

Antioxidant Potential of *Lepidium Sativum* (Garden Cress) Seed Extracts: A Comparative Study

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ABSTRACT

Garden cress (*Lepidium sativum*) is annually growing herb of Egypt and West Asian countries although now it is growing globally. The seeds are rich in proteins, carbohydrates, omega-3 and omega-6 fatty acids, vitamins, minerals and other nutrients. The study investigated the antioxidant potential of the garden cress seeds in reference to phenolic compounds, flavonoids, free radical scavenging activity, oxidative agent and antioxidant enzymes in three different extracts. The ethanolic extract of garden cress seeds has higher antioxidant potential as compared to the aqueous and DMSO-based extract. It is concluded that for obtaining the antioxidant compounds from garden cress seeds ethanolic extract would be preferably considered.

Keywords: Antioxidant potential, Garden cress, *Lepidium sativum*, Seed extracts

INTRODUCTION

Lepidium sativum plant is an annual, edible fast-growing herb belongs to the family of Brassicaceae (Kanabur et al., 2020). *Lepidium sativum* plant shares its botanically characteristics to watercress and mustard. The plant is commonly known as garden cress and locally called Halun in Pakistan. The main characteristic of garden cress is that it can be grown in any type of climate and soil conditions. However, the plant is economically important for its seeds, roots and leaves but it is grown mainly for its seeds which are small, triangular, pointed and oval-shaped reddish-brown colored. Garden cress seeds has antioxidant, antimicrobial, antidiabetic, anti-analgesic and antihypertensive activities (RH Raghavendra et al., 2011). The seeds are rich in fatty acids, phenols and natural antioxidants (vitamin A and E) which helps to protect the cells from free radicals' damage (Adera et al., 2022). The seeds are widely used as a food additive and as spice in different regions of the world. These seeds are also used as a medicine for diabetes due to its hypoglycemic properties. The seeds have also shown promising results in reducing the asthmatics symptoms thus improving lung functions. Although the seeds and seed extracts have gained interest in recent years but it is still remained fairly unexplored that which extract has the higher antioxidant potential against the free radicals and oxidative compounds.

OBJECTIVES

The comparative study aimed to assess the different extracts of garden cress seed in order to achieve the higher antioxidant potentials in relation to its: phenolic compounds, flavonoid compounds, free radical scavenging activity, oxidative agents and antioxidant enzyme activity.

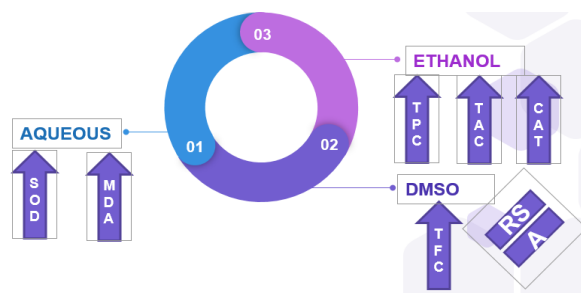
METHODOLOGY

L. sativum seeds were purchased from a local market in Karachi, Pakistan. The seeds were washed, dried and grounded by using an electric grinder to a coarse powder. For the first method, seed powder was mixed and boiled with de-ionized water for 10 minutes. For second method, seed powder was mixed with de-ionized water, after which DMSO was added and boiled the mixture for 10 minutes (Mahassni et al., 2013). For the third method, seed powder was extracted by using 70% ethanol by using magnetic stirrer in a closed vessel for

4 hours (Al-Salam et al., 2019). Each of the extract was filtered by filter paper and final stock solutions were frozen at -20°C for used up to six weeks. Then, the phytochemical analysis of seed extract was carried out by the spectrophotometric estimation of total antioxidant compounds, phenols, flavonoids (Al-Salam et al., 2019), radical scavenging activity by DPPH solution (Sikarwar et al. 2019), oxidative agent Malondialdehyde (Haider et al. 2018), activity of oxidative enzymes; superoxide dismutase and catalase (Haider et al. 2018). All the results were represented as mean \pm standard deviation (SD).

RESULTS

The aqueous extract of garden cress seed had 0.5 mg/g total phenolic compounds, 24 $\mu\text{g/g}$ total flavonoid compounds, 85 $\mu\text{g/g}$ total antioxidant compounds, 7% free radical scavenging activity while the estimated CAT activity was 2 $\mu\text{mol/min/g}$, SOD activity was 7876 units/g and the level of MDA was 43 $\mu\text{mol/mL}$. The DMSO based extract of garden cress seed had 0.5 mg/g total phenolic compounds, 27 $\mu\text{g/g}$ total flavonoid compounds, 90 $\mu\text{g/g}$ total antioxidant compounds, 11% free radical scavenging activity while the estimated CAT activity was 1.5 $\mu\text{mol/min/g}$, SOD activity was 7080 units/g and the level of MDA was 45 $\mu\text{mol/mL}$. The ethanolic extract of garden cress seed had 0.7 mg/g total phenolic compounds, 27 $\mu\text{g/g}$ total flavonoid compounds, 140 $\mu\text{g/g}$ total antioxidant compounds, 11% free radical scavenging activity while the estimated CAT activity was 3 $\mu\text{mol/min/g}$, SOD activity was 5648 units/g and the level of MDA was 48 $\mu\text{mol/mL}$.



CONCLUSIONS

Lepidium sativum seed extracts were evaluated for their antioxidant potential. The antioxidant potential of the extracts was tested in relation to their phenolic compounds, flavonoid compounds, free radical scavenging activity, oxidative agents and antioxidant enzyme activity. The results of the comparative study shows that the ethanolic extract of garden cress seed has the significant content of antioxidant compounds as compared to the aqueous based extracts. Therefore, it is concluded that the ethanolic extract of the garden cress seeds can be used for the medicinal purpose against the diseases caused by oxidative stress after doing further pre-clinical and clinical trials.

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