Prickly Pear
Research Information

The Science Behind
Prickly Pear Fruit!
Prickly Pear Research Information

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This information is intended for physicians and other licensed health care provider to use as a basis for determining whether or not to recommend prickly pear fruit. This medical and scientific information is not for use by consumers.

   By: University of Arizona’s Department of Obstetrics and Gynecology; Arizona Cancer Center, Division of Gynecologic Oncology, Tucson, Arizona; Department of Gynecologic Oncology, Fudan University, Shanghai, China; Guangxi Medical University, Guangxi, China.
   SUMMARY: Anti-cancer: Arizona prickly pear cactus extracts effectively inhibited cell growth in several different immortalized and cancer cell cultures in vitro and suppressed tumor growth in a nude mouse of an ovarian cancer model. These effects of the extracts were comparable with those caused by a synthetic retinoid currently used in chemoprevention trials. Currently, the team of research institutions is investigating the expressions of genes related to cell growth and apoptosis which may be altered by treatment with cactus products to elucidate possible pathways through which this natural product exerts its anti-cancer effects.

2. Nutritional and medicinal use of Cactus pear cladodes and fruits.
   By: University of Arizona’s Department of Obstetrics and Gynecology. Institute of Food Technology, Plant Foodstuff Technology, Hohenheim University, Stuttgart, Germany.
   SUMMARY: Anti-cancer: based on recent studies cactus pear inhibits the proliferation of cervical, ovarian and bladder cancer cell lines in vitro and suppresses tumor growth in nude mice in vivo comparable to synthetic retinoid retinamide, which is currently used as a chemopreventive agent in ovarian cancer chemoprevention. Anti-oxidant properties: The presence of several antioxidants (ascorbic acid, carotenoids, reduced glutathione, cysteine, taurine and flavonoids such as quercetin, kaempferol and isorhamnetin) has been detected in cactus pear. Recently the antioxidant properties of betalains (betanin and indicaxanthin) have been revealed in prickly pear. Polyphenolics are antioxidants with well-known cardioprotective, anticancer, antiviral and antiallergenic properties. Cactus polyphenolics induce a rise of the
intracellular pool of calcium ions from the endoplasmic reticulum and thus perturb the expression of the interleukin 2, which is associated with the S-phase transition in human Jurkat T-cells. **Anti-viral effect**: Study demonstrated that administration of a cactus stem extract to mice, horses, and humans inhibits intracellular replication of a number of DNA- and RNA-viruses such as Herpes simplex virus Type 2, influenza virus, and HIV-1. An inactivation of extra-cellular viruses was also reported by the same authors.

**Anti-inflammatory agent**: Numerous studies have evocated the analgesic and anti-inflammatory actions of the prickly pear by using the fruit and stems. The research identified beta-sitosterol as the active anti-inflammatory principle from the stem extract. **Anti-diabetic (type 2) effect**: Studies have demonstrated hypoglycemic activity of the prickly pear on diabetic humans. **Anti-hyperlipidemic and hypercholesterolemic effects**: Evidence suggest that cactus pear reduces cholesterol levels in human blood and modifies low density lipoprotein (LDL) composition. Studies found that cholesterol LDL and triglyceride plasma levels were strongly reduced after 30 days of daily administration of cactus. The effects of cactus are generally attributed to the high fiber content of the cladodes, although other active ingredients (such as beta-carotenes, vitamin E and beta-sitosterol) may be involved. **Further benefits**: While the cactus fruit has been traditionally used to treat ulcers, allergies, fatigue, and rheumatism and as an antiuric and diuretic agent, research has found alleviating effects toward alcohol hangover symptoms were associated with reduced inflammatory responses after excessive alcohol consumption. Amongst the flavonoids extracted from the cactus fruit or stem, quercetin 3-methyl appears to be the most potent neuroprotector.

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3. **Supplementation with cactus pear fruit decreases oxidative stress in healthy humans: a comparative study with vitamin C.**


*By*: University of Palermo, Italy

**SUMMARY**: Consumption of cactus pear fruit positively affects the body’s redox balance, decreases oxidative damage to lipids, and improves antioxidant status in healthy humans. Vitamin C is a well-characterized antioxidant in cactus pear fruit. So, the research team compared the effects of supplementation with cactus pear fruit with those of supplementation of an equivalent dosage of vitamin C. The results showed supplementations with vitamin C at a comparable dosage enhances overall antioxidant defense but does not significantly affect body oxidative stress. Something in the cactus pear fruit other than vitamin C may help to decrease lipid oxidation. Components of cactus pear fruit other than antioxidant vitamins may play a role in the observed effects. **The results of the present study further underscore that daily**
supplementation with 500g. cactus pear fruit pulp for 2 weeks greatly improves the oxidative stress status of healthy subjects. Improved body redox status suggest major benefits from diets including cactus pear, which may reduce the risk of age-related and degenerative diseases in which the level of body oxidative stress may play a pathogenic role.

4. Use of Opuntia Cactus as Hypoglycemic agent in Managing Type II Diabetes.
*Source: 2007, Nutrition Bytes, 12:1.*
*By: Jose Luis Lopez, UCLA School of Medicine*
**SUMMARY:** The prickly pear cactus’ pectin affectively decreases plasma LDL levels, increases expression of a poliprotein receptor expression, increases hepatic LDL turnover, and affects cholesterol homeostasis in guinea pigs. It demonstrates the ability to decrease blood glucose levels as well the hyperglycemic peak during glucose tolerance testing likely due to both fiber content and specific hypoglycemic agents. In addition, the prickly pear has demonstrated the ability to control experimentally induced diabetes. Currently, homeopathic industries have begun to incorporate opuntia (prickly pear cactus) into supplements intended to help regulate plasma glucose levels. Additional properties that would benefit patients with diabetes mellitus include its ability to reduce hypercholesterolemia, optimize platelet function and decrease oxidative tissue damage. The prickly pear cactus constitutes the herbal most commonly used for its hypoglycemic properties. Its popularity in addition to its hypoglycemic properties makes the prickly pear cactus an ideal dietary constituent in the management of type 2 diabetes mellitus.

