International Journal of Botany Studies
ISSN: 2455-541X; Impact Factor: RJIF 5.12
Received: 04-01-2021; Accepted: 31-01-2021: Published: 10-02-2021
www.botanyjournals.com
Volume 6; Issue 1; 2021; Page No. 470-472

Therapeutic use of dropped pomegranate flowers on metabolic disorders: A review

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Abstract
Pomegranate, a small shrub biologically known as Punica Granatum L. It is mainly grown throughout dry Mediterranean regions like hot, dry summers. Flowering in this shrub occurs on one year old spurs or short branches appearing as solitary, pairs, or clusters. It not only gives fruit but also has been observed to be effective in many diseases. The study was conducted to find out medicinal use of pomegranate flowers. About 25 research papers were studied from various databases like Pubmed, Google Scholar, Science Direct etc. the results revealed that pomegranate flower has a therapeutic effect on rat models having diabetes, nephrotoxicity, hepatotoxicity, oxidative stress, arthritis etc. due to its anti oxi dative property, anti-inflammatory property and he pato protective property and many more therapeutic benefits. It is thus concluded that pomegranate flowers can be used as herbal remedy in many diseases thus not only being cost effective but also having no side effects. It is usually considered as a by-product of pomegranate cultivation as drop rate of flowers are very high and leads to agricultural waste. Thus to get best out of waste, nutritional analysis of fresh pomegranate flowers and dry pomegranate flower powder was also done. Results were statistically analysed. Further exclusive and intense studies on the effect of pomegranate flower on humans with these diseases need to be done.

Keywords: pomegranate flower, nutritional analysis, therapeutic effects, waste management

Introduction
Pomegranate flower is a part of pomegranate tree which is a small shrub comes from the family of Punicaceae, which is a monogenetic family of two species i.e. PunicaGranatum L. and P. Protopunica. Pomegranate tree only grows up to 5m. Flowering in pomegranate tree occurs very early as on one year old spurs. Pomegranate flowers are odourless but very colourful. They are 5-9cm in length and cylindrical in shape [1]. Flower is chemically composed of phenol compounds like Gallic acid, protocatechuic acid, chlorogenic acid, caffeicacid, ferulic acid, and quercetin etc. Pomegranate flower is usually considered as a by-product of pomegranate cultivation as all flowers do not developed as pomegranate. It is having tremendous nutritional value and health benefits. Various properties shown by flower are: Peroxisome proliferator-activated receptor (PPAR) – alpha/-gamma activator property according to which PPAR – alpha helps in fatty acid uptake, reduces swelling and improves arterial function whereas PPAR – gamma helps in fatty acid deposits, glucose balance and reduces inflammation [2]. Hence PPARs are considered main activators for fats and glucose anabolism [3]. Ant oxidative property is due to presence of anthocyanins namely pelargonidin 3, 5-diglucoside and pelargonidin 3-glucoside in its purified form which showed strong radical scavenging activities [4]. Anti – inflammatory property and hepatoprotective property [6]. Health benefits of pomegranate flower are: helps to regulate blood glucose, ensures heart health, prevents arthritis and also reduce cisplatin chemotherapy induced nephrotoxicity [6]. Instead of being treated as an agriculture waste, pomegranate flower can be utilized as an ingredient in food product formulation. Considering all these valuable properties of pomegranate flower, the present study was done to critically review all the available literature related to this.

Material and Methods
We targeted researches investigating the medicinal use of pomegranate flower in various diseases. We conducted a computer search through Pubmed, Google Scholar, Science Direct etc.using the key terms “pomegranate flower,” “metabolic disorders,” and “medicinal use of pomegranate flower.” We categories articles that assessed the association of pomegranate flower in form of powder and extract with various diseases in rat models. We identified many other articles by discerning each article’s reference section and the other internet database. Finally, our searching efforts yielded a total of 25 articles that were critically analysed.

Results
Effect of pomegranate flower on cardiac lipid metabolism
A 2005 study published in British Journal of Pharmacology results that the pomegranate flower extract improves abnormal vascular lipid anabolism in Zucker diabetic fatty rats by activating PPAR-alpha and thereby reducing movement of lipids and inhibiting its vascular uptake.

Hepatoprotective effect of pomegranate flower extract
A 2006 study published in Food and Chemical Toxicology Journal found the hepatoprotective activity of extract of pomegranate flower against ferric nitrilotriacetate (Fe-NTA)

activated hepatotoxicity in mice which was observed to be possibly resulted from the influential antioxidant activity of polyphenols in PPF extract.

PPAR-alpha/-gamma activator property of pomegranate flower

Another 2008 study published in Diabetes Obes Metabolism journal found that pomegranate flower was an unique and traditional ant diabetic medicine with PPAR – alpha/gamma activator property which were the major regulators of lipids and glucose metabolism. They are widely used to treat dislipidaemia, hyperglycaemia and their complications.

Effect of pomegranate flowers on Hyperlipidemia, Pancreatic cells lipid peroxidation and antioxidant enzymes

A 2009 study published in Food and Chemical Toxicology Journal found a positive decrease in blood glucose, total cholesterol, triglycerides, Low Density Lipoproteins-C and Very Low Density Lipoproteins -C levels of diabetic rats which suggests that pomegranate flower had potential to decrease the risk of type II diabetes and other vascular diseases.

