VRI Press
Phytomedicine
eISSN 2330-0280
Journal home page at www.VedicJournals.com

ISSN 2330-0280 (Online); CODEN: VRIPBU, VRI Phytomedicine, VRI Press, Vedic Research, Inc. USA

Short Communication
DOI: http://dx.doi.org/10.14259/pm.v3i1.153

Effect of *Punica granatum* and *Syzygium cumini* on Body Weights in Ethylene Glycol-Induced Kidney Stone Rats

Ayesha Tajammul[1], Nurul Kabir[1], Maryam Ahmed[2*], Ali Sufyan[3]

[1]*Dr. Panjwani Center for Molecular Medicine and Drug Research, International Center for Chemical and Biological Sciences (ICCBS), University of Karachi, Pakistan*
[2]*Department of Pharmacognosy, Faculty of Pharmacy, Federal Urdu University of Arts, Science and Technology, Pakistan.*
[3]*Department of Microbiology, University of Karachi, Pakistan.*

Article Info: Received: *June 2nd, 2014*; **Accepted:** *June 9th, 2014*

Abstract

Punica granatum L. (PG) and *Syzygium cumini L.* (SC) are commonly used medicinal plants in Pakistan. All over the world, 80% of individuals show decrease in their body weight during kidney illness. In this study, PG and SC showed that during the treatment of the kidney stone disease they also exert positive effects on the body weights of rats having ethylene glycol-induced kidney stone. Body weights of all groups including control, KS model, PG and SC rats were assessed by relative body weight. Rats having ethylene glycol-induced kidney stone showed a decrease in body weight as compared with control group. PG and SC groups at doses of 250 and 350g showed gradual increase in body weight during the illness and exhibited that both plant's products have nutritional values which play a key role in the maintenance and improvement in health by increasing the body weights. Comparing the effect of PG and SC on body weight, we found that SC fruits extract at dose of 250mg showed better effect on the body weight of rats than PG flowers extract.

Keywords: *Body weight, Punica granatum L, Syzygium cumini L, Kidney stones.*

Introduction

Diet impacts highly on body weight and play a key role on individual's health. Weight loss is one of the earliest objectives in manifestations of disease. It is vital to assess the health of an individual. The 80% patients are reported with weight loss, ranging from 4.52 to 22.6 kg during illness [1]. Factors such as anorexia, irregular meal patterns and lack of fruit and vegetables lowers the body weight in diseased condition. Reduction in intestinal absorption or loss of protein through bowel might also play key role in weight loss [2]. Caloric needs are also affected with a marked increase during the chronic inflammation [3]. In some cases, increased body weight and insulin resistance might increase the calcium level and other substances in the urine and has the association between obesity or weight gain and the risk of developing kidney stones [4]. There are some traditional plants that not only take part in curing the disease but also in maintenance of the body weight during the illness. There is a need to produce a novel drug which besides treating disease also recovers the body weight to gain the health.

Punica granatum L. (Pomegranate) (PG) is a deciduous tree and found in the most part of the Asian and the Mediterranean region [5]. It is being used as herbs from olden times, dating back more than 3,000 years. It has many chemical constitutes that valuable as pharmacologically [6]. It has several antioxidants contents such as flavonoid and anthocyanidin [7]. PG also has been reported for anti-inflammatory effect that is beneficial for prevention of tissue injury as well as it also inhibits the bacterial and fungal growth. PG also protects from varieties of cancers

*Corresponding Author
Dr. Maryam Ahmed,
Department of Pharmacognosy, Faculty of Pharmacy, Federal Urdu University of Arts, Science and Technology, Pakistan.
Mobile: +92 345-2740035
Email: maryamahd@yahoo.com

including prostate, breast and lung cancers [8-11].

Syzygium cumini L. (SC) commonly known as jambolan, is one of the widely used edible and medicinal plant. It is native to the tropics including America, Australia, Africa and Asia. It contains several constituents such as anthocyanins, glucoside, ellagic acid and myrecetin. Fruits of SC have considerable amount of glucose, fructose, citric acid, mallic acid [12, 13]. Different parts of SC possess promising activity against diabetes mellitus [14] also have antioxidant [15], anti-inflammatory [16], anti-bacterial, antifungal [17], anti HIV [18] and antidiarrheal [19] activities.

The aim of this study is to evaluate the effect of PC and SC on body weight of rats having ethylene glycol induced kidney stone.

Materials and Methods

Plant material

Punica granatum flowers and *Syzygium cumini* fruits were purchased from local market from Karachi, Pakistan. Identification and authentication was done by the Department of Botany, University of Karachi. Voucher specimens for *Punica granatum* flowers (No. 5498) and *Syzygium cumini* fruits (No. 14723) have been deposited in the herbarium of Department of Botany, University of Karachi, Pakistan. Both parts of plants were soaked in 80% alcoholic and 80% analytical methanolic solutions respectively for 3 days at room temperature. Solutions were gradually pour from one container into another, typically in order to separate out sediment and filtered. The crude extracts were evaporated in a container to obtain the extracts.

