened the immune systems of mice, improved their resistance to x-rays, and has antibacterial and antiviral properties. Bee pollen prevented the development of cancerous tumors in mice.4 )

Bee pollen proves to be quite useful for activity enhancement and sports nutrition. It produces an accelerated rate of recovery, including a return to normal heart rate, breathing, and readiness for the next event. Bee pollen improves second and subsequent performances. Humans not receiving bee pollen show declining performances. It provides energy, stamina, and strength, and enhances performance levels.
Bee pollen should not be confused with the pollen that is blown by the wind and is a common cause of allergies. Allergy-causing pollen is called anemophiles; it is light and easily blown by the wind. Bee pollen is heavier and stickier - "and is collected off bees' legs" by special devices placed at the entrance to hives. It is called entomophiles or "friends of the insects," and will rarely cause allergy symptoms.

Many people with allergies and hay fever safely and effectively ingest bee pollen. 73% of patients with hay fever averaged a 75% improvement when given bee pollen orally. 78% of asthma patients averaged a 75% improvement in taking bee pollen orally. 17.8% of hay fever patients and 33.3% of asthma patients showed a complete, 100%, improvement with oral bee pollen-usually the sooner bee pollen treatment began pre-seasonally the greater the rate of healing.5,6,7,8)

Quercetin in bee pollen inhibits the release of histamine in the body. It may be one of the contributing factors in decreasing allergic and hay fever responses.9,10,11,12)

Bee pollen improves fertility. It can reduce cholesterol levels. Bee pollen improved the condition of men with prostatitis. It produced therapeutic benefits in patients with glycohaemia (abnormal amount of blood sugar), low hemoglobin, and bleeding ulcers.

Bee pollen, royal jelly, and vitamin C were given to menopausal women for 30 days, after which 82% were symptom-free. Patients with kidney insufficiency were fed bee pollen and showed great improvement. Bee pollen promotes healing of a wide variety of other health problems.

Regarding safety, I have observed that a small percent of people who initially ingest large amounts may occasionally experience minor gastrointestinal irritation and a laxative effect or a rare allergic reaction.

One 1983 research study corroborates my clinical experience. It is unclear whether this effect is due to the person being very sensitive; or due to poor quality pollen such as gathered from commercially-sprayed flowers; or improperly cleaned, dried, or stored pollen which therefore may contain debris or mold-causing moisture. I have also clinically observed that large amounts of bee pollen may be contraindicated for some people with gout as it may elevate purine or uric acid levels.

For preventive purposes, a common initial adult dosage of bee pollen granules is initially 1/8 to 1/4 teaspoon once per day. The dosage is gradually increased to 1-2 teaspoons one to three times per day. Adults suffering from allergies are best advised to start off with one to three granules daily, and then to gradually increase to higher doses-usually over a period of one month or more. Pollen is also available in gelatin caps, tablets, mixed with other bee products, as a liquid, tincture, cream, and salve. For preventive purposes, the suggested amount is two 450-580 mg. capsules three to four times daily. A short term, therapeutic amount of bee pollen is about three times the preventive amount. Bee pollen should not be cooked.

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5) Maurer, Murray L. and Strauss, Margaret, "A New Oral Treatment for Ragweed Fever." Journal of Allergy, 32:343 (1961).
Bee Pollen

Scientific Name(s): Produced by the honeybee, *Apis mellifera* L.

Common Name(s): Bee pollen, honeybee pollen

Uses

Although bee pollen is nutritionally rich, claims that it enhances everyday and athletic performance have not been reliably verified. It has been traditionally used for a variety of purposes, including relief of constipation; treatment of prostatic conditions, such as prostatitis, benign prostatic hyperplasia, and prostate cancer; wound healing; and for its proposed antioxidant action. It also has been promoted as an energy booster, immune system strengthener, and vitality enhancer. Bee pollen has been used to prevent hay fever, but there is a risk of severe allergic reaction with this practice. It may also relieve premenstrual syndrome and climacteric symptoms associated with menopause.

Dosing

The best recommended dose of bee pollen is unknown. Doses vary among products because tablets contain differing amounts of bee pollen. Manufacturers' recommendations may provide more guidance.

Contraindications
None well documented.

**Pregnancy/Lactation**

Clinical data regarding safety and efficacy in pregnancy and lactation are lacking. However, use in pregnant rats resulted in fetuses with higher birth weights and decreased death rates, suggesting that bee pollen may be an effective prenatal nutrient. ¹

**Interactions**

None well documented.

**Adverse Reactions**

Ingestion produces allergic reactions in sensitive individuals. Attempts to hyposensitize patients by administering bee pollen may produce severe anaphylaxis and other acute or chronic responses. Although rare, bee pollen can cause serious, sometimes fatal, adverse reactions. Some case reports of acute hepatitis and photosensitivity following ingestion of bee pollen have been reported.

**Toxicology**

Research reveals little or no information regarding toxicity with the use of this product.

Bee pollen consists of plant pollens collected by worker bees combined with plant nectar and bee saliva, usually a mixture of pollen species from several different plants. The pollens are packed by the insects into small dust pellets that are then used as a food source for the male drones. Commercially, the pollen is gathered at the entrance of the hive by forcing the bees to enter through a portal partially obstructed with wire mesh that brushes the material off the hind legs into a collection vessel. Because of the increasing popularity of bee pollen as a health food, this means of pollen collection has been supplemented by collection directly from the hives.

