Discover the properties of Pomegranate

Scientific studies of Pomegranate extract

[Pomegranate exerts chemoprevention of experimentally induced mammary]

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Breast cancer is the second leading cause of cancer-related death in women in the United States and discovery and development of safe chemopreventive drugs is urgently needed.

RESEARCH TITLE: Pomegranate exerts chemoprevention of experimentally induced mammary tumorigenesis by suppression of cell proliferation and induction of apoptosis

COUNTRIES: USA and Puerto Rico.

CONDUCTED BY: Department of Pharmaceutical Sciences, College of Pharmacy, Larkin Health Sciences Institute, Miami, Florida,USA; Department of Pharmaceutical Sciences, College of Pharmacy, Northeast Ohio Medical University, Rootstown, Ohio,USA; School of Health Sciences, University of Turabo, Gurabo,Puerto Rico; Department of Pharmacogenomics, Bernard J. Dunn School of Pharmacy, Shenandoah University, Ashburn, Virginia,USA

PUBLISHED ON: PubMed

RESEACH:

The fruit pomegranate (*Punica granatum*) is gaining importance because of its various health benefits. This study was initiated to investigate chemopreventive potential of a pomegranate emulsion (PE) against 7,12-dimethylbenz(*a*)anthracene (DMBA) rat mammary carcinogenesis.

The animals were orally administered with pomegranate emulsion (0.2–5.0 g/kg), starting 2 wk before and 16 wk following DMBA treatment. Pomegranate emulsion exhibited a striking reduction of DMBA-induced mammary tumor incidence, total tumor burden, and reversed histopathological changes.

Pomegranate emulsion dose-dependently suppressed cell proliferation and induced apoptosis in mammary tumors. Immunohistochemical studies showed that Pomegranate emulsion increased intratumor Bax, decreased Bcl2 and manifested a proapoptotic shift in Bax/Bcl2 ratio. In addition, our gene expression study showed Pomegranate emulsion-mediated upregulation of Bad, caspase-3, caspase-7, caspase-9, poly (ADP ribose) polymerase and cytochrome c in mammary tumors.

Thus, **Pomegranate emulsion exerts chemoprevention of mammary carcinogenesis by suppressing cell proliferation and inducing apoptosis** mediated through upregulation of Bax and downregulation of Bcl2 in concert with caspase cascades.

Pomegranate bioactive phytoconstituents could be developed as a chemopreventive drug to reduce the risk of breast cancer.

YEAR: 2015

https://zumodegranada.com/en/pomegranate-exerts-chemoprevention/

The potential role of pomegranate treatment on murine malaria

The potential role of pomegranate treatment on murine malaria

The potential role of pomegranate treatment on murine malaria

Malaria is a health burden disease where the world harnessed the power of expertise and innovation to understand the biology of the parasite and the pathogenesis of the disease as well as to discover effective drugs.

RESEARCH TITLE: The potential role of *Punica granatum* treatment on murine malaria-induced hepatic injury and oxidative stress

COUNTRIES: Saudi Arabia and Egypt.

CONDUCTED BY: Department of Clinical Laboratory Sciences, College of Applied Medical Sciences, King Saud University, Saudi Arabia; Department of Zoology, College of Science, King Saud University, Riyadh, Saudi Arabia ; Department of Zoology and Entomology, Faculty of Science, Helwan University, Cairo, Egypt.

PUBLISHED ON: Parasitology Research

RESEACH:

Malaria is a health burden disease where the world harnessed the power of expertise and innovation to understand the biology of the parasite and the pathogenesis of the disease as well as to discover effective drugs. However, the treatment of malaria remains a challenging task and inadequate to address today's perplexing problem, the emergence of resistant strains.

Historically, traditional medicine has been a mainstay for remediation and still retains its importance with the presence of potent natural products. Pomegranate has been used as antioxidant and anti-inflammatory against a range of diseases. Therefore, pomegranate peel extract was used in this study to examine its effect on *Plasmodium chabaudi*-induced hepatic inflammation.

Animals were allocated into three groups: a vehicle control group, a group infected with 10^6 *P. chabaudi*-parasitized erythrocytes and a pomegranate-treated group infected with 10^6 *P. chabaudi*-parasitized erythrocytes. This group received 100µl of 300 mg/kg pomegranate peel extract after infection.

The results showed the effectiveness of pomegranate peel extract on reversing the anaemic signs that have been provoked by *P. chabaudi* infection through instating the haemoglobin concentration and erythrocyte count back to normal values. Moreover, pomegranate peel extract exhibited hepatoprotective activities upon histopathological examination and liver function tests.

These data were further confirmed by the significant reduction of the hepatic oxidative markers, glutathione, nitric oxide and malondialdehyde, in mice infected with *P. chabaudi*. Based on these

outcomes, **pomegranate could be used as a hepatoprotective agent against *P. chabaudi*-induced hepatic injury.** However, further studies are needed in order to determine the mode of action of pomegranate upon infection.

YEAR: 2015

https://zumodegranada.com/en/role-of-pomegranate-treatment/

Effect of Pomegranate Extract Consumption on Cardiovascular Disease Risk Factors

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This exploratory study investigates the effect of Pomegranate extract consumption on blood pressure (BP), insulin resistance (HOMA-IR), stress hormone levels (cortisol/cortisone) and quality of life in healthy human volunteers.

RESEARCH TITLE: Effect of Pomegranate Extract Consumption on Cardiovascular Disease Risk Factors, Stress Hormones, and Quality of

Life in Human Volunteers: An Exploratory Randomised, Double-Blind, Placebo-Controlled Trial

COUNTRIES: Scotland, United Kingdom

CONDUCTED BY: Dietetics, Nutrition and Biological Sciences, School of Health Sciences, Queen Margaret University, Scotland, United Kingdom; The James Hutton Institute, Invergowrie, Scotland, United Kingdom

PUBLISHED ON:Cronicon Open Access

RESEACH:

Background

Pomegranate extract provides a rich and varied source of biophenols, which can act as powerful antioxidants. The most abundant being ellagitannins, anthocyanins, and ellagic and gallic acid derivatives. Evidence suggests that pomegranate juice consumption may alleviate cardiovascular disease (CVD) risk factors. This exploratory study investigates the effect of Pomegranate extract consumption on blood pressure (BP), insulin resistance (HOMA-IR), stress hormone levels (cortisol/cortisone) and quality of life in healthy human volunteers.