Experimental design

Male Wistar rats (180–200 g) were obtained from the Animal House, International Center for Chemical and Biological Sciences, University of Karachi and were allowed for standard diet and water ad libitum. The rats were divided into four groups each containing six rats. Group 1: Control rats receiving water; Group 2: Ks model rats receiving 1% Ethylene glycol orally in drinking water; Group 3: PG flower extract treated rats (250 g/kg body weight) and Group 4: SC fruits extract treated rats (250 and 350 g/kg body weight, SC-250 and SC-350 respectively). Extracts were given orally using an intragastric tube for 27 days.

Relative body weight assessment

The body weight of each rat was monitored thoroughly during the experimental period, once before the treatment and daily during the treatment. The relative body weight (*RBW*) of each rat was calculated by following formula:

$$RBW = ABT\ (g)/IB\ (g) \times 100$$

Whereas, *ABT* is the absolute body weight at one time interval and *IB* is the body weight of rat on the beginning of the treatment [20].

Results and Discussion

Body weight increased in all groups of treated and control rats. In the control, the body weight gradually increased throughout the experimental period in a normal manner. All the other groups including KS model receiving ethylene glycol showed loss in body weight during the experimental period. The KS-model was observed with relatively low body weight than PG (Fig. 1) and SC (Fig. 2). Effect of ethylene glycol on weight of kidney stone model rats was monitored with respect to the control rats for a period of 27 days (4weeks). Up to day 7, the KS model showed gradual increase in body weight after oral administration of ethylene glycol. However, after 7 days the decrease in body weight was more noticeable and at day 27 body weight of KS model was same as compared to the value of day one that indicates that KS model rats were lowering their weight with gradually increase in the illness. PG flowers extract

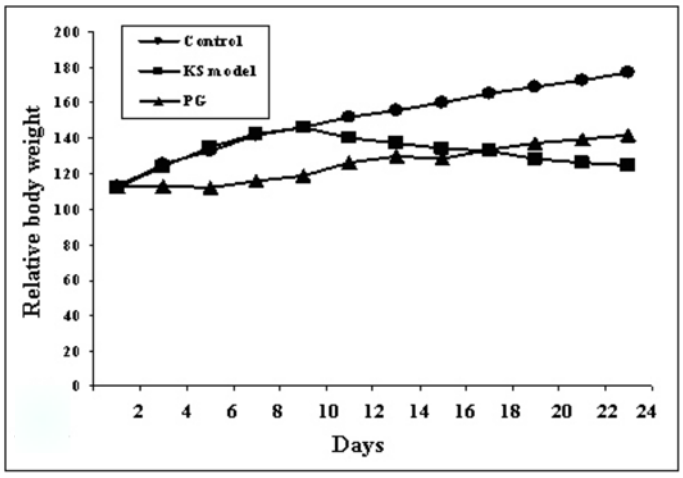

Figure 1: Relative body weight (%) of *Punica granatum* flowers extract 250mg/kg treated rats

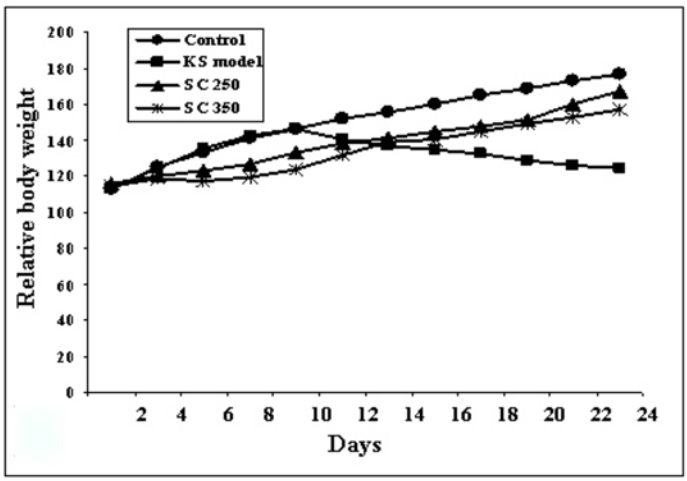

Figure 2: Relative body weight (%) of *Syzygium cumini* fruits extract treated rats

at 250mg/kg dose treated rats gained weight gradually (Fig. 1) as compared to the weight of the kidney stone model rats. The increase in weight of PG group was not in equal intensity of the control group but after 16 days they gain weight as compared to KS model.

SC fruit extracts as SC-250mg showed better effect in gaining weight than SC-350mg (Figure 2). After 11th day of the experiment, there was a gradual increase in body weight of SC-250mg and SC-350mg as compared with weight of KS model rats. After the 18 days of treatment, SC groups showed gradual increase in body weight than the PG group, showing more significant effect on the body weight than the PG. SC fruit is edible and contains juicy fruit-pulp having more nutritional value than PG flower and might be a reason to gain more weight in SC groups than PG group.