**History**

The use of bee pollen increased during the late 1970s following testimonials by athletes that supplementation increased stamina and improved athletic ability. Although bee pollen has been used in certain cultures for thousands of years, its popularity has become more widespread in recent years due to its potential health benefits. Products containing bee pollen have become widely available in health food stores and drugstores, as well as online.

**Chemistry**
Bee pollen is a nutritional source for drone bees. It has been described as “nature’s perfect food” and is a highly concentrated food source containing a complex supply of quality nutrients. A number of traditional Chinese herbal formulas contain bee pollen. It is rich in vitamins, minerals, trace elements, enzymes, and amino acids, and contains approximately 30% protein, 55% carbohydrate, 1% to 2% fat, and 3% minerals and trace vitamins. Vitamin C concentrations of 3.6% to 5.9% have also been found in some samples. Promotional literature lists up to 100 vitamins, minerals, enzymes, amino acids, antioxidants, and other identified compounds. However, the physiologic importance of many of these components is poorly understood. Bee pollen preparations often contain mixtures of pollens from diverse types of plants that vary with geographic origin.

**Uses and Pharmacology**

**Performance enhancer**

Articles in the popular press suggest that athletes could enhance performance by ingesting bee pollen; however, an investigation conducted by the National Athletic Trainers’ Association with Louisiana State University swim team members found no beneficial effect. 4

**Animal data**

In a pilot study, 10 Arabian horses were randomized to receive either Dynamic Trio, a product containing 55% bee pollen, or placebo consisting of 50% red wheat bran, 25% evaporate cane juice crystal sugar, 17% baking flour, and 8% powdered apple peels for 42 days. At baseline, the horses performed a standard exercise test. During the study, they continued to participate in horsemanship classes and were ridden throughout the week. Additionally, the horses performed the standard exercise test twice weekly, with a gradual increase in exercise intensity. At the end of this study, there were no treatment differences for $V_{150}$ and $V_{200}$, values of projected velocities at heart rates of 150 and 200 bpm, respectively. No changes were noted in heart rate, or in lactate, hematocrit, or hemoglobin levels. Horses receiving bee pollen tended to digest more neutral detergent fiber and acid detergent fiber. Additionally, they had less phosphorus excretion and tended to retain nitrogen. Thus, the product containing bee pollen may only be beneficial in the performance of horses by increasing food intake and nutrient retention. 5

**Clinical data**

A 2-year, double-blind study found bee pollen “absolutely not a significant aid in the metabolism, workout training, or performance” of athletes. 6 The results of another study conducted in track athletes suggested that runners who took bee pollen recovered faster after exercise and that bee pollen would therefore be of value in relieving common tiredness and lack of energy. Critics of this study found the test group to be small, the blinding inadequate, and the conclusions premature. 7 Another 6-week study in 20 competitive swimmers found no differences in strength and endurance tests between those treated with bee pollen and those treated with placebo (cod liver oil). However, it was noted that swimmers treated with bee pollen missed fewer days (4 days) of training because of upper respiratory tract infections
compared with those treated with placebo (27 days). The study was not designed to statistically assess this observation. 8

Prostatic conditions

Cernilton, an extract of bee pollen, has been used in prostatic conditions for its presumed anti-inflammatory and antiandrogenic effects. 9 A single dose of Cernilton contains 60 mg of Cernitin T60 (a water soluble pollen extract fraction) and 3 mg of Cernitin GBX (an acetone-soluble pollen extract fraction). Because Cernilton has antiandrogenic effects via relaxation of urethral smooth muscle tone and increases in bladder muscle contraction and/or acts on alpha-adrenergic receptors and relaxes internal and external sphincter muscles, it may be effective. 10

Animal data

Research reveals no animal data regarding the use of bee pollen in the treatment of prostatic conditions.

Clinical data

There is a growing body of evidence involving the use of bee pollen for the management of prostatitis and benign prostatic hyperplasia (BPH). Studies using Cernilton have shown modest improvement in urological symptoms, but have been limited by their short duration, small number of participants, and questionable standardization of preparations. 10, 11, 12, 13, 14

A systematic review of clinical trials assessing the efficacy of Cernilton in men with symptomatic BPH was published in 2000. Two placebo-controlled trials and 2 comparative trials enrolling 444 participants receiving treatment for 12 to 24 weeks were included in the review. The weighted mean relative risk of self-improvement for those receiving Cernilton versus placebo was 2.4 (range, 1.21 to 4.75) and versus Tadenan (an extract from the African plum plant) was 1.42 (range, 1.21 to 4.75). Nocturia was reduced with Cernilton therapy compared with placebo, with a relative risk of 2.05 (range, 1.41 to 3). When compared with Paraproast (a mixture of amino acids), the weighted mean difference for nocturia was −0.4 times per evening (range, −0.73 to 0.07). Cernilton did not reduce prostate size, improve urinary flow rates, or improve residual volume when compared with placebo or active comparators. The only reported adverse effect with Cernilton was nausea. 10