Methods

Seven males and 22 females(n = 29) participated in a double-blind, randomised, placebo-controlled exploratory study (BMI: 25.05 ± 3.91 kg/m², age: 34.5 ± 13.7 years). All participants consumed either Pomegranate extract or a placebo capsule daily, after a meal, for 4 weeks. Dietary history and habits and the health related Quality of Life questionnaire (Rand 36) were recorded pre- and post-intervention. BP, salivary cortisol and cortisone levels (am, noon, and pm) were assessed byELISAs, and fasting blood was obtained at baseline and after 4 weeks to compare glucose, insulin and insulin resistance parameters.

Results

All participants randomised in the study completed the intervention.Systolic BP was significantly reduced following Pomegranate extract from 120.3 ± 13.3 to 115.6 ± 13.1 mmHg (P = 0.012). There was a reduction in the HOMA-IR levels from2.22 ± 2.62 to 1.61 ± 1.88 (P = 0.045), and glucose, insulin and uric acid alldecreased from baseline. No significant changes were recorded in volunteerstaking the placebo.

Pomegranate extract consumption caused a significant drop of salivary cortisol levels (am; 39.5 ± 19.6%, $p < 0.001$ and noon; 43.1 ± 32.3%, $p = 0.016$). The salivary cortisol/cortisone ratio was also significantly reduced (am from 1.11 ± 0.51 to 0.55 ± 0.26, $p < 0.001$, noon 1.57 ± 0.85 to 0.75 ± 0.72, $p < 0.001$ and pm; 1.22 ± 0.90 to 0.74 ± 0.59, $p = 0.011$). Physical ($p = 0.018$) and social functioning ($p = 0.021$), pain ($p = 0.003$), general health ($p = 0.008$) and overall Quality of Life score ($p = 0.007$) were significantly improved in those taking the Pomegranate extract capsules. The intervention was delivered successfully with no withdrawals.

Conclusions

T**hese results suggest that Pomegranate extract intake rich in biophenolsmay ameliorate cardiovascular risk factors, reduce stress levels and improve perceived health related quality of life.** The reduction in salivary cortisol levels may prove beneficial for people suffering from chronic stress. This exploratory study provides useful information required to conduct a definitive trial.

YEAR: 2015

https://zumodegranada.com/en/effect-of-pomegranate-extract-consumption/

Scientific studies of Pomegranate juice

[Effects of Pomegranate Juice in Athletes]

Effects of Pomegranate Juice in Athletes

Effects of Pomegranate Juice in Athletes

The aim of the present study was to assess the effects of pomegranate juice on the level of oxidative stress in blood of endurance-based athletes.

RESEARCH TITLE: Effects of Pomegranate Juice in Circulating Parameters, Cytokines and Oxidative Stress Markers in Endurance-Based Athletes: A Randomised Controlled Trial

COUNTRIES: Spain

CONDUCTED BY: Toxicology Unit. Institute of Bioengineering, University Miguel Hernandez. Elche- Alicante. Spain; Biochemistry and Cell Therapy Unit. Institute of Bioengineering, University Miguel Hernandez. Elche (Alicante); Immunology Division, Biotechnology Department, University of Alicante. San Vicente del

Raspeig (Alicant), SPAIN; Immunology Division, Biotechnology Department, University of Alicante. San Vicente del Raspeig (Alicant), SPAIN;

PUBLISHED ON: Nutrition

RESEACH:

Abstract

The aim of the present study was to assess the effects of pomegranate juice on the level of oxidative stress in blood of endurance-based athletes. Pomegranate juice is rich in polyphenols, conferring it a higher antioxidant capacity than other beverages with polyphenolic antioxidants.

A randomized, double-blind, multicenter trial was performed in athletes from 3 different sport clubs located in the southern region of Spain. Plasma oxidative stress markers (protein carbonyls and malondialdehyde (MDA)) as well as C-reactive protein and sE-selectin were measured.

A total of 31 athletes participated in the study, supplemented during 21 days with 200 ml/day pomegranate juice (PJ) (n=10), 200 ml/day pomegranate juice diluted 1:1 with water (PJD) (n=11) and a control group not consuming pomegranate juice (C) (n=10). Nine volunteers were excluded due to protocol violations (n=4 in the PJ group and n=5 in the PJD group) since they did not respect the 24 h of rest before the last blood test.

The control group increased levels of carbonyls (+0.7 ± 0.3 nmols/mg protein) and MDA (+3.2 ± 1.0 nmols/g protein), while pomegranate juice and PJD groups maintained or decreased their levels, respectively. On the other hand, lactate levels increased in the pomegranate juice group (from 10.3 at day 0 to 21.2 mg/dL at day 22).

A non-significant decrease was detected in sE-selectin and C-reactive protein in the groups consuming pomegranate juice. Consumption of pomegranate juice during 21 days improves MDA levels and carbonyls, decreasing the oxidative damage caused by the exercise.

YEAR: 2015

[Pomegranate Juice Improves Iron Status]

Pomegranate Juice Improves Iron Status

Ayurveda, an Indian system of medicine, describes pomegranate (Punica granatum) fruits as a Rasayana and a dietary supplement for managing a condition called Pandu, which is akin to Iron Deficiency Anemia. Let´s see what the investigation concluded about it.

RESEARCH TITLE: Pomegranate Juice Improves Iron Status and Ameliorates Iron Deficiency Induced Cellular Changes in Saccharomyces cerevisiae

COUNTRIES: India

CONDUCTED BY: *S.P. Balasubramani, G. Padmagiri, P. Venkatasubramanian, R. Vidyashankar, A. Godbole*

PUBLISHED ON: Lifesciences global

RESEACH:

Background

Iron Deficiency Anemia (IDA) is most prevalent form of anemia affecting around 2 billion people world-wide. Ayurveda, an Indian system of medicine, describes pomegranate (Punica granatum) fruits as a Rasayana and a dietary supplement for managing a condition called Pandu, which is akin to Iron Deficiency Anemia. Rasayanas are methods to maintain homeostasis by improving digestion, metabolism and absorption of nutrients and elimination of waste. Yeast (Saccharomyces cerevisiae) has been a well-accepted model organism to study iron metabolism.