5. Daily prickly pear consumption improves platelet function.
**ABSTRACT:** Prickly pear is traditionally used by Pima Indians as a dietary nutrient against diabetes mellitus. We examined the effect of daily consumption of 250 g in 8 healthy volunteers and 8 patients with mild familial heterozygous hypercholesterolemia on various parameters of platelet function. Beside its action on lipids and lipoproteins, prickly pear consumption significantly reduced the platelet proteins (platelet factor 4 and Bthromboglobulin),
ADP-induced platelet aggregation and improved platelet sensitivity (against PGI and PGE) in volunteers as well as in patients. Also plasma 11-DH-TXB and the WU-test showed a significant improvement in both patients and volunteers. In contrast, collageninduced platelet aggregation and the number of circulating endothelial cells showed a significant response in patients only. No influence of prickly pear ingestion on peripheral platelet count was monitored. The dietary run-in period did not influence any of the parameters of haemostasis examined. No sex difference was seen. Prickly pear may induce at least part of its beneficial actions on the cardiovascular system via decreasing platelet activity and thereby improving haemostatic balance.

6. Antioxidant compounds from four Opuntia cactus pear fruit varieties
By: Joseph O. Kuti, Texas A & M University, Horticultural Crops & Food Research Laboratory.
SUMMARY: The antioxidant compounds in extracts from cactus fruits were investigated. Conjugated flavonoids (quercetin, kaempferol and isorhamnetic), ascorbic acid and carotenoids were isolated. One of the most interesting findings in this study regarding the phytochemical content of cactus pear fruits is that the flavonoid quercetin is one of the most commonly consumed flavonoids and thus has been well studied for its potential health benefits. Quercetin possesses anti-proliferate, anticarcinogenic and antioxidant activities. The high antioxidant capacity of the purple skinned cactus pears, observed in this study, may be due to the high phenolic content or possible a combination of individual antioxidants producing synergistic effects. This investigation shows the potential value of cactus pear fruits as a good source of natural antioxidants and that consumption of cactus pear fruit or its products may contribute substantial amounts of antioxidants to the diet that can be used in nutritional supplement formulations.

7. Pectins from Opuntia spp.: A Short Review.
Source: February 2003, Journal of PACD, 17-29
By: Francisco M. Goycoolea and Adriana Cardenas; Centro de Investigacion en Alimentacion y Desarrollo, A.C., Laboratory of Biopolymers; Centro de Investigacion en Alimentacion y Desarrollo, A.C., Unidad Guaymas
SUMMARY: Two distinctive water-soluble high-molecular weight pectin polysaccharide materials that occur in Opuntia fruits have been extracted and studied in this research laboratory, namely the well-known mucilage and a calcium-sensitive gelling fraction. It has been demonstrated experimentally that intake of prickly-pear pectin decreases plasma low-density lipoprotein (LDL) cholesterol levels in guinea pigs as a good model to human plasma lipoprotein
profile. In patients suffering from Type 2 Diabetes, the hypoglycemic effect of cactus has long been documented. As in the case of the hypocholesterolemic effects, the responsible mechanisms have not been established. Other effects of the intake of cactus pectin that have been demonstrated include anti-inflammatory activity for the treatment of enteritis. Undoubtedly, the whole subject area concerned with physiological effects of cactus pectins is complex and the underlying mechanisms are still poorly understood, but the number of products based on Optunia is growing rapidly.

8. Absorption, excretion, and distribution of dietary antioxidant betalains in LDLs: potential health effects of betalains in humans
By: Luisa Tesoriere, Mario Allegra, Daniela Butera, and Maria A Livrea

ABSTRACT: Background: Betalains were recently identified as natural antioxidants. However, little is known about their bioavailability from dietary sources. Objective: The objective was to evaluate the bioavailability of betalains from dietary sources. Conclusion: Our results show that cactus pear fruit is a source of bioavailable betalains and suggest that indicaxanthin and betanin may be involved in the observed protection of LDL against ex vivo induced oxidative modifications.

9. Sample text for Prickly pear cactus medicine: treatments for diabetes, cholesterol and the immune system.
Source: Prickly Pear Cactus Medicine, Library of Congress Catalog: number 2004003633
By: Ran Knishinsky,

SUMMARY: Cactus fruit Vitamin and Mineral Content: The fruit is packed with cofactors that boost immunity. It contains significant portions of the minerals calcium, magnesium, and potassium. The cactus fruit also contains a large portion of antioxidant compounds, including flavonoids that help protect against cancer and are chiefly responsible for protecting the body against the oxidation of cholesterol. Medicinal Benefits: The fruits have been under intense research noting positive links between cactus fruit and antihyperglycemic effects. Studies suggest that daily intake of the prickly pear fruit yielded positive results and exhibited a notable anti-diabetic effect. Studies at the University of Arizona by Dr. Maria Luz Fernandez show the effects of diet on cholesterol metabolism. The results of the tests point to a decrease in plasma cholesterol, which is mainly a decrease in low-density lipoprotein. Other results also suggest that prickly pear pectin may modulate the body’s glucose response.