Different doses of Cernilton for the prevention of BPH progression were assessed in a comparative study. Men with BPH (N = 240) received Cernilton 375 or 750 mg twice daily for 4 years. Patients receiving the higher dose of Cernilton experienced a more obvious improvement in the International Prostate Symptom Score (IPSS), prostate volume, postvoid residual urine, and Q max assessments compared with those receiving the lower dose (P < 0.0001). Additionally, patients receiving the higher dose of Cernilton experienced improvements in IPSS and Q max after 3 and 6 months of therapy compared with 6 and 9 months in those receiving the lower dose. 15

The efficacy of Cernilton N for the treatment of chronic prostatitis syndrome was assessed in 90 patients. The supplement was administered as 1 tablet 3 times daily
for a 6-month period. The participants were divided into 2 groups, those with complicating factors (n = 18), such as urethral strictures, prostatic calculi, and bladder neck sclerosis, and those without complicating factors (n = 72). Seventy-eight percent of patients without complicating factors experienced a favorable response with Cernilton N therapy. Thirty-six percent were cured of their symptoms, and 42% improved in measures such as flow rate, leukocyturia in post-prostate massage urine, and complement C3/coeruloplasmin in ejaculate fluid. Only 1 patient with complicating factors demonstrated a response. Thus, consideration for complicating factors may be an important determinant for successful treatment. 16

One study evaluating the effects of the chloroform extract of bee pollen from Brassica campestris, a plant used as an herbal defense against cancer in China, found that the steroid extract could induce cytotoxicity in prostate cancer PC-3 (human) cells via apoptosis. 17 Additional studies of bee pollen in the treatment of prostate cancer are needed.

Premenstrual syndrome and menopausal symptoms

Animal data

In a study of mice, Melbrosia, a product containing pollen, perga-pollen (bee bread), and royal jelly, was given in doses of 6, 60, and 600 mg/kg orally for 3 days to groups of 10 immature rats. Subcutaneous Melbrosia was administered in the same doses to groups of 12 ovariectomized rats for 3 days. Estrogenic effects were not evident with Melbrosia therapy. 18

Clinical data

In a randomized, double-blind, placebo-controlled, crossover study, the effect of Femal (an herbal remedy containing pollen extract 36 mg, combined pollen and pistil extract 120 mg, and royal jelly 6 mg) on premenstrual syndrome (PMS) was assessed in 32 women with regular menstrual cycles. Each participant received Femal or placebo for 2 consecutive menstrual cycles, followed by the alternate treatment for 2 more consecutive cycles. Three women dropped out of the study and 29 participants were included in the analysis. Overall symptoms such as irritability and dysphoria were improved, and 6 of 9 symptom scores were reduced by 27% to 57%. Evidence also suggested a slow onset of action (no effect was noted between Femal and placebo after the first cycle of treatment) and protracted effect, considering that the placebo group first experienced a reduction in symptoms. Except for sleep quality, there were no differences in symptoms in participants receiving Femal before placebo. Weight gain was reduced by 50% in participants treated with Femal compared with placebo. The results suggest that Femal may be beneficial in improving PMS symptoms. However, the results of this study should be interpreted cautiously because there was no wash-out period, which raises doubt given that the authors found a carry-over effect, and a preliminary phase designed to eliminate placebo responders was not conducted. 19

Melbrosia is used in Europe and contains the active ingredients phytosterols, phytoestrogens, amino acids, oligopeptides, and enzymes. 20 The effects of Melbrosia on ameliorating climacteric symptoms were clinically assessed. Two groups of women were followed; 32 served as a control group and 34 received Melbrosia. Patients receiving therapy experienced a reduction in the Kupperman
menopausal index. Specifically, it was most effective on nervousness, anxiety, irritability, headache, and hot flashes. No changes were noted in gonadotropin, estradiol, or lipid values. Thus, products containing bee pollen may serve as potential treatment options for patients suffering from climacteric symptoms associated with menopause. 21

Similarly, another randomized, placebo-controlled study in women with severe menopausal symptoms found that the use of Melbrosia resulted in improvements in headache, urinary incontinence, vaginal dryness, and decreasing vitality. However, no changes in biochemical parameters were noted. 22

In an open, multicenter, uncontrolled, prospective observation study, the effects of Melbrosia on menopausal symptoms and cardiovascular risk markers were assessed. Fifty-five postmenopausal women with climacteric complaints received 2 capsules of Melbrosia once daily for the first 2 weeks, followed by 1 capsule daily for the remaining 10 weeks. Twenty-seven of the 55 patients underwent laboratory assessment of cardiovascular risk markers, including cholesterol and C-reactive protein (CRP) levels. A significant reduction in the standardized Kupperman score (P < 0.001) and other symptom measuring tools (ie, Zerssen Symptoms List and Zung Depression Score) was noted with treatment. Improvements were also demonstrated in problem-solving (P = 0.0015) but not in self-esteem or self-assessment. Additionally, patients experienced worsening of irritability with Melbrosia therapy (P < 0.001). Total cholesterol (P = 0.03), low-density lipoprotein (P = 0.0053), and high-density lipoprotein (P = 0.018) improved with Melbrosia. However, triglyceride levels increased significantly (P = 0.0088). CRP levels were not significantly different with Melbrosia therapy (P = 0.37). Thus, products containing bee pollen may not only improve menopausal symptoms but may improve most cholesterol parameters. 20