Materials & Methods

In the current study we developed 'anemic yeast' by culturing yeast cells in iron-free medium with bathophenanthroline disulfonate (BPS). The effect of pomegranate juice on reversing the 'Iron Deficiency Anemia like' condition in yeast was studied.

Results

Culturing iron deficient (ID) cells in the presence of 10% pomegranate juice supplemented medium (IDP), improved iron status by at least 7 fold ($p<0.0001$) and reversed mitochondrial degeneration induced by iron deficiency. Percentage of healthy reticulate mitochondria in IDP cells was >30% higher ($p<0.0001$) than that in the iron deficient cells grown in iron deficient medium (IDD) and at least 14% more than that in ID cells grown in 10% Pomegranate Juice-equivalent iron substituted media. Interestingly, Pomegranate Juice substitution improved the functional ferrous (Fe^{2+}) form as well as the bio-assimilated heme form of iron, but not the ferric (Fe^{3+}) storage form in iron deficient cells.

Conclusion

Yeast model can be useful as a quick screen to identify potential nutritional supplements. Pomegranate's potential role as a nutritional supplement in Iron Deficiency Anemia management and as a hematinic is worthy of further research.

YEAR: 2015

https://zumodegranada.com/en/pomegranate-juice-improves-iron-status/

Ameliorative effects of quince fruit on diabetes

Ameliorative effects of quince fruit on diabetes

The objective of the present study was to evaluate the effect of aqueous extract of Cydonia oblonga Mill. Fruit on lipid profile and some biochemical parameters in streptozotocin-induced diabetic rats.

WEB TITLE: Ameliorative effects of quince fruit on diabetes

COUNTRIES: Iran

CONDUCTED BY: Department of Pharmacology and Toxicology, School of Pharmacy, Zanjan University of Medical Sciences, Zanjan, Iran; Department of basic science, Science and Research branch, Islamic Azad University, Tehran, Iran; Faculty of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran; Department of Immunology, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran.

PUBLISHED ON: Iranian Journal of Pharmaceutical Reseach

RESEARCH:

Diabetes mellitus is associated with complications in several different systems of the body, and the incidence of diabetes is rapidly increasing worldwide. The objective of the present study was to evaluate the effect of aqueous extract of Cydonia oblonga Mill. Fruit on lipid profile and some biochemical parameters in streptozotocin-induced diabetic rats. The extract showed anti hyper lipidemic activity as evidenced by significant decreases in serum triglyceride, total cholesterol, and low density lipoprotein cholesterol (LDL-C) levels along with the elevation of high density lipoprotein cholesterol (HDL-C) in the diabetic rats. The biochemical liver functional tests were also analyzed and it was shown that serum biomarkers of liver dysfunction, including alanine transaminase (ALT), aspartate transaminase (AST), and alkaline phosphatase (ALP) were significantly reduced in aqueous extract of Cydonia oblonga Mill. treated diabetic rats. In addition, our results showed that the oral administration of the extract prevented diabetes-induced increase in serum urea and creatinine levels as the markers of renal dysfunction. In conclusion, the present study indicates that aqueous extract of Cydonia oblonga Mill. Is able to improve some of the symptoms associated with diabetes and possesses hypolipidemic, hepatoprotective, and renoprotective effects in streptozotocin-induced diabetic rats.

Serum lipid profiles: The results of the serum lipid profile showed that streptozotocin injection led to the development of hyperlipidemia in which serum triglyceride, total cholesterol, and LDL-C markedly ($p < 0.001$) increased when compared to the control group (Figure 1-3). However, HDL-C decreased in diabetic rats in comparison with the normal control (Figure 4). As shown in Figure1-4 the different concentrations of aqueous extract of Cydonia oblonga Mill. Fruit caused a significant decrease in the serum triglyceride, total cholesterol, and LDL-C, but a significant increase in HDL-C levels in the diabetic rats during 6 weeks of the treatment.

Liver parameters: Serum activities of ALT, AST, and ALP as the markers of liver function significantly ($p < 0.001$) were increased in the untreated diabetic rats in comparison to the non-diabetic rats (Figure 5-7). The extract at the concentrations of 80, 160, and 240mg/kg caused a significant decrease in the biomarkers of liver injury in the diabetic rats treated with the extract ($p < 0.001$).

Drug-induced diabetes is one of the most commonly used experimental diabetic models (28). In the present study diabetes was induced in rats by injection of streptozotocin. Diabetes is often accompanied by hyperlipidemia that manifests marked elevations of cholesterol, triglyceride, and LDL-C as well as low concentration of HDL-C (29, 30). These serum lipid abnormalities result due to disruption of fatty acid metabolism (31). Our results confirm that hyperlipidemia was occurred in the diabetic rats. Natural products that reduce or alter serum lipid profiles have proved to be effective for the treatment of many diabetic complications (32). Our findings showed that the oral administration of aqueous extract of Cydonia oblonga Mill. Fruit was able to ameliorate serum lipid profiles in the diabetic rats. It can be therefore suggested that quince fruit could be a potential source of hypolipidemic agent (s) and it can be used in the management of hyperlipidemia in diabetic patients. Diabetes plays a central role in the initiation and progression of liver injury and this progressive disease is an independent risk factor for the development of chronic liver diseases (33, 34). The serum activities of ALT, AST, and ALP are biomarkers of hepatic injury (15, 35). ALT and AST are transaminase enzymes that catalyse amino transfer reactions and play an important role in amino acids catabolism and biosynthesis (36, 37). In addition, ALP is a hydrolase enzyme which acts as non-specific phosphomonoesterases to hydrolyse phosphate esters (38). In the present study, the serum elevation of liver damage biomarkers was occurred as a result of deleterious effect of hyperglycemia in the liver of diabetic rats. Increasing the activities of these enzymes is mainly due to leakage of the enzymes from the liver into the blood stream as a result of streptozotocin toxicity which leads to the liver damage. However, the treatment of diabetic groups with the extract of Cydonia oblonga Mill. for 42 consecutive days could ameliorate the activities of the above enzymes. A possible explanation for the hepatoprotective effects of the extract is that this fruit may inhibit the liver damage induced by streptozotocin. These results

