

Abstract

Asthma caused by bromelain: an occupational allergy(鳳梨酵素導致過敏)

Clinical & Experimental Allergy 18 (5) , 445–450 doi: 10.1111/j.1365-2222.1988.

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Summary

Bromelains consist of a group of proteolytic enzymes of Bromeliaceae. They are commonly used in pharmaceutical industries, food production and in diagnostic laboratories. Bromelains are known to cause IgE-mediated reactions of both the immediate type and the 'late phase reaction of immediate type reaction' with predominantly respiratory symptoms. We report four cases of occupational allergy to bromelain in workers of a blood grouping laboratory. These observations prompted us to investigate the sensitization rate to bromelain in all workers of the particular diagnostic laboratory who had contact with bromelain. These results were compared with those obtained from healthy, randomly selected individuals without evident bromelain exposure. Our findings indicate that (i) bromelain is a strong sensitizer, (ii) sensitization usually occurs due to inhalation and not to ingestion, (iii) bromelain allergy is occupationally acquired, and adequate precautions are necessary. We can further state that (iv) skin testing with relatively pure allergens such as isolated proteases like bromelain may induce systemic reactions, even at very high dilutions.



udn / 健康醫藥 / 專題 / 健康話題 / 過敏與氣喘 / 友善列印

對鳳梨過敏 一吃就嘴腫【記者林秀美／高雄報導】

正值鳳梨盛產季節，鳳梨味美多汁不但芳香可口，還有消暑解熱功用，但卻有人無福消受，高雄長庚發現一名六歲男童只要一嘗鳳梨就嘴腫，經檢查原來是對鳳梨過敏。

高雄長庚醫院兒童過敏氣喘免疫風濕科醫師于鴻仁表示，過敏疾病係多重基因遺傳，有的以慢性過敏性發炎反應，有的以過敏性鼻炎、氣喘、異位性皮膚炎、過敏性結膜炎或過敏性胃腸炎表現。這名男童本身沒有氣喘，卻有慢性過敏發炎反應；而引起他過敏反應的物質，竟然是含豐富營養成分的鳳梨。

高雄長庚兒童過敏氣喘免疫風濕科曾為 650 名病童進行過敏原分析，結果發現以塵（80.46%）占最多數，其次是過敏食物混合篩檢（19.54%），食物包括牛奶、蛋白、花生、燕麥、黃豆、鱈魚等；其他還有蟑螂（12.92%）、狗皮屑（6.92%）、豬草花粉（2.15%）。像男童吃鳳梨會過敏的，則十分少見。

高雄醫學大學附設醫院中醫部主任劉景昇表示，大熱天吃鳳梨產生過敏症，民間稱為「鳳梨沙症」，主要是引起皮膚斑疹、浮腫搔癢、煩躁難受等症狀。不過，老祖宗對此早有解方，可用鹽水清洗鳳梨，或沾鹽、或沾甘草粉吃都可減輕過敏反應。

吃鳳梨引起過敏，嚴重可能致死，一名醫師透露，二十多年前他曾發現吃鳳梨噎死的意外，患者本身即是過敏體質者，不慎吃鳳梨造成喉嚨水腫、呼吸道阻塞，導致缺氧，送醫不治。

【2006/06/09 民生報】

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Bromelain

URL of this page: <http://www.nlm.nih.gov/medlineplus/druginfo/natural/patient-bromelain.html>

Background

Classified as an herb, bromelain is a sulfur-containing proteolytic digestive enzyme that is extracted from the stem and the fruit of the pineapple plant (*Ananas comosus* , family Bromeliaceae) .

When taken with meals, bromelain is believed to assist in the digestion of proteins. When taken on an empty stomach, it is believed to act medicinally as an anti-inflammatory agent.

The expert panel, the German Commission E, approved bromelain for the treatment of swelling/inflammation of the nose and sinuses caused by injuries and surgery in 1993.

Synonyms

Ananas comosus, *Ananas sativus* , Ananase®, Bromelain-POS, bromeline (pleural), Bromelainum, Bromeliaceae (family), Bromelin, Bromelins, Debridase, Phlogenzym (rutoside, bromelain, and trypsin), enzyme-rutosid combination, ERC (rutosid, bromelain, trypsin), plant protease concentrate, pineapple, pineapple extract, rutosid, Traumanase®, trypsin.

Evidence

These uses have been tested in humans or animals. Safety and effectiveness have not always been proven. Some of these conditions are potentially serious, and should be evaluated by a qualified healthcare provider.