Other uses

Other potential uses of bee pollen include combating the effects of aging, treating respiratory infections, treating endocrine disorders, and relief of enteritis, colitis, and constipation. Bee pollen administered to rats was also found to possibly display antiaging effects. 23 Bee pollen may possess antioxidant effects 24 that may be attributed to polyphenol substances, such as quercetin, caffeic acid, pinocembrin, and galangin, among others. One study found that bee pollen and propolis extracts inhibited respiratory burst, a transient increase in oxygen consumption following the production of reactive oxygen species, within cancer cell lines. This effect was attributed to the antioxidant potential. 25 Another study found that bee pollen modulated antioxidant enzymes in the livers, brains, and lysates of erythrocytes in mice, and hepatic lipid peroxidation also decreased. 26 Bee pollen has been reported to immunologically strengthen multiple sclerosis patients being treated with prednisolone and Proper-Myl, a yeast preparation. 27

Dosage

The best recommended dose of bee pollen is unknown. Doses vary between products because tablets contain differing amounts of bee pollen. Manufacturers' recommendations may provide more guidance.
Pregnancy/Lactation

Pregnant Sprague-Dawley rats fed bee pollen had fetuses with higher birth weights and decreased death rates, suggesting that bee pollen may be an effective prenatal nutrient. However, clinical data regarding safety and efficacy of bee pollen in pregnancy and lactation are lacking.

Interactions

None well documented.

Adverse Reactions

Reports of adverse reactions with bee pollen have been related to allergic reactions after ingestion by sensitive individuals.

Allergic reactions have been reported after single doses among patients with a history of allergic rhinitis. The dose required to precipitate an acute allergic reaction was less than bee pollen 15 mL. The development of hypereosinophilia, as well as neurologic and GI symptoms, in a woman who ingested bee pollen for more than 3 weeks was reported. Allergic symptoms resolved upon discontinuation of the preparation.

Although infrequent, some reports of severe allergic reactions to bee pollen have been observed. A man 33 years of age with no prior allergies had an acute anaphylactic reaction 15 minutes after ingesting bee pollen. He recovered fully after emergency medical treatment with epinephrine, Ringer's lactate, and methylprednisolone.

One study describes an anaphylactic reaction in an atopic patient who ingested a small quantity of bee pollen. He had previously responded to a course of allergen immunotherapy to treat allergic rhinitis. The case report highlighted that oral ingestion of even small quantities of pollens can cause anaphylaxis in sensitized atopic individuals.

In another report of anaphylaxis, a man 46 years of age with a history of seasonal allergic rhinitis took a 5 mL dose of bee pollen to treat his hay fever symptoms. Fifteen minutes later, he developed paroxysm of sneezing, and by 30 minutes experienced generalized angioedema, itching, dyspnea, and light-headedness. He recovered following treatment with epinephrine, corticosteroids, and diphenhydramine.

The reactivity of bee pollen was assessed in 145 atopic patients and 57 healthy volunteers. All patients received skin-prick testing with 6 standard aeroallergens (olive, grasses mix, Parietaria, mugwort, Dermatophagoids pteronyssinus , and Dermatophagoids farinae ) and with homemade bee pollen extracts. There was a strong correlation between cutaneous reactions to bee pollen extracts and olive, grasses mix, and mugwort. Additionally, strong cutaneous reactions to bee pollen were observed in atopic patients compared with healthy volunteers.
There is a popular but ill-advised home practice of using bee pollen to treat allergic disorders. Despite the usually limited response to oral hyposensitization techniques and the potential for severe allergic reactions, this practice has spread considerably. Anaphylactic reactions can occur within 20 to 30 minutes of ingestion of even small amounts of bee pollen.

Bee pollen may also cause a photosensitivity reaction in some patients. A case report of a woman 32 years of age describes the presence of a pruritic, erythematous rash located on the sun-exposed portions of her neck and extremities. She had no past medical history. The only medication that she had been taking was Metabolife 356, an herbal weight loss remedy containing multiple constituents, one of which was bee pollen, for 1 month. The patient was advised to discontinue the herbal remedy and take hydroxyzine. However, this was not effective for the rash. Two days later, she was given a subcutaneous injection of triamcinolone, topical corticosteroids, and desloratadine. The rash subsequently resolved over several days. The patient never restarted Metabolife 356. Although it is difficult to discern the exact ingredients or combination of ingredients responsible for this response, bee pollen may cause a photosensitivity reaction in some patients. 33

Two case reports of acute hepatitis following bee pollen ingestion have been reported. In one report, a woman 33 years of age had been taking 2 tablespoons of pure bee pollen daily for several months and subsequently developed sharp mid-epigastric and right upper quadrant pain. Liver function tests were elevated upon evaluation. Although she was taking several other medications, only the bee pollen was discontinued. Within 6 weeks, a complete resolution with normalization of laboratory values occurred. In the second report, a man 69 years of age was taking 14 tablets daily of a mixed herbal product containing bee pollen. He developed worsening pruritus and nausea, followed by anorexia, weight loss, and jaundice. The only other medication this patient was taking was metoprolol tartrate. Liver function tests were elevated upon presentation. Within 8 weeks of discontinuation of only the herbal product, his symptoms dissipated and liver function tests normalized. 34

Toxicology

Research reveals little or no information regarding toxicity with the use of this product.