suggest a hepatoprotective role for quince fruit against liver injury associated with diabetes. Diabetes mellitus is also associated with complications in the renal system. Patients with diabetes experience major long-term complications such as nephropathy and diabetic nephropathy is one of the leading causes of end-stage renal disease (ESRD) in the world (39, 40). Our results reconfirmed that the plasma levels of urea and creatinine, which are considered as significant biomarkers of renal dysfunction (41), were increased in the experimentally induced-diabetes. However, the treatment of diabetic rats with the extract of Cydonia oblonga Mill. reduced their plasma urea and creatinine levels. This implies that quince fruit normalizes the function of kidneys in the diabetic rats. It was reported that the extract of Cydonia oblonga Mill. leaves possessed remarkable hypoglycemic effect in streptozotocin-induced diabetic rats. The leaves extract also showed antioxidant activity and protected the heart tissue against lipid peroxides produced by diabetes (23). In addition, Cydonia oblonga Mill. Leaf extracts showed hypolipidaemic and hepatoprotective effects in the rat model of hyperlipidaemia (22). Our results demonstrated that the fruit of Cydonia oblonga Mill. possesses hypolipidemic, hepatoprotective, and renoprotective effects in streptozotocin-induced diabetic rats. Previous studies have also shown that Cydonia oblonga Mill. Fruit contains polyphenols (19). It is well established that polyphenolic compounds have hypoglycemic activity and prevent the development of diabetic complications (42, 43). Therefore, the presence of these constituents may explain the protective effects of this fruit in diabetes-related complications. However, we believe that further studies are necessary to determine the exact nature of the active components and the mechanism of action of Cydonia oblonga Mill. Fruit in diabetes and its associated complications.

Conclusion: The results of this study demonstrate that the oral administration of aqueous extract of Cydonia oblonga Mill. Fruit improve serum lipid profile in diabetic rats by lowering cholesterol, triglyceride, and LDL-C levels and raising HDL-C levels. In addition, the hepatoprotective effect of quince fruit is demonstrated by the significant reduction of serum levels of ALT, AST, and ALP in the diabetic treated rats. The extract also improved renal function in diabetic rats by reducing serum urea and creatinine. It can be concluded that Cydonia oblonga Mill. Fruit possesses hypolipidemic, hepatoprotective, and renoprotective effects in streptozotocin-induced diabetic rats.

YEAR: 2015

https://zumodegranada.com/en/ameliorative-effects-of-quince-fruit-on-diabetes/

Photoprotection by Punica granatum seed oil

Photoprotection by Punica granatum seed oil

The aim of this study was to analyze the photoprotection provided by *Punica granatum* seed oil nanoemulsion entrapping the polyphenol-rich ethyl acetate fraction against UVB-induced DNA damage in the keratinocyte HaCaT cell line.

RESEARCH TITLE: Photoprotection by *Punica granatum* seed oil nanoemulsion entrapping polyphenol-rich ethyl acetate fraction against UVB-induced DNA damage in human keratinocyte (HaCaT) cell line

COUNTRIES: Spain; Brazil

CONDUCTED BY: Departament de Fisiologia, Facultat de Farmàcia, Universitat de Barcelona, Barcelona, Spain; Unidad de Toxicología y Ecotoxicología del Parc Cientific de Barcelona, Barcelona, Spain; Programa de Pós-Graduação em Farmácia, Universidade Federal de Santa Catarina,Florianópolis, Brazil

PUBLISHED ON: Journal of Photochemistry and Photobiology B: Biology

RESEACH:

Abstract

There has been an increase in the use of botanicals as skin photoprotective agents. Pomegranate (*Punica granatum* L.) is well known for its high concentration of polyphenolic compounds and for its antioxidant and anti-inflammatory properties. The aim of this study was to analyze the photoprotection provided by *Punica granatum* seed oil nanoemulsion entrapping the polyphenol-rich ethyl acetate fraction against UVB-induced DNA damage in the keratinocyte HaCaT cell line. For this purpose, HaCaT cells were pretreated for 1 h with nanoemulsions in a serum-free medium and then irradiated with UVB (90–200 mJ/cm^2) rays. Fluorescence microscopy analysis provided information about the cellular internalization of the nanodroplets. We also determined the*in vitro* SPF of the nanoemulsions and evaluated their phototoxicity using the 3T3 Neutral Red Uptake Phototoxicity Test. The nanoemulsions were able to protect the cells' DNA against UVB-induced damage in a concentration dependent manner. Nanodroplets were internalized by the cells but a higher proportion was detected along the cell membrane. The SPF obtained (~ 25) depended on the concentration of the ethyl acetate fraction and pomegranate seed oil in the nanoemulsion. The photoprotective formulations were classified as non-phototoxic. In conclusion,

nanoemulsions entrapping the polyphenol-rich ethyl acetate fraction show potential for use as a sunscreen product.

Conclusion

Our results suggest that pomegranate seed oil nanoemulsion entrapping pomegranate peel polyphenol-rich extract has great potential to be used as a sunscreen. EAF-loaded NE were internalized by the keratinocyte cells and also accumulated along the cell membrane. Formulations protected the cells' DNA against UVB-induced damage, protection was concentration dependent. The SPF determined for EAF-loaded NE was relatively high given that no synthetic filters were involved. No phototoxic effect was observed after incubation of EAF or EAF-loaded NE with 3T3 mouse fibroblasts or human keratinocyte HaCaT at the concentration tested. The data presented here can be considered a starting point for the initiation of the use of pomegranate seed oil nanoemulsion entrapping pomegranate peel polyphenol-rich extract for photoprotection against UVB radiation and its damaging effects on human skin. However, further studies are needed to better understand this photoprotective effect.