Composition of anthocyanins in pomegranate flower and their antioxidant activity

A 2011 study conducted by Lihua Zhang, Quanjuan Fu, Yuanhu Zhang found that two anthocyanins named "pelargonidin 3, 5-diglucoside" and "pelargonidin 3-glucoside" were recognized from pomegranate flowers. Furthermore, the antioxidant activities of purified anthocyanins were screened and found that pelargonidin 3-glucoside exhibits higher antioxidant activity than pelargonidin 3, 5-diglucoside.

Effect on cisplatin induced nephrotoxicity

A 2014 study published in Journal of Nephropathology found that a small dose of pomegranate flower extract plays a very protective role against Cisplastin – caused toxicity in rats.

Chemical composition, antioxidant, anti-inflamatory and Cytotoxic activities from pomegranate flower

Another 2016 study by Bekir J *et al* found the highest phenolics, flavanoids, tannins and anthocyanins content in Chetoui variety of pomegranate flowers. Garsi and Zaghwani varieties showed highest antioxidant activity whereas for anti-inflamatory activity, all varieties are active.

Anti – inflammatory effect of pomegranate flowers

A 2017 study by Xu J, Zhao Y, Aisa HA showed that pomegranate flower produced potential anti-inflammatory effects through regulating the synthesis of several mediators and cytokines involved in the inflammation process.

Hence keeping in view all the health benefits of pomegranate flower, nutritional analysis of fresh pomegranate flower and dry pomegranate flower powder was done which shows results as

Table 1: Nutritional Analysis of fresh pomegranate flowers:

S. No.	Parameter	Values / 100gm
1	Energy (Kcal)	21.8
2	Protein (gm)	<0.1
3	Total Fat (gm)	<0.1
4	Total Carbohydrate (gm)	2.37
5	Dietary Fibre (gm)	1.04
6	Anthocyanins (mg)	27.45
7	Ash Content (%)	4.27
8	Moisture Content (%)	67.8

Table 1 shows the nutritional properties per 100gm of extract developed from fresh pomegranate flowers. The powder has 21.8 kcal of energy, <0.1g of protein, 2.37g of total carbohydrate, <0.1g of total fat, 1.04g of dietary fibre and 274.5mg of anthocyanins.

Table 2: Nutritional Analysis of dry pomegranate flowers powder:

S. No.	Parameter	Values /100gm
1	Energy (Kcal)	285.6
2	Protein (gm)	9.4
3	Total Fat (gm)	2.35
4	Total Carbohydrate (gm)	10.84
5	Dietary Fibre (gm)	14.84
6	Anthocyanins (g)	44.88
7	Ash Content (%)	2.53
8	Moisture Content (%)	11.8

Table 2 shows the nutritional properties per 100gm of extract developed from dry pomegranate flowers powder. The powder has 285.6 kcal of energy, 9.4g of protein, 10.84g of total carbohydrate, 2.35g of total fat, 14.84g of dietary fibre and 448.8mg of anthocyanins.

Table 3: Antioxidant content in fresh pomegranate flowers and dry pomegranate flower powder.

Antioxidant	Fresh Pomegranate Flower	Dry Pomegranate Flower Powder	P-value
Anthocyanins	27.45gm / 100gm	44.88gm / 100gm	<0.01

Table 3 shows that antioxidant content in fresh pomegranate flower and dry pomegranate flower powder is statistically significantly as p-value is <0.01.

Conclusion

The study concluded that pomegranate flowers showed varies health benefits like curing metabolic disorders, prevents arthritis, reduces nephrotoxicity and decreases the risk of cardiovascular diseases. The study also showed that the dry pomegranate flower powder is more nutritious as compared to fresh pomegranate flowers due to loss of moisture content which enhance the nutritional properties of the ingredient.

RDA of anthocyanins by NHANES (National Health and Nutrition Examination Survey) 2007-2008 stated as 11.6g per day for people below 20yrs and women above 20yrs has to take 12.6g/day whereas for men the recommendation is 10.6g/day.

Hence we can recommend 2.5 teaspoons of dry pomegranate flower powder to an individual to enhance anthocyanins content in the body.

References

1. Dinesh Babu K. Floral Biology of Pomegranate (Punica Granatum L.). Fruit, vegetable and Cereal science and Biotechnology. 2010; 4(2):47.
2. Huang TH1, Peng G, Kota BP, Li GQ, Yamahara J, Roufogalis BD *et al*. Anti-diabetic action of Punicagranatum flower extract: activation of PPAR-gamma and identification of an active component. National Centre for Biotechnology Information. 2005; 207(2):160-169.
3. Li Y1, Qi Y, Huang TH, Yamahara J, Roufogalis BD. Pomegranate flower: a unique traditional ant diabetic medicine with dual PPAR-alpha/-gamma activator properties. National Centre for Biotechnology Information. 2008; 10(1):10-7.
4. Taylor C Wallace, M Monica Giusti 2. Anthocyanins. Advances in Nutrition. 2015; 6(5):620-622.
5. Kaur G, Jabbar Z, Athar M, Alam MS. Punicagranatum (pomegranate) flower extract possesses potent antioxidant activity and abrogates Fe-NTA induced hepatotoxicity in mice. Food and Chemical Toxicology. 2006; 44(7):984 93.
6. Motamedi F, Nematbakhsh M. Effect of pomegranate flower extract on cisplatin- induced nephrotoxicity in rats. J Nephropathol. 2014; 3(4):133-138.