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The effects of Bee Pollen on Energy and Weight Loss

Kendra Collins

History

Bee pollen has been used as food for centuries. Medical records dating back to 2735 BC draw allusions to the power of this natural product. Even then, people believed in the therapeutic and nutritional benefits of bee pollen. Its use is lauded in several well-known texts and by legendary people. "The Bible, The Talmud, the Torah, the Koran (the Code of Islam), along with the scrolls of the Orient, the writings of ancient Greece and Rome, the legends of the Russian and Slavic people, even the relatively recent Book of Mormon (1830), all praise the industrious honey bee and her highly nutritious and healing products of the beehive." (http://www.garynull.com/Documents/Arthritis/bee_pollen.htm) Some of the "Fathers of Western Medicine" (Hippocrates, Pliny the Elder, and Pythagoras) trusted the healing qualities of bee pollen; they often prescribed it to their patients.

(http://www.apitherapy.org/AAS/pollen.html) Pollen obtained from the hive was a delicacy for primitive man, often accompanied by the eggs and larvae of the bees. To this day, Aboriginal tribes are known to feast on bees and place much value on their pollen and honey. "Every age has regarded the bee as benefactor of mankind and accords this little creature almost holy status." (http://www.garynull.com/Documents/Arthritis/bee_pollen.htm) The use of bee pollen as an energy enhancer was introduced to Americans athletes by Gold Medal Olympic coaches from Europe. Some of these athletes took the coach's advice and now regard bee pollen as "energy in a tablet."(http://www.glen-net.ca/honeyman/pollen.html) This long history of bee pollen may lead one to wonder, exactly what is bee pollen?
Pollen is a very fine powder made in the stamen (male part) of flowers and plants. Male DNA is carried to the female parts of a flower or plant (of the same species as the male) by pollen. The pollen allows for the reproduction of plants. It is the traveling part of the plant, essential for the transport of the DNA, due to the fact that plants are non-mobile. One grain of pollen usually contains three cells and one hundred thousand to five million pollen spores. A single pollen spore is "capable of reproducing an entire species." 

Bees travel from plant to plant collecting pollen. Then they mix it with saliva (containing digestive juices) and nectar from the plant. The process of pollen collection is instinctive to the bees. They are able to determine which pollen granules are nutritious and healthy and very rarely collect unwholesome granules.

Bee pollen "cannot be duplicated in a laboratory." It contains all of the 22 elements that compose the human system, and several more. Bee pollen also contains almost all B complex vitamins (Vitamin C, Vitamin A, Vitamin E, folic acid, and carotenoids). Several minerals, trace elements, essential fatty acids, enzymes and amino acids are found in bee pollen. It is composed of 35% protein, 55% carbohydrate, 2% fatty acids, and 3% vitamins and minerals. Bee pollen also contains Rutin (Vitamin P), which strengthens capillaries and blood cell walls. It is not a drug, but a food and it has no known side effects.

After the benefits of bee pollen were postulated, a method of obtaining the pollen was needed. A device would have to collect only a small amount of the pollen from the bee, leaving enough to feed the colony. Royden Brown invented such an apparatus. He scientifically designed a grid made of wire to collect the pollen from the hind legs of the bee as it entered the hive. The "trap" would only brush off about 60% of the pollen the bee was carrying and drops it through a screen onto a dish for collection.

Bell et al. (1983) studied two common bee pollens collected for human consumption, Jarrah (Eucalyptus marginata) and Marri (Eucalyptus calophylla). They performed a series of experiments to determine moisture, ash content, mineral composition, total protein, crude fiber content, and total lipid content. It was determined that moisture depends mainly on the freshness of the collected pollen and that the moisture content was similar in both types. Jarrah and Marri proved to be good sources of protein, have similar ash content, possess very low lipid content, and have high crude fiber content. "Analysis of the mineral composition showed that potassium, phosphorus, calcium, and sodium were the elements present in highest concentrations in both pollens." (Bell et al., 1983, p. 2481) Both also contain copper, magnesium, copper, and iron. Another experiment measured the digestibility of Jarrah and Marri in comparison to another type of pollen (casein). Three groups of rats with similar weights were housed in cages with controlled lighting and temperature. Each group of ten rats was fed diets based on the three types of pollen (respectively) for 28 days. Food consumption and weight gains were measured at the end of the experiment. Digestibility was determined by fecal and urine analysis for nitrogen determination using the formula: 

\[
\text{Digestibility} = \left( \frac{\text{N intake} - \text{fecal N}}{\text{N intake}} \right) \times 100
\]

100/N intake. The digestibilities of Jarrah and Marri were found to be much lower than that of casein. It was concluded that Jarrah and Marri are both good food sources considering their
high concentrations of protein although are not very useful to humans because of their low digestibilities. (Bell et al., 1983)