YEAR: 2015

https://zumodegranada.com/en/photoprotection-by-punica-granatum-seed-oil/

Antioxidant profile of cookies fortified with juice and peel of fresh Pomegranate

Antioxidant profile of cookies fortified with juice and peel of fresh Pomegranate

Peel powder and juice of fresh pomegranate (Punica granatum) were utilized to prepare cookies as sources of antioxidants, along with the other common ingredients, in the present study.

RESEARCH TITLE: Antioxidant profile and sensory evaluation of cookies fortified with juice and peel powder of fresh Pomegranate (Punica granatum)

COUNTRIES: India

CONDUCTED BY: Department of Food & Nutrition, Sarada Ma Girls' College, Kolkata, India

PUBLISHED ON: Agricultural and Food Sciences

RESEACH:

Peel powder and juice of fresh pomegranate (Punica granatum) were utilized to prepare cookies as sources of antioxidants, along with the other common ingredients, in the present study. The components were added in different proportions during the cookie preparation and their rheological, sensory and antioxidant properties were evaluated. Chemical composition (moisture, protein, carbohydrate and ash) and antioxidant profile (DPPH and ABTS radical scavenging, contents of total polyphenolics, flavonoids and anthocyanins) of control and fortified cookies was determined. Sensory evaluation was done by a panel of 10 tasters, using 9-point hedonic test. It was observed that DPPH radical scavenging activity in the fortified cookies was significantly improved, probably due to incorporation of less polar phytochemicals. This was substantiated by the fact that flavonoid and anthocyanin contents were also significantly increased in the fortified cookies. Maximum limit of fortification was 50% for juice and 10% for peel powder as sensorial parameters deteriorated beyond such limits. The study indicated that addition of pomegranate peel powder or juice in cookies preparation could enhance its nutritional quality without affecting the rheological, sensorial and antioxidant properties.

YEAR: 2015

https://zumodegranada.com/en/antioxidant-profile-of-cookies-fortified-with-juice-and-peel-of-fresh-pomegranate/

Protection against Oxidative Damage in Human Erythrocytes and Preliminary Photosafety Assessment of Pomegranate

Protection against Oxidative Damage in Human Erythrocytes and Preliminary Photosafety Assessment of Pomegranate

The main purpose of the present study is to evaluate the ability of nanoemulsion entrapping pomegranate peel polyphenol-rich ethyl acetate fraction (EAF) prepared from pomegranate seed oil and medium chain triglyceride to protect human erythrocyte membrane from oxidative damage and to assess preliminary *in vitro* photosafety.

RESEARCH TITLE: Protection against Oxidative Damage in Human Erythrocytes and Preliminary Photosafety Assessment of *Punica granatum* Seed Oil Nanoemulsions Entrapping Polyphenol-rich Ethyl Acetate Fraction

COUNTRIES: Spain; Brazil

CONDUCTED BY: Departament de Fisiologia, Facultat de Farmàcia, Universitat de Barcelona, Spain; Programa de Pós-Graduação em Farmácia, Centro de Ciências da Saúde, Universidade Federal de Santa Catarina, Campus Universitário Trindade, Brazil.

PUBLISHED ON: Toxicology in Vitro

RESEACH:

The main purpose of the present study is to evaluate the ability of nanoemulsion entrapping pomegranate peel polyphenol-rich ethyl acetate fraction (EAF) prepared from pomegranate seed oil and medium chain triglyceride to protect human erythrocyte membrane from oxidative damage and to assess preliminary *in vitro* photosafety. In order to evaluate the phototoxic effect of nanoemulsions, human red blood cells (RBCs) are used as a biological model and the rate of haemolysis and photohaemolysis (5 J cm^{-2}UVA) is assessed *in vitro*. The level of protection against oxidative damage caused by the peroxyl radical generator AAPH in human RBCs as well as its effects on bilayer membrane characteristics such as fluidity, protein profile and RBCs morphology are determined. EAF-loaded nanoemulsions do not promote haemolysis or photohaemolysis. Anisotropy measurements show that nanoemulsions significantly retrain the increase in membrane fluidity caused by AAPH. SDS-PAGE analysis reveal that AAPH induced degradation of membrane proteins,

but that nanoemulsions reduce the extend of degradation. Scanning electron microscopy examinations corroborate the interaction between AAPH, nanoemulsions and the RBCs membrane bilayer. Our work demonstrates that *P. granatum* nanoemulsions are photosafe and protect RBCs against oxidative damage and possible disturbance of the lipid bilayer of biomembranes. Moreover it suggests that these nanoemulsions could be promising new topical products to reduce the effects of sunlight on skin.

YEAR: 2015

https://zumodegranada.com/en/protection-against-oxidative-damage-in-human-erythrocytes-and-preliminary-photosafety-assessment-of-pomegranate/

Evaluation of Total Phenolic Content, Total Antioxidant Activity, and Antioxidant Vitamin Composition of Pomegranate Seed and Juice

Evaluation of Total Phenolic Content, Total Antioxidant Activity, and Antioxidant Vitamin Composition of Pomegranate Seed and Juice

This study aimed to determine total phenolic content (TPC), total antioxidant activity (TAA), antioxidant vitamin composition (A, C, and E) of pomegranate fruit.

RESEARCH TITLE: Evaluation of Total Phenolic Content, Total Antioxidant Activity, and Antioxidant Vitamin Composition of Pomegranate Seed and Juice

COUNTRIES: Malaysia

CONDUCTED BY: Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Selangor, Malaysia;

PUBLISHED ON: OMICS

RESEACH:

Abstract

This study aimed to determine total phenolic content (TPC), total antioxidant activity (TAA), antioxidant vitamin composition (A, C, and E) of pomegranate fruit. In addition, two edible parts of pomegranate juice, pomegranate seed, and combination of them were compared based on antioxidant properties. TPC was determined by using Folin-Ciocalteu (FC) method based on colorimetric reduction. Ferric reduction ability power (FRAP assay) was used to test the antioxidant activity. Vitamin assessments were conducted by using high performance liquid chromatography (HPLC). Results for antioxidant vitamin composition in pomegranate juice (PJ) showed that the concentration of vitamin A was 22.8 ± 0.69 µg/100 g, vitamin C was 57.8 ± 0.59 mg/100 g, and vitamin E was 0.07 ± 0.01 mg/100 g. Besides, TPC in PJ, pomegranate seed (PS), and pomegranate seed-juice (PSJ) was 2502 ± 54, 165 ± 49, and 2696 ± 49 mg GAE/L, and TAA was 32 ± 5.1, 20 ± 2.8, and 47 ± 5.5 mmol/L respectively. This study revealed that PSJ contained high level of phenolic compounds, antioxidant activity, and vitamin C. In addition, TPC was as main contributor to antioxidant activities, and positively correlated with TAA (r^2=0.91, <0.05)