Uses based on scientific evidence	Grade*
<p>Inflammation</p> <p>Several preliminary studies suggest that when taken by mouth, bromelain can reduce inflammation or pain caused by inflammation. Better quality studies are needed to confirm these results.</p>	B
<p>Sinusitis (sinus inflammation)</p> <p>It is proposed that bromelain may be a useful addition to other therapies used for sinusitis (such as antibiotics) due to its ability to reduce inflammation/swelling. Studies report mixed results, although overall bromelain appears to be beneficial for reducing swelling and improving breathing. Better studies are needed before a strong recommendation can be made.</p>	B
<p>Burn debridement</p> <p>A bromelain-derived debriding agent, Debridase, has been studied on deep second degree and third degree burns with positive results. Further results are needed to confirm these results.</p>	C
<p>Cancer</p> <p>There is not enough information to recommend for or against the use of bromelain in the treatment of cancer, either alone or in addition to other therapies.</p>	C
<p>Chronic obstructive pulmonary disease (COPD)</p> <p>There is not enough information to recommend for or against the use of bromelain in COPD.</p>	C
<p>Digestive enzyme/pancreatic insufficiency</p> <p>Bromelain is an enzyme with the ability to digest proteins. However, there is little reliable scientific research on whether bromelain is helpful as a digestive aid. Better study is needed before a firm conclusion can be made.</p>	C
<p>Nutrition supplementation</p> <p>There is not enough information to recommend for or against the use of bromelain as a nutritional supplement.</p>	C
<p>Osteoarthritis</p> <p>There is conflicting evidence on the effectiveness of bromelain to treat osteoarthritis. Further well-designed clinical trials of bromelain alone are needed to confirm these results.</p>	C
<p>Rash</p> <p>Bromelain may help treat this type of skin rash. This treatment may be effective because bromelain has been shown to decrease inflammation, regulate the immune system, and have antiviral effects.</p>	C
<p>Rheumatoid arthritis (RA)</p>	C

There is not enough information to recommend for or against the use of bromelain in rheumatoid arthritis (RA).	
Steatorrhea (fatty stools due to poor digestion) There is not enough information to recommend for or against the use of bromelain in the treatment of steatorrhea.	C
Urinary tract infection (UTI) There is not enough information to recommend for or against the use of bromelain in urinary tract infections.	C

***Key to grades**

- A: Strong scientific evidence for this use;
- B: Good scientific evidence for this use;
- C: Unclear scientific evidence for this use;
- D: Fair scientific evidence against this use;
- F: Strong scientific evidence against this use.

Uses based on tradition or theory

The below uses are based on tradition or scientific theories. They often have not been thoroughly tested in humans, and safety and effectiveness have not always been proven. Some of these conditions are potentially serious, and should be evaluated by a qualified healthcare provider.

Acquired immune deficiency syndrome (AIDS), acute lateral ankle sprain, allergic rhinitis (hay fever), amyloidosis (deposits of amyloid proteins causing disease), angina (chest pain), antibiotic absorption problems in the gut, appetite suppressant, atherosclerosis ("hardening" of the arteries), autoimmune disorders, back pain, blood clot treatment, bronchitis, bruises, bursitis, cancer prevention, carpal tunnel syndrome, colitis, common cold, cough, diarrhea, epididymitis (painful inflammation of the epididymis), episiotomy pain (after childbirth), food allergies, frostbite, gout, heart disease, hemorrhoids, immune system regulation, infections, injuries, joint disease, "leaky gut" syndrome, menstrual pain, pain, parasites, Peyronie's disease, platelet inhibition (blood thinner), pneumonia, poor blood circulation in the legs, sciatica, scleroderma, shingles pain/post-herpetic neuralgia, shortening of labor, skin infections, smooth muscle relaxation, sports or other physical injuries, staphylococcal bacterial infections, stomach ulcer/stomach ulcer prevention, swelling (after surgery or injury), tendonitis, treatment of scar tissue, ulcerative colitis, upper respiratory tract infection, varicose veins, wound healing.

Dosing

The below doses are based on scientific research, publications, traditional use, or expert opinion. Many herbs and supplements have not been thoroughly tested, and safety and effectiveness may not be proven. Brands may be made differently, with variable ingredients, even within the same brand. The below doses may not apply to all products. You should read product labels, and discuss doses with a qualified healthcare provider before starting therapy.

Adults (18 years and older)

A variety of doses have been used and studied. Research in the 1960s and 1970s used 120 to 240 milligrams of bromelain concentrate tablets daily (Traumanase® or Ananase®; 2,500 Rorer units per milligram) in three to four divided doses for up to one week to treat inflammation. The German expert panel, the Commission E, has recommended 80 to 320 milligrams (200 to 800 FIP units) taken two to three times per day. Some authors recommend 500 to 1,000 milligrams of bromelain to be taken three times daily, and many manufacturers sell products standardized to 2,000 GDU in 500 milligram tablets. Effects of bromelain may occur at lower doses, and treatment may be started at a low dose and increased as needed.

Cream containing 35% bromelain in an oil-containing base has been applied to the skin to clean wounds.

Children (younger than 18 years)

There is not enough scientific research to recommend safe use of bromelain in children.

(沒有安全性資料證實 18 歲以下幼童可安全可使用鳳梨酵素)

Safety

The U.S. Food and Drug Administration does not strictly regulate herbs and supplements. There is no guarantee of strength, purity or safety of products, and effects may vary. You should always read product labels. If you have a medical condition, or are taking other drugs, herbs, or supplements, you should speak with a qualified healthcare provider before starting a new therapy. Consult a healthcare provider immediately if you experience side effects.