Pollen has to be very well protected to ensure its survival during the passage to the female plant parts. Therefore it has two protective layers of covering, one made of exine and one of intine. Pollen is so indestructible that it can survive in this coating for millions of years. For this reason, archeologists often use it to date their sites. This protection ensures the survival of plants although it also causes a problem for those wanting to consume the pollen. Unprocessed pollen is very indigestible to humans. This is due to the fact that the cell wall of pollen contains cellulose, hemicellulose, and lignin, which are incompatible with the human digestive system. There are four common methods used to make bee pollen more digestible. One method is mechanical disruption, such as milling. This process often proves difficult. A second method is to impose violent changes in temperature on the pollen, although heat sometimes kills the cells and freeze thawing tends to reduce the quality of the pollen. Fermentation or enzymatic degradation is also used but adds chemicals that cause the pollen to breakdown and withers its nutrition. The final process is shear plane technology which usually proves effective although is very expensive. Dr. Kelvin Duncan is the Dean of Science at Canterbury University. He invented a process that fractures the cell wall without harming the pollen. "It is like cracking a hole in an egg shell to get the digestible material inside." (http://beepollennu.hypermart.net/Bee%20Pollen.htm) Supposedly, this method enhances the bioavailability to 90% or higher.

📚 List of Nutrients in bee pollen 📚

| Vitamins     | Minerals  | Enzymes/Co-enzymes | Proteins/amino acids | Others | Others (continued) |
|--------------|-----------|--------------------|----------------------|--------|--------------------|
| Provitamin A | Calcium   | Amylase            | Isoleucine           | Nucleic Acids | Lecithin           |
| B1 Thiamine  | Phosphorus| Diatase            | Leucine              | Flavonoids | Xanthopylls        |
| B2 Riboflavin| Potassium | Saccharase         | Lysine               | Phenolic Acids | Crocetin           |
| B3 Niacin    | Sulfur    | Pectase            | Methionine           | Tarpenes  | Zeaxanthin         |
| B6 Group     | Sodium    | Phosphatase        | Phenylaline          | Nucleosides | Lycopene           |
| Panthothenic Acid | Chlorine | Catalase           | Threonine            | Auxins    | Hexodecanal       |
|       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|
| Biotin | Magnesium | Disphorase | Tryptophan | Fructose | Alpha-amino-butyric acid |
| Cyanocobalamin B12 | Copper | Cozymase | Valine | Glucose | Monoglycerides |
| Folic Acid | Iodine | Cytochrome systems | Histidine | Brassins | Triglycerides |
| Choline | Zinc | Lactic dehydrogenase | Arginine | Gibberellins | Pentosans |
| Inositol | Silicon | Succinic dehydrogenase | Cystine | Kinins |
| Vitamin C | Molybdenum | 24 oxidoreductases | Tyrosine | Vernine |
| Vitamin D | Boron | 21 transferases | Alanine | Guanine |
| Vitamin E | Titanium | 33 hydrolyases | Aspartic Acid | Xanthine |
| Vitamin K |       | 11 lyases | Glutamic Acid | Hypoxal-thine |
| Rutin |       | 5 isomerases | Hydroxy-proline | Nuclein |
|       |       | Pepsin | Proline | Amines |
|       |       | Trysin | Serine |       |
What Claims are being made?

Some say bee pollen is "the finest food source discovered by man." Others claim it "contains all the vitamins, amino acids, essential minerals, and active antioxidants needed for a full active life." It is said that when compared to any other food, bee pollen has a higher percentage of nutrients needed for survival. A cancer specialist, Ernesto Contreras, M.D, even comments, "To my knowledge, there is no better and more complete natural nutrient than honey bee pollen." As one could accurately deduce, there are a lot of claims being made about the benefits of bee pollen.

One particularly popular claim is that bee pollen has ergogenic effects. An ergogenic substance is anything that can be used to maximize the utilization of energy. In fact, bee pollen is known as "Mother Nature's natural energy booster." Supposedly, bee pollen increases stamina, strength, speed, and endurance. It also improves physical reactions, alertness, and resistance before exercise. Bee pollen is said to "produce accelerated rate of recovery, including return to normal heart rate, breathing, and readiness for the next event." Therefore it would help to improve performances after the initial exertion. This makes it "a favorite among many world class athletes and those interested in sustaining and enhancing quality performance."

Another claim is that bee pollen can aid in weight loss. According to Carson Wade, "Bee pollen is a natural way to improve metabolism and help control and take weight off." It is said that bee pollen improves metabolism by correcting a chemical imbalance and by "supplying the missing factors other foods cannot supply." Bee pollen supposedly speeds the process of converting sugar into energy providing oxygen that fat can use to speed their conversion into energy. "130mg of bee pollen helps digest 3 pounds of food." Lecithin is another component of bee pollen that supposedly speeds the rate at which calories are burned. It also "aids in the digestive process and assimilation of nutrients."

Evidence or Hype?