Conclusions

These findings suggested that pomegranate seed-juice has high level of phenolic content and antioxidant activity, which were positively correlated. Moreover, pomegranate juice could be acomplementary source of vitamin C and A. In addition, the result concluded that the combination of seed and juice have higher antioxidant activity than two other parts (seed and juice) separately. Therefore, pomegranate seed-juice has possessed a potential source of natural antioxidant; which can be used as treatment for chronic diseases relative to overproduction of free radicals. Therefore, combination of pomegranate seed and juice may become an alternative and potential source of natural antioxidant; which can be used as treatment for chronic diseases relative to overproduction of free radicals.

YEAR: 2015

https://zumodegranada.com/en/evaluation-of-total-phenolic-content-total-antioxidant-activity-and-antioxidant-vitamin-composition-of-pomegranate-seed-and-juice/

Pomegranate Juice Increase Memory

Pomegranate Juice Increase Memory

Despite increasing emphasis on the potential of dietary antioxidants in preventing memory loss and on diet as a precursor of neurological health, rigorous studies investigating the cognitive effects of foods and their components are rare.

Recent animal studies have reported memory and other cognitive benefits of polyphenols, found abundantly in pomegranate juice.

RESEARCH TITLE: Pomegranate Juice Augments Memory and fMRI Activity in Middle-Aged and Older Adults with Mild Memory Complaints

COUNTRIES: USA

CONDUCTED BY: Center for Cognitive Neurosciences, Department of Psychiatry and Biobehavioral Sciences and Semel Institute for Neuroscience and Human Behavior, University of California, Los Angeles, Los Angeles, USA; Center for Human Nutrition, David Geffen School of Medicine, and the UCLA Longevity Center, University of California, Los Angeles, USA.

PUBLISHED ON: Evidence-Based Complementary and Alternative Medicine

RESEACH:

Abstract

Despite increasing emphasis on the potential of dietary antioxidants in preventing memory loss and on diet as a precursor of neurological health, rigorous studies investigating the cognitive effects of foods and their components are rare. Recent animal studies have reported memory and other cognitive benefits of polyphenols, found abundantly in pomegranate juice. We performed a preliminary, placebo-controlled randomized trial of pomegranate juice in older subjects with age-associated memory complaints using memory testing and functional brain activation (fMRI) as outcome measures. Thirty-two subjects (28 completers) were randomly assigned to drink 8 ounces of either pomegranate juice or a flavor-matched placebo drink for 4 weeks. Subjects received memory testing, fMRI scans during cognitive tasks, and blood draws for peripheral biomarkers before and after the intervention. Investigators and subjects were all blind to group membership. After 4 weeks, only the pomegranate group showed a significant improvement in the Buschke selective reminding test of verbal memory and a significant increase in plasma trolox-equivalent antioxidant capacity (TEAC) and urolithin A-glucuronide.

Furthermore, compared to the placebo group, the pomegranate group had increased fMRI activity during verbal and visual memory tasks. While preliminary, these results suggest a role for pomegranate juice in augmenting memory function through task-related increases in functional brain activity.

YEAR: 2013

https://zumodegranada.com/en/pomegranate-juice-increase-memory/

Pomegranate Juice for the Management of Cardiovascular Health

Pomegranate Juice for the Management of Cardiovascular Health

Results of the study showed that ideal cardiovascular health, was rare among young participants of the study. An amazingly low (only 1%) percentage of the participants had all 7 health metrics in the 5,785 young adults participating from all international cohorts. Many of the participants had ideal glucose (73%), cholesterol (64%), and were non-smokers (64%); diet (7%) was the least common metric for participants from any of the cohorts.

The lowest prevalence of a clinical cardiovascular disease risk factor from the life's 7 simple was blood pressure ; this was normal in only 52% of the participants. The Nationaland Nutrition Examination Surveys (NHANES) 2003-2008 evaluated the prevalence of the 7cardiovascular health metrics in 14,515 adults.

RESEACH TITLE: No-Pharmacological Intervention: Pomegranate Juice for the Management of Hypertension and the Improvement of Cardiovascular Health

COUNTRY: Greece and USA

CONDUCTED BY: George Washington University and Aristotle University of Thessaloniki

PUBLISHED ON: The Open Hypertension Journal

RESEACH:

The concept of ideal cardiovascular (CV) health, with emphasis on the prevention of CV disease (CVD), was included by the American Heart Association (AHA) among its strategic goals for 2020 [1]. This concept was intended to focus mainly on the promotion of a healthy lifestyle and the adoption of a multifactorial intervention with nonpharmacological or pharmacological means, aiming at the prevention or the effective control of CVD risk factors [1]. Ideal cardiovascular health is defined as optimal levels of 3 CVD risk factors [blood pressure (BP), fasting plasma glucose and total cholesterol) and 4 behaviours [body mass index (BMI), smoking, physical activity and healthy diet] [1]. These 7 ideal CV metrics, called life's simple 7, are probably the best available markers of life-time CVD risk [2]. Recent studies have shown that the levels of ideal CV health in the United States to be very low at a community level [3-5] and to be associated with cardiac events [3], stroke [2] and total mortality [6]. A large study was conducted in 5,785 young adults (20-39 years old) from 5 international populations: the Minneapolis Childhood Cohort

Study, the Princeton Follow-up Study, the Bogalusa Heart Study, the Cardiovascular Risk in Young Finns Study, and the Childhood Determinants of Adult Health (CDAH) Study; all members of the International Childhood Cardiovascular Cohort (i3C) Consortium [7]. Results of the study showed that ideal CV health, as defined by the AHA, was rare among young participants of the study. An amazingly low (only 1%) percentage of the participants had all 7 health metrics in the 5,785 young adults participating from all international cohorts [7]. Many of the participants had ideal glucose (73%), cholesterol (64%), and were non-smokers (64%); diet (7%) was the least common metric for participants from any of the cohorts [7]. The lowest prevalence of a clinical CVD risk factor from the life's 7 simple was BP; this was normal in only 52% of the participants [7]. The Nationaland Nutrition Examination Surveys (NHANES) 2003-2008 evaluated the prevalence of the 7 CV health metrics in 14,515 adults [8]. Participants were stratified in young (20-39 years), middle-aged (40-64 years) and elderly (65 years).

