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Seed Extract of *Punica granatum* Possesses Antioxidant and Antiulcer Potential

Mohamed Abdul Rahman Elwakil
Department of Plant Pathology, Faculty of Agriculture, Mahnsoura University, El-Mansoura, 35516, Egypt

Nowadays plants are used in almost every kind of medicinal therapies. Traditionally plants are used to treat many health defects e.g., fever, cold, body pain, diabetes, asthma, wounds, eye, skin and stomach infections (Muthu *et al*., 2006; Karim *et al*., 2011). These and many other remedial effects are due to plants' antioxidant phytochemchemicals e.g., alkaloids, phenols, flavonoids etc. (Makhija *et al*., 2011). As oxidative products are responsible for many disorders and plants antioxidants compounds have the ability to counter their activity in body (Motlhanka, 2008; Sanda *et al*., 2011). Ulcer is one of oxidative stress-induced disease, in which an increase in lipid peroxidation and decrease in superoxide dismutase and catalase level is usually happen (Tandon *et al*., 2004). Ulcer in gastric tracts is majorly due to infection by *Helicobacter pylori* and by the use of nonsteroidal anti-inflammatory drugs, whereas smoking and production of gastric acid play minor role (Yeomans, 2011). Whatever the reasons of ulcer production; oxidative stress is always involved in it (James *et al*., 2003; Nanjundaiah *et al*., 2011). This stress can be stopped by the application of antioxidant plants, as done by ginger extracts to stop the infection of *H. pylori* and subsequent production of ulcer. Likewise, another plant *Hedranthera barteri* showed antioxidant protection from gastric ulcer (Onasanwo *et al*., 2010). It has ability to scavenge the reactive oxygen species and reduce the gastric ulcer lesions induced by various (aspirin, alcohol, histamine etc.) agents. Thus plants due to their potent antioxidant ability are able to reduce the oxidative damage and their antioxidant species can treat ulcer.

Punica granatum is one of the traditionally used medicinal plants and it possesses excellent antiviral and antioxidant properties (Al-Mustafa and Al-Thunibat, 2008; Sohail *et al*., 2011). In Jordanian traditions it is one of the highly recommended anti-diabetic plant and its rinds are the rich source of phenolic compounds, as the aqueous extracts of its rinds contain nearly 98.6 mg g^{-1} phenols. Moreover, methanolic extract of its rind showed 83% antioxidant activity in β-carotene-linoleate model system and 93% inhibition to low density lipoprotein oxidation (Singh *et al*., 2002). Thus, it has high antioxidant activity and may be able to treat ulcer relative oxidation problems. The antioxidant activity in *P. granatum* was also found by Gill *et al*. (2012) in his recently conducted research. According to them, like other parts of *P. granatum*, its seed showed significant antioxidant property, which could be used to treat ulcer. The ethanolic extracts of its seed were tested to estimate their phytochemical composition; these extracts were majorly constituted by triterpenoids, sterols and tannins. Whereas, other pytochemicals like flavonoids, alkaloids and coumarin glycosides were present in minor amounts. The antioxidant property of its extracts was varying character, when tested by 1,1-diphenyl- 2-picrylhydrazyl method and dependant on the concentration of extract. Highest 82.80±0.267% antioxidant ability was showed by 100 μg mL^{-1} concentration, while lowest (60.63±0.181%) was showed by 50 μg mL^{-1}, thus extract's ability to scavenge 1,1-diphenyl- 2-picrylhydrazyl increased with an increase in its concentration. Moreover its extracts showed positive results during qualitative test of 1,1-diphenyl- 2-picrylhydrazyl radical neutralization, it turned TLC plate yellow. Furthermore, its extracts showed a significant antioxidant activity in hydrogen peroxide method and again showed the same concentration dependant behavior. When the antiulcer activity of *P. granatum* pretreatment was tested in rat model, all concentrations (50, 75, 100 μg mL^{-1}) showed significant antiulcer activity against pyloric ligation induced ulcer. The effect of these extracts in reducing the ulcer index was concentration dependant and its highest reduction was made by 100 μg mL^{-1} (1.3±0.542). Although other concentrations (50 and 75 μg mL^{-1}) were also effective in reducing ulcer index, 100 μg mL^{-1} produced effects were non-significantly different from standard antiulcer drug, ranitidine. Moreover, this concentration showed highest 74.51% inhibition to ulcer formation. *P. granatum*'s ulcer inhibiting activity was also tested quantitatively by examining gastric volume, free and total acidity. These parameter were again efficiently maintained by the 100 μg mL^{-1} concentration, it reduced the ulcer induced increased levels of gastric liquid from 2.86±0.046 to 1.46±0.054 mL/100 g. In addition it was most effective in reducing the total and free radical acidity, these results were significantly different from diseased group and non-significantly different from ranitidine treated group. So this can be said that *P. granatum* were enriched with antioxidant property and highly significantly results against free radicals and ulcer were the attributes of

100 μg mL^{-1} concentration. As it showed ulcer inhibition in pretreated animals it can be said that its incorporation in food might reduce the chances of ulcer.

Plants are an important part of human diet and are used traditionally to treat many diseases. Now, plants' remedial properties are extensively studied in combination with their phytochemicals, as Phytochemicals (mostly antioxidant) are the active ingredients responsible for these effects. Ulcer is one of the oxidation related disease, which can be treated through application of antioxidant plant. This view was strengthened by Gill *et al*. (2012) conducted research on *P. granatum*; they found that its seeds' extracts were constituted by many antioxidant Phytochemicals. These extracts protected the rat's stomach from oxidative stress of ulcer and thus can be used to treat human gastric problems. More studies on its Phytochemical role will provide a beneficial support to its medicinal use.

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