The evidence for the relationship between bee pollen consumption and weight loss and increased energy is not quite equivalent to the claims for such a relationship. Nevertheless, there is a small amount of evidence in the form of scientific research. There are also many testimonials, which cannot be treated as evidence. For example, a 28-year-old woman who was 67 pounds overweight and easily fatigued began to use bee pollen. After about four
months, she started to lose a couple pounds a week and felt energized, was able to exercise for longer periods of time, and noticed positive personality alterations. (http://www.garynull.com/Documents/Arthritis/bee_pollen.htm)

Clinical tests have proven that bee pollen is digested quickly and enters the bloodstream quickly as well. Two hours after the bee pollen was taken orally it was found in the blood, urine, and cerebral and spinal fluids. (http://www.apitherapy.org/AAS/pollen.html) Another experiment performed on mice showed that they can survive and reproduce viable offspring (without distress) on a diet of bee pollen alone. (http://www.garynull.com/Documents/Arthritis/bee_pollen.htm) "European studies have proven that one can live on nothing more than water and bee pollen. It contains every substance required to sustain life, plus a few the bees add themselves." (http://www.wic.net/waltzark/beepollen.htm) According to Dr. Betty Lee Morales, "Bee pollen is the only food which contains every essential nutrient needed by mankind for perfect health. This fact can hardly be disputed, since it has been proved by analysis in the laboratories of the world many times." (http://beepollennu.hypermart.net/Bee%20Pollen.htm)

There is some information relating to ergogenics and nutritional value but a very limited amount of "evidence" for the claim of effects on weight loss. In fact, the small amount of information found was largely lacking detail and written in a tone of advertisement. "A study reported by Aerospace Medicine and Life Sciences proved that the average daily consumption of food falls by 15-20% when bee pollen is a regular item on the menu." (http://www.garynull.com/Documents/Arthritis/bee_pollen.htm) As it relates to ergogenics, a former Russian Olympic Coach (Remi Korchemny) performed a 2-year study to confirm that "bee pollen does improve crucial recovery power of athletes after stressed performances." (http://www.garynull.com/Documents/Arthritis/bee_pollen.htm) Another study showed that performance declines on subsequent attempts when bee pollen is not used, although does not decline when it is used. (http://www.apitherapy.org/AAS/pollen.html)

Xie, Wan, and Li (1994) performed an experiment testing the effect of bee pollen of maternal nutrition and fetal growth. The question in this experiment was whether bee pollen would prove an effective nutrient for a developing fetus. In this experiment the bee pollen used was of Brassia campestres L. A group of pregnant Sprague-Dawley rats was obtained and divided into three parts. The first group was fed a normal diet and the other two groups were fed a normal diet plus bee pollen. The pollen-fed dams (mother rates) had a greater body weight and higher levels of total protein. The fetuses of the dams that were fed the pollen had greater body weight and lower death rate than the fetuses of the dams that were fed a normal diet. The fetuses were then checked for any type of malformations. "These results suggested that bee pollen could improve maternal nutrition without affecting normal fetus development. It is a practical and effective nutrient during pregnancy." (Xie, Wan, & Li, 1994, abstract) This information should invalidate the claims that bee pollen has positive effects on weight loss. In fact, it has been proven to cause weight gain.

Ergogenic increased utilization of energy includes the control, efficiency, and production of energy. Williams (1992) raised the question of the effectiveness of nutritional ergogenics as they relate to aerobic endurance performance. One such nutritional aid tested was Vitamin E, a component of bee pollen. According to Williams, detailed research was performed to test the theory that Vitamin E "enhances aerobic endurance by reducing the peroxidation of red blood cell membranes (1992, S346)." His review of this research lead him to the conclusion that this vitamin did not enhance endurance at sea level, but did show an increase in VO2max or oxidative metabolism with Vitamin E at altitude. Another nutritional aid reviewed by
Williams (1992) was phosphate (also a component of bee pollen). Although four studies were noted to find no ergogenic properties of phosphate, contrary information was also found. As Williams states (1992, S346), "four other studies reported significant increases in VO\textsubscript{2max}, decreases in lactic acid during sub maximal exercise, increase in cycling and running endurance time, and a faster time in a 40-km bike race under laboratory conditions." One may falsely assume from the results found in these studies that bee pollen would have similar effects due to the fact that it contains both Vitamin E and phosphate. In addition to Williams' (1992) review of these experiments, he also found information on bee pollen itself as a nutritional aid. According to Williams (1992), although bee pollen contains various vitamins, amino acids, and minerals, it has not been proven to have ergogenic effects. Six experiments (including one performed in Williams' laboratory) "reported no beneficial effects on physiological responses to exercise, such as VO\textsubscript{2max}, as well as other measures of endurance capacity. Williams (1992) concluded that Vitamin E at altitude and phosphate have some ergogenic effects and seem to be safe when taken in correct dosages. Furthermore, he found that although bee pollen contains Vitamin E and phosphate, no ergogenic effects were found with its use and it may produce dangerous allergic responses.

Steben and Boudreaux (1978) preformed an experiment assessing the effects of bee pollen and protein supplements on athletic performance. "The purpose of this study was to validate and further investigate the question of whether normal training over a period of time rather than food supplements was primarily responsible for improved performance of endurance athletes who ingest normal diets." (Steben & Boudreaux, 1978, p. 222) Eighteen male cross-country runners from Louisiana voluntarily participated in this experiment. They were randomly divided into three groups. The first group ingested bee pollen, the second ingested protein extracts, and the third group was given a placebo. The average velocity for a three-mile run on the same marked cross-country course was measured at the beginning and end of a twelve-week time interval. The results of these performance tests are recorded in the table. Steben and Boudreaux concluded that both the pollen and protein extracts had no significant effect on the performance of the athletes.