Beyond hypertension, oxidative stress is also causally related with several CVD risk factors such as diabetes, dyslipidaemia, metabolic syndrome and smoking; oxidative stress has been proved to play a key role in the pathogenesis of atherosclerosis [33]. Oxidized LDL (Ox-LDL) is present in atherosclerotic lesions and in plasma from patients with CVD, and it correlates with the presence of angiographically documented complicated plaques [33], thus identifying patients who are at increased risk for future myocardial infarction, independently of other risk factors [34]. Since Pomegranate Juice contains very potent antioxidants (tannins, anthocyanins), which are also considered potent anti-atherogenic agents, it might attenuate atherosclerosis development by reducing oxidative stress in these patients [34]. Indeed, human plasma obtained from healthy subjects after 2 weeks of Pomegranate Juice consumption (50 mL Pomegranate Juice concentrate/day, equivalent to 1.5 mmol total polyphenols) demonstrated a significantly decreased susceptibility to free radical-induced lipid peroxidation, in comparison to plasma obtained at baseline prior to Pomegranate Juice consumption initiation, as measured by lipid peroxides formation or by total antioxidant status in serum [31,35]. Very recently, a study evaluated a product a new functional beverage based on a de-alcoholized red wine matrix supplemented by a pomegranate extract. This product is expected to have even more potent antioxidant action [36].

Regarding patients with metabolic syndrome (one of the components of which is hypertension), it has been demonstrated that Pomegranate Juice exerts hypoglycaemic effects by increasing insulin sensitivity, inhibiting -glucosidase, and modulating glucose transporter type-4 function, but also lowers total cholesterol and exerts anti-inflammatory effects through the regulation of peroxisome proliferator-activated receptor pathways [37].

In conclusion, current data suggest that long-term (at least for 1 year) use of Pomegranate Juice has a beneficial effect on BP, improves endothelial function, reduces arterial stiffness and delays or reverses the progression of atherosclerosis. These effects could result in an improvement in CV and overall health status. Therefore, pomegranate Juice might be useful as an adjunctive therapy for the management of hypertension on top of other non-pharmacological interventions or drug therapy. The use of pomegranate Juice might reduce the number of drugs or their doses for patients requiring antihypertensive drug therapy. Pomegranate Juice might be more useful in patients with hypertension and high oxidative burden such as those with diabetes, obesity, metabolic syndrome or who smoke. However, our knowledge on the CV effects of Pomegranate Juice are based on studies with a small number of patients and limitations in their design. Therefore, future long-term well-designed studies with polyphenols-rich foods (alone or in combination), but also with isolated phenolic compounds would provide valuable data to establish public health recommendations on the use of polyphenols forhealth protection.

YEAR: 2013

https://zumodegranada.com/en/pomegranate-juice-for-the-management-of-cardiovascular-health/

Effects of pomegranate juice on blood pressure in hypertensive individuals

Effects of pomegranate juice on blood pressure in hypertensive individuals

Pomegranate juice is rich in bioactive phytochemicals with antioxidant, and anti-inflammatory and cardioprotective functions. The present trial investigated the acute effects of Pomegranate juice consumption on blood pressure and markers of endothelial function.

Consumption of Pomegranate juice could be considered in the context of both dietary and pharmacological interventions for hypertension.

RESEACH TITLE: Clinical investigation of the acute effects of pomegranate juice on blood pressure and endothelial function in hypertensive individuals

COUNTRY: Iran

CONDUCTED BY: University of Medical Sciences, Iran.Professor, Isfahan Cardiovascular Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran

PUBLISHED ON: Arya atherosclerosis

RESEACH:

Background

Pomegranate juice is rich in bioactive phytochemicals with antioxidant, and anti-inflammatory and cardioprotective functions. The present trial investigated the acute effects of Pomegranate juice consumption on blood pressure and markers of endothelial function.

Methods

In this single-arm study, thirteen hypertensive men aged 39-68 years were recruited. Included subjects were assigned to natural Pomegranate juice (150 ml/day) following a 12 hour fast. Systolic blood pressure (SBP), diastolic blood pressure (DBP), and flow-mediated dilation (FMD), along with serum concentrations of C-reactive protein (CRP), intracellular adhesion molecule-1 (ICAM-1), vascular cell adhesion molecule 1 (VCAM-1), E-selectin and interleukin-6 (IL-6) were measured at baseline and 4-6 hours after Pomegranate juice consumption.

Results

Comparison of pre- vs. post-trial values revealed a significant reduction in both SBP (7%; P = 0.013) and DBP (6%; P < 0.010). However, changes in FMD (20%) as well as circulating levels of CRP, ICAM-1, VCAM-1, E-selectin, and IL-6 did not reach statistical significance (P = 0.172).

Conclusion

Pomegranate juice has promising acute hypotensive properties. Consumption of Pomegranate juice could be considered in the context of both dietary and pharmacological interventions for hypertension.

YEAR: 2013

https://zumodegranada.com/en/effects-of-pomegranate-juice-on-blood-pressure-in-hypertensive-individuals/

Antimicrobial Effect of Pomegranate Juice on Listeria innocua and Escherichia coli

Antimicrobial Effect of Pomegranate Juice on Listeria innocua and Escherichia coli

The edible part of pomegranates (*Punica granatum* L.) contains organic acids, sugars, vitamins, polysaccharides, polyphenols and minerals with unique flavor, taste and heath promoting characteristics. Natural antimicrobials developed from pomegranates (seeds and peel) have potential application in food preservatives.

This study provides useful information on potential application of pomegranates or pomegranate extracts as food additives in food systems.