Conclusion

Decreased in body weight in KS model rats might be due to anorexia leading to the disturbances in metabolism of body and absorbance of nutrients which can be affected by ethylene glycol administration whereas ethylene glycol is reported as the toxic nature and its nephrotoxicity is well known and dangerous to health [21]. The PG and SC groups showed gain in body weight in rats which have ethylene glycol-induced kidney stones but comparing to PG flower 250mg/kg, SC fruit extract on both doses 250 and 350mg/kg showed better effects on body weight of KS treated model rats because it is edible and contains juicy fruit-pulp having punch of nutritional constituent. *Punica granatum* and *Syzygium cumini* extracts help in recovery of body weight during the illness in kidney stone.

References

1. Burbige EJ, Huang SS, Bayless MT: **Clinical manifestations of crohn's disease in children and adolescents.** Pediatrics 1975, **55**: 866-871.
2. Beeken WL: **Absorptive defects in young people with regional enteritis.** Pediatrics 1973, **52**:69.
3. Layden T, Rosenberg J, Rosenberg I: **Reversal of growth arrest in regional enteritis with parenteral alimentation and elemental diet.** Clinical Research 1974, **22**:579A.
4. http://www.webmd.com/kidney-stones/news/20050125/weight-gain-obesity-linked-to-kidney-stones (Accessed on May 29, 2014).
5. Facciola S, Cornucopia: **A Source Book of Edible Plants.** Kampong Publications,Vista, California; 1990, 166.
6. Seeram NP, Schulman RN, Heber D: **Pomegranates: Ancient Roots to Modern Medicine.** Taylor and Francis Group, Boca Raton; 2006, 5-8.
7. Noda Y, Kaneyuki T, Mori A, Packer L. **Antioxidant activities of pomegranate fruit extract and its anthocyanidins: delphinidin, cyanidin, and pelargonidin.** Journal of Agricultural and Food Chemistry 2002, **50**: 166-171.
8. Simmons DL, Buckley CD: **Some new and not so new, anti-inflammatory targets.** Current Opinion in Pharmacology 2005, **5**: 394-397.
9. Koyama S, Cobb LJ, Mehta HH, Seeram NP, Heber D, Pantuck AJ, Cohen P: **Pomegranate extract induces apoptosis in human prostate cancer cells by modulation of the IGF-IGFBP axis.** Growth Hormone & IGF Research 2010, **20**: 55-62.
10. Sturgeon SR, Ronnenberg AG: **Pomegranate and breast cancer: possible mechanisms of prevention.** Nutrition Reviews 2010, **68**: 122-128.
11. Khan N, Afaq F, Kweon MH, Kim K, Mukhtar H: **Oral consumption of pomegranate fruit extract inhibits growth and progression of primary lung tumors in mice.** Cancer Research 2007, **67**: 3475-3482.
12. Srivastava HC: **Paper chromatography of fruit juices.** Journal of Scientific & Industrial Research 1953; **12 B**: 363-365.
13. Lewis YS, Dwarakanath CT, Johar DS: **Acids and sugars in Eugenia jambolana.** Journal of Scientific & Industrial Research 1956; **15 C**: 280-281.
14. Chirvan-Nia P, Ratsimamanga AR: **Regression of cataract and hyperglycemia in diabetic sand rats (Psammomys obesus) having received an extract of Eugenia jambolana Lam.** C R Acad Sci Hebd Seances Acad Sci D 1972, **274** : 254-257.
15. Banerjee A, Dasgupta N, De B: *In vitro* **study of antioxidant activity of** *Syzygium cumini* **fruit.** Food Chemistry 2005; **90**: 727-733.
16. Muruganandan S, Pant S, Srinivasan K, Chandra S, Tandan SK, Lal J: **Inhibitory role of** *Syzygium cumini* **on autacoidinduced inflammation in rats.** Indian Journal of Physiology and Pharmacology 2002, **46**: 482-486.
17. Chandrasekaran M, Venkatesalu V: **Antibacterial and antifungal activity of** *Syzygium jambolanum* **seeds.** Journal of Ethnopharmacology 2004, **91**: 105-108.
18. Kusumoto IT, Nakabayashi T, Kida H, Miyashiro H, Hattori H, Namba T: **Screening of various plant extracts used in ayurvedic medicine for inhibitory effects on human immunodeficiency virus type I (HIV-I) protease.** Phytotherapy Research 1995, **12**: 488-493.
19. Mukherjee PK, Saha K, Murugesan T, Mandal SC, Pal M, Saha BP: **Screening of anti-diarrhoeal profile of some plant extracts of a specific region of West Bengal India.** Journal of Ethnopharmacology 1998, **60**: 85-89.
20. S. Bouanani C, Henchiri E, Migianu-Griffoni N, Aouf M, Lecouvey: **Pharmacological and toxicological effects of Paronychia argentea in experimental calcium oxalate nephrolithiasis in rats.** Journal of Ethnopharmacology 2010, 129: 38–45.
21. Hodgkinsons A: **Oxalic Acid in Biology and Medicine.** Academic Press, London, 1977; 1–325.

Note: VRI Press, Vedic Research Inc. is not responsible for any data in the present article including, but not limited to, writeup, figures, tables. If you have any questions, directly contact authors.

Visit us @ www.vedicjournals.com : DOI: http://dx.doi.org/10.14259/pm.v3i1.153

Copyright © 2013-2015 VRI Press, USA. All rights reserved.

Authors Column