**Pre and Post Performance Results**

| Diet       | Pre-post Measure | Mean velocity (V) yds/sec |
|------------|------------------|--------------------------|
| Pollen     | Pre              | 4.700                    |
|            | Post             | 5.067                    |
| Placebo    | Pre              | 4.650                    |
|            | Post             | 4.917                    |
| Protein    | Pre              | 4.767                    |
Hypothetically, bee pollen is an excellent source of nutrition. With its abundance of vitamins, minerals, amino acids, and enzymes, it is hard not to believe the many claims made about the positive effects of bee pollen. Although a very limited amount of recent information can be found proving positive nutritional effects, in reality, studies have consistently proven that bee pollen has no ergogenic effects. Furthermore, no legitimate information can be found proving positive effects on weight loss. In fact, one study (Xie, Wan & Li, 1994) shows that pollen can actually induce weight gain. One must take into consideration the fact that pollen is very indigestible to humans and also that fact that some of the studies on bee pollen were performed several years ago. This could mean that some more recent methods for improving the bioavailability of bee pollen have been invented and nutritional benefits can be more effectively obtained today. This is not to say that the pollen may have a positive effect on weight loss, as there is no real evidence to support that claim. It also does not necessarily lead to proof of ergogenic effects. Although what the above consideration may mean is that pollen has nutritional benefits that can be harvested. Hopefully, this paper will refute the abundance of false claims on the benefits of bee pollen. One must remember that you can't believe everything you read these days.

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Xie Y, Wan B, Li W. (1994). Effects of bee pollen on maternal nutrition and fetal growth. Hua Hsi I Ko Ta Hsueh Hsueh Pao, 4, (434-437).
The common honey bee is a fascinating little insect that offers us humans some valuable natural foods with health-promoting benefits. These “super foods” include bee pollen, royal jelly and propolis.

**Bee Pollen**

Bee pollen is the pollen gathered from plants by honey bees, and brought back to their hive. Bee pollen contains all of the eight essential amino acids in amounts that vary between five to seven times the level found in equal weights of traditional high protein foods. It also contains vitamins A, D, E, K, C and bioflavonoids, as well as the complete B-complex; especially pantothenic acid (B5) and niacin.

The high levels of vitamin B5 are particularly beneficial for the adrenal glands which are adversely affected during stress. Bee pollen has been used traditionally as an anti-aging food, and an energy food. As a matter of fact, it has been used by a number of Olympic athletes to improve their performance.

**Antioxidant/anti-aging**

The oxidative damage caused by free radicals have been implicated in quite a number of disease processes, and is the primary factor in aging. Antioxidants are capable of providing protection, sometimes significant protection, against this oxidative damage. Interestingly, bee pollen appears to provide significant antioxidant activity, which may explain its traditional use as an anti-aging food. One animal study demonstrated that bee pollen (as well as beta-carotene oil), was able to abolish the effects of harmful ionizing radiation on the brain. This was a function of bee pollen’s antioxidant properties. X-rays can activate lipid peroxidation (i.e., free radical activity) in the liver, and adversely affect liver glutathione (i.e., antioxidant) systems. Animal research has shown that bee pollen is able to normalize the activity of important glutathione system enzymes in the liver. Another study demonstrated that bee pollen was able to markedly decrease lipoperoxide levels in animals fed a limited diet, compared to animals not receiving bee pollen. Free radicals can also contribute towards lipofuscin, also known as age pigments and liver spots. These are commonly seen as small brownish spots on the back of hands on elderly people. Liver spots are actually an outward sign of internal toxic accumulation of lipofuscin; including, but not limited to vital nerve centers such as the brain. Such toxic accumulation of lipofuscin can block nutrient absorption in the cells. Animal research has shown that bee pollen markedly reduces lipofuscin in the cardiac muscle (heart), significantly inhibits the increase of lipofuscin in cardiac muscle, liver, brain and adrenal gland cells.

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Trophic Effect of Bee Pollen on Small Intestine in Broiler Chickens

Jue Wang,1 Shenghe Li,1 Qifa Wang,1 Baozhong Xin,2 and Heng Wang2

1Anhui Science and Technology University, Fengyang, Anhui, People’s Republic of China; and 2Das Deutsch Center Clinic for Special Needs Children, Middlefield, Ohio

ABSTRACT In this study, the effects of bee pollen on the development of digestive organs were evaluated in broiler chickens. A total of 144 1-day-old AA broiler chickens were randomly and equally divided into two groups, assigned as the control group and the pollen group, respectively. The control group was fed with a basic diet, while the pollen group was fed with a basic diet supplemented with 1.5% bee pollen over a period of 6 weeks. At the end of each week, the digestive organs were obtained for comparison from 12 broilers randomly selected from each group. The results demonstrated that compared to the control group, the small intestine villi from the duodenum, jejunum, and ileum were longer and thicker in the pollen group. This difference was more significant during early development, especially through the first 2 weeks. Bee pollen increased the length of the villi by 37.1% and 29.4% in the duodenum, 28.1% and 33.7% in the jejunum, and 18.6% and 16.2% in the ileum in week 1 and 2, respectively. Furthermore, the small intestinal glands were developed at a higher density in the pollen group, and the depth of the glands was significantly increased by bee pollen in the first 2 weeks. These findings suggest that bee pollen could promote the early development of the digestive system and therefore is a potentially beneficial food supplement for certain conditions, such as short bowel syndrome.