RESEARCH TITLE: Antimicrobial Effect of Pomegranate Juice on *Listeria innocua* and *Escherichia coli* in Different Culture Systems

COUNTRIES: China and Canadá

CONDUCTED BY: Zhaojun Ban, Xinjiang Agricultural University, Urumqi, China; Lihua Fan, Agriculture and Agri-Food Canada, Kentville, Canada; Craig Doucette, Agriculture and Agri-Food Canada, Kentville, Canada; Timothy Hughes, Agriculture and Agri-Food Canada, Kentville, Canada; Sherry Fillmore, Agriculture and Agri-Food Canada, Kentville, Canada; Junfeng Guan, Hebei Academy of Agriculture and Forestry Sciences, Shijiazhuang, China; Jiang Li, Xinjiang Agricultural University, Urumqi, China.

PUBLISHED ON: International Association for Food Protection

RESEACH:

Introduction: The edible part of pomegranates (*Punica granatum* L.) contains organic acids, sugars, vitamins, polysaccharides, polyphenols and minerals with unique flavor, taste and heath promoting characteristics. Natural antimicrobials developed from pomegranates (seeds and peel) have potential application in food preservatives.

Purpose: The objective of this study was to investigate the antimicrobial effects of pomegranate juice at different concentration against *Listeria innocua* and *Escherichia coli*.

Methods: The experiments were conducted in the distilled water (DW) and bacterial culture broth systems. *L. innocua* or *E. coli* at 10^5 CFU/ml was inoculated into sterile test tubes containing five different concentrations of pomegranate juice and then incubated at 4, 25 or 37°C, respectively. The bacterial population and pH value were monitored at 0, 6, 24 and 48 h.

Results: The antimicrobial effects of pomegranate juice were dependent upon the concentrations of juice, culture conditions (temperature, time and matrix), as well as bacteria species tested. Overall, increased juice concentration and incubation temperature resulted in increased antibacterial effects. Both bacterial species were more effectively killed in DW system than in culture broth, while *L. innocua* was more sensitive to pomegranate juice compared with *E. coli*. In DW system, pomegranate juice regardless of concentrations reduced the population of *L. innocua* to undetectable levels at 4, 25 or 37°C for 48 h while *E. coli* was reduced by 3.6 log when treated with 10% juice at 37°C for 48 h. The population of *L. innocua* and *E. coli* were also significantly inhibited by 20% pomegranate juice ($P < 0.05$) in the culture broth system at 37°C for 48 h. By monitoring the pH changes, it was suggested that both high acidity and polyphenols in pomegranate juice contributed to the antimicrobial effect.

Significance: This study provides useful information on potential application of pomegranates or pomegranate extracts as food additives in food systems.

YEAR: 2015

https://zumodegranada.com/en/antimicrobial-effect-of-pomegranate-juice-on-listeria-innocua-and-escherichia-coli/

Triclosan administration and the possible protective role of pomegranate juice

Triclosan administration and the possible protective role of pomegranate juice

The study aimed to elucidate the impact of Triclosan on the histological structure of the seminiferous tubules (STs) in adult male albino rats, as well as the possible protective role of pomegranate juice coadministration.

The study clearly indicates that Triclosan has the potential to adversely impact the testicular structure and function, and that Pomegranate Juice is able to ameliorate such adverse effects.

RESEARCH TITLE: Histological study of adult male rat seminiferous tubules following triclosan administration and the possible protective role of pomegranate juice

COUNTRY: Egypt

PUBLISHED ON: The Egyptian Journal of Histology

RESEACH:

Introduction: Triclosan (TCS) is an antimicrobial agent, widely incorporated in a variety of personal care products, household items, medical devices, and clinical settings. Recently, concern has been raised over TCS's potential for endocrine and reproductive disruption.

Aim: The study aimed to elucidate the impact of Triclosan on the histological structure of the seminiferous tubules (STs) in adult male albino rats, as well as the possible protective role of pomegranate juice coadministration.
Materials and methods: A total of 32 adult male albino rats (140–160 g) were randomly categorized into four equal groups. Group I (the control group): rats in this group received PBS (1 ml/kg/day) orally. Group II: rats in this group received PJ orally at a dose of 10 ml/kg/day. Group III: rats in this group received TCS orally at a dose of 20 mg/kg/day. Group IV: rats in this group received TCS at the same dose as group III in conjunction with PJ daily. The experiment continued for 60 days. At the end of the experiment, blood samples were collected from the retro-orbital venous plexus of all rats for estimation of serum testosterone level. The animals were then euthanized. The testes of all rats were harvested for both light and transmission electron microscopic examination of the STs. The germinal

epithelial height and the number of germ cells/high-power field (HPF) were estimated morphometrically in H&E-stained sections and statistically analyzed.

Results: The study revealed that Pomegranate Juice administration was safe as it did not alter serum testosterone levels as compared with the control group. Histologically, the STs of these animals exhibited normal appearance similar to that of the control group. TCS administration was associated with significantly lowered serum testosterone levels as compared with the control group. Histologically, the STs were lined with relatively few spermatogenic cells with deeply stained nuclei. Cytoplasmic vacuolation of the lining cells and exfoliation of germ cells in the tubular lumina were seen as well. Ultrastructurally, vacuolar degenerative changes involving all types of spermatogenic cells as well as Sertoli cells were revealed. Moreover, the germinal epithelial height and the number of germ cells/HPF were significantly reduced compared with the control group. Coadministration of PJ with TCS resulted in a significant increase in serum testosterone level as compared with the TCS group. Histologically, most of the STs retained normal appearance and epithelial stratification. Only some tubules revealed vacuolation of germ cells in the basal compartment with deeply stained nuclei. Mild ultrastructural alterations of germ cells were evidenced as well. These results were confirmed histomorphometrically by the significant increase in the germinal epithelial height and number of germ cells/HPF as compared with the TCS group.

Conclusion: The study clearly indicates that TCS has the potential to adversely impact the testicular structure and function, and that Pomegranate Juice is able to ameliorate such adverse effects.

YEAR: 2014

https://zumodegranada.com/en/triclosan-administration-and-the-possible-protective-role-of-pomegranate-juice/