Allergies

There are multiple reports of allergic and asthmatic reactions to bromelain products, including throat swelling and difficulty breathing. Allergic reactions to bromelain may occur in individuals allergic to pineapples or other members of the Bromeliaceae family, and in people who are sensitive/allergic to honeybee venom, latex, birch pollen, carrot, celery, fennel, cypress pollen, grass pollen, papain, rye flour, or wheat flour. (很多文獻報告有過敏的可能性)

Side Effects and Warnings

Few serious side effects have been reported with the use of bromelain. **The most common side effects reported are stomach upset and diarrhea.** Other reported reactions include increased heart rate, nausea, vomiting, irritation of mucus membranes, and menstrual problems. (最常見的副作用是腸胃道的不適·也有一些報告指出可能會加速心跳·噁心·嘔吐·女性的生理期問題)·In theory, **bromelain may increase the risk of bleeding.** (增加出血的危險) Caution is advised in people who have bleeding disorders or who are taking drugs that increase the risk of bleeding. Dosing adjustments may be necessary. **Bromelain should be used with caution**

in people with stomach ulcers,(有胃潰瘍的人更要小心使用鳳梨酵素) active bleeding, a history of bleeding, taking medications that thin the blood, or prior to some dental or surgical procedures.

Bromelain may increase heart rate at higher doses and should be used cautiously in people with heart disease. Some experts warn against bromelain use by people with liver or kidney disease,(鳳梨酵素在人也许增加心率，在使用較高劑量，應該慎重地使用在心臟病患者。有些專家對鳳梨酵素用途提出警告在使用於肝腎疾病患者) although there is limited scientific information in these areas. Bromelain may cause abnormal uterine bleeding or heavy/prolonged menstruation.

Pregnancy and Breastfeeding

Bromelain is not recommended during pregnancy or breastfeeding, as little safety information is available. Bromelain may cause abnormal uterine bleeding. 鳳梨酵素並不建議使用於懷孕或授乳婦，甚至有可能造成子宮異常出血。

Interactions

Most herbs and supplements have not been thoroughly tested for interactions with other herbs, supplements, drugs, or foods. The interactions listed below are based on reports in scientific publications, laboratory experiments, or traditional use. You should always read product labels. If you have a medical condition, or are taking other drugs, herbs, or supplements, you should speak with a qualified healthcare provider before starting a new therapy.

Interactions with Drugs 藥物交互作用

In theory, bromelain may increase the risk of bleeding when taken with drugs that increase the risk of bleeding. Some examples include aspirin, anticoagulants ("blood thinners") such as warfarin (Coumadin®) or heparin, anti-platelet drugs such as clopidogrel (Plavix®), and non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen (Motrin®, Advil®) or naproxen (Naprosyn®, Aleve®). In addition, bromelain theoretically may add to the anti-inflammatory effects of NSAIDs.

Human studies suggest that bromelain may increase the absorption of some antibiotics, notably amoxicillin and tetracycline, and increase the levels of these drugs in the body. Bromelain may increase the actions of the chemotherapy (anti-cancer) drugs 5-fluorouracil and vincristine, although reliable scientific research in this area is lacking. In theory, use of bromelain with blood pressure medications in the "ACE inhibitor" class, such as captopril (Capoten®) or lisinopril (Zestril®), may cause larger drops in blood pressure than expected.

Some experts suggest that bromelain may cause drowsiness or sedation and may increase the amount of drowsiness caused by some drugs. Examples include benzodiazepines such as lorazepam (Ativan®) or diazepam (Valium®), barbiturates such as phenobarbital, narcotics such as codeine, some antidepressants, and alcohol. Caution is advised while driving or operating machinery.

Bromelain may also interact with heartbeat regulating medications, magnesium, and nicotine.

Interactions with Herbs and Dietary Supplements 與保健食品或中草藥交互作用

In theory, bromelain may increase the risk of bleeding when taken with herbs and supplements that are believed to increase the

risk of bleeding. Multiple cases of bleeding have been reported with the use of *Ginkgo biloba*, and fewer cases with garlic and saw palmetto. Numerous other agents may theoretically increase the risk of bleeding, although this has not been proven in most cases.

Bromelain and the enzyme trypsin are suggested to have stronger anti-inflammatory effects when combined, based on preliminary animal research. It has been suggested that zinc might block the effects of bromelain in the body while magnesium may increase the effects, although scientific research in these areas is lacking.

Bromelain may also interact with herbs and supplements that effect the heart, antibacterials, soy, sedatives, and tobacco.

Methodology

This information is based on a professional level monograph edited and peer-reviewed by contributors to the Natural Standard Research Collaboration (www.naturalstandard.com): Ethan Basch, MD, MSc, MPhil (Memorial Sloan-Kettering Cancer Center); Dawn Costa, BA, BS (Natural Standard Research Collaboration); Cynthia Dacey, PharmD (Northeastern University); Mary McGarry, PharmD (University of Rhode Island); Shaina Tanguay-Colucci, BS (Natural Standard Research Collaboration); Catherine Ulbricht, PharmD (Massachusetts General Hospital); Mamta Vora, PharmD (Northeastern University); Wendy Weissner, BA (Natural Standard Research Collaboration); Jen Woods, BS (Natural Standard Research Collaboration).

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January 01, 2008



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