

Examples of phytoalexins and their properties

The examples below are just a few of the many thousands of phytoalexins produced by plants, but serve to highlight the potential benefits of including them as part of a healthy diet, and perhaps the drawbacks of not doing so.

The ailments that may respond to these compounds include acne, arthritis, bacterial infections, cancer, diabetes, fungal infections, heart disease, inflammation and even memory loss. There are undoubtedly expensive pharmaceutical products that may address any or all of the above. However, if there are dietary compounds that may prevent the onset of illness then surely choosing to eat produce containing those compounds as part of the daily diet is a sensible approach. Prevention is better than cure.

For anyone prepared to invest the time, there is a wealth of information on the internet just waiting to be read. Some of the articles are necessarily more technical than others, but you should be able to find ones that provide you with a message you can understand. (use Google as a search tool)

Anthocyanins

(a sub group of flavanoids)

Cyanidin

Cyanidin is an antioxidant and occurs naturally in the fruit of sour cherries, blueberries, blackberries and european grapes. It may protect cells from oxidative damage and reduce the risk of heart diseases. Studies have generally shown that the glucoside derivative of cyanidin may have an important future role in cancer therapy. It is responsible for the red colours in the fruits and serves as an attractant to insects for pollination.

References

Differentiation of human melanoma cells induced by cyanidin-3-O-B glucopyranoside

<http://www.fasebj.org>

Flavanoids

Resveratrol

(Found in European grapes)

Resveratrol is a polyphenolic phytoalexin and possesses diverse biochemical and physiological actions. It is an antioxidant, anti-inflammatory, anti-bacterial and anti-tumour and there are a host of other attributes. So says the Agricultural Research Service (ARS) of the US Department of Agriculture. To see what else it can do click the link www.ars-grin.gov/duke/chem-activities.html and type in the word resveratrol to find the activities of the chosen chemical.

You can use the same technique to investigate the properties of other phytoalexins mentioned here, or any others you may know of.

The first reference below discusses the cardioprotective abilities of resveratrol, and its promise as an alternative medicine. The second article discusses other attributes. One

drawback of resveratrol is that its bioavailability is very poor.

<http://www.fasebj.org>

References

1) Dipak K Das and Nilanjana Maulik. Resveratrol in Cardioprotection. Molecular Interventions Vol 6 Issue 1 36-47 (2006). www.molinterv.aspetjournals.org

2) Resveratrol as a cancer preventative agent

www.nature.com/bjc/journal

Tangeretin

(Found in orange peel)

Tangeretin is a citrus bioflavonoid. It has antioxidant properties and has shown promise in reducing the risk of certain cancers, as well as neuroprotective activities. It is able to cross the blood brain barrier and may have a role to play in the treatment of Parkinson's disease. Recent studies suggest tangeretin may interfere with the drug Tamoxifen, commonly used in the treatment of breast cancer. A google search on this plant chemical turns up an enormous amount of data on its potential uses.

Nobiletin

(Found in citrus peel)

Nobiletin is a close cousin of tangeretin, and a google search produces an even greater volume of papers. Reported benefits include anti-inflammatory, anti-cancer, cholesterol reduction, improvements in memory loss and even for the treatment of acne. A truly versatile phytoalexin if ever there was one.

References

1) Tangeretin by Ray Sahelian M.D.

www.raysahelian.com/tangeretin.html

Phytochemicals

2) www.phytochemicals.info/phytochemicals/nobiletin.php

Phenolic acids

Ellagic acid

Ellagic acid is another polyphenolic phytoalexins with many useful properties. It is an antioxidant, antiyeast, Candida-SAP-inhibitor and has cancer preventative activities. It occurs in a number of fruits including raspberries, strawberries, blackberries and cranberries as well as walnuts. The first reference below discusses studies carried out in 1999 and 2005, while the second looks at how combinations of plant chemicals work synergistically to produce enhanced health benefits.

References

- 1) World of molecules
www.worldofmolecules.com/antioxidants/ellagic_acid.htm
- 2) The American society for nutritional sciences J. Nutr. 133:2669-2674, August 2003
www.jn.nutrition.org

Gallic acid

Gallic acid may be found in a number of plants, but occurs at higher levels in walnuts, grapes, tea and hops. It has been used in ointments for the treatment of psoriasis and has anti-fungal properties as well. The first reference below refers to its ability to prevent fungus from producing harmful aflatoxins. The second reference is to its use in the treatment of inflammation, rheumatoid arthritis and is part of a patent application.

References

- 1) www.ars.usda.gov
- 2) <http://www.freshpatents.com>

Hydroxycinnamic acids

Ferulic acid

Ferulic acid is an antioxidant and can be found in apples, oranges, lemons, spinach and the much maligned Brussels sprout. It is reported to reduce cholesterol levels, may reduce the risk of certain cancers and in the reference below is thought to be useful in the treatment of diabetes. The diabetes study suggests the inclusion of ferulic acid in the normal daily diet.

References

- 1) sciencelinks.jp/j-east/article/200410/000020041004A0290511.php

Carotenes

Lycopene

Lycopene is probably best known as the red pigment in tomatoes, but it also appears in citrus fruits, watermelon, carrots, apricots, peaches and grapes. It is widely thought to reduce the risk of prostate, lung and stomach cancer. It is also thought to have a role to play in the reduction of heart disease. Fans of tomato ketchup will be pleased to know that it is an excellent source of lycopene.

References

- 1) www.lycopene.com
- 2) www.news.uiuc.edu/scitips/03/1104lycopene.html

