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Phytochemical investigation, antioxidant properties and pharmacological activity of extract of Salvia officinalis

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ABSTRACT: *Medicinal Plant properties play an important role in food and pharmaceutical industries for disease prevention and treatment. The objective of present study is to characterizes the antioxidant activity of medicinal plants, including the leaves of Salvia officinalis L. by using colorimetric and spectrophotometric assays. The well-known antioxidant properties of these plant species stand out as a relatively more valuable plant source of natural bioactive molecules for developing novel functional pharma ingredients, with potential for promoting human health and improving bio-valorization and environment.*

KEYWORDS: *Assays, Pharma industries, Medicinal plant, Health, antioxidant*

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I. INTRODUCTION:

The recent development of functional foods and pharmaceutical products based on medicinal plants has brought improvements to all aspects of life, including the alleviation of physical disorders, the reduction in the use of synthetic antibiotics, and the increase in life expectancy. Indeed, these plants have long been used as safe, effective and sustainable sources of natural antioxidants or free radical scavengers, particularly phenolic compounds, such as phenolic acids, flavonoids, tannins, stilbenes, and anthocyanins. Those phenolics are mostly regarded to confer upon the antioxidant activity of medicinal and food plants, making a marked contribution in the fight against many pathological conditions such as cancer, diabetes, aging, cardiovascular, and other degenerative diseases.

Salvia officinalis L. commonly named as sage, rosemary, and peppermint, respectively, belongs to the family of Lamiaceae. They are well-known herbs and spices used in foods for flavors and aromas. Infusions, leaves or essential oils of its each species are reported to possess therapeutics in anti-cancer, anti-microbial, anti-diabetes, and gastrointestinal diseases, etc. Several bioactivities of sage like hypolipidemic, and memory-enhancing effects have been shown. Rosmarinic acid is abundant both in sage and rosemary, contributing to their anti-inflammatory properties. It has been one of the key plants of the pharmacopoeia since ancient times for the use in tremors, paralysis, nervine disorders, and joint pain. And nowadays, it becomes medicine in Mediterranean region, due to its prominent biological activities, especially neuroprotection. Rutin, psoralen, limonene, and pinene are reported as main constituents in this plant extracts or rue oils. Olive oil is one of the major components of the Mediterranean diets. Recently, phenolics present in olive leaves, especially the oleuropein, are reviewed to be potential economic and renewable source of natural by-products, attributed to its antioxidant, antihypertensive, hypoglycemic, hypocholesterolemic and cardioprotective activity. Parsley, used as culinary and medicinal herb, is originated from Mediterranean region. Phytochemicals particularly apigenin, coumarins, myristicin, and apiol are active compounds rich in parsley leaves, exhibiting diverse pharmacological properties, such as cyto-, gastro-, brain-, nephron-protective effects, and so on.

Pomegranate a deciduous shrub in the family of Lythraceae, is one of the oldest known plants. Both the edible (namely fruit juice) and non-edible parts (including seeds, peels, leaves, roots and bark) of this plant have been evidenced to have a wide range of health benefits, largely resulting from its abundant phenolic acid, flavonoids, tannins, amino acids, and alkaloids. However, the importance of pomegranate leaves, as agricultural and industrial waste, is of great interest and value to be emphasized by means of describing its beneficial effects and studies performed on this field.

Within the frame, materials from the seven medicinal and food plants aforementioned, that is, leaves and young stems of rue, peppermint, and parsley, as well as the leaves of sage, rosemary, olive, and

pomegranate are outstanding for their higher levels of phenolic contents and antioxidant capacities, along with relatively lower (dose-dependent) or inexistent toxicity. Therefore, in an attempt to explore plant-based alternative solutions in promoting health, as well as paving the way towards our future pre-clinical and clinical studies, we aimed to analyze the phenolic classe and antioxidant activities of different plant species under the same evaluation condition. Furthermore, the principal phenolic constituents were chromatographically characterized to investigate the relationship between the phenolic content and antioxidant activity.

II. MATERIALS AND METHODS

REAGENTS: Folin-Ciocalteu reagent, phenol, sulfuric acid, ethanol, sodium acetate, aluminum chloride, methanol other reagents were analytical grade.

EQUIPMENTS:The vegetal material was grounded o a fine powder by grinder mill.

The spectrophotometric measurements were made using elico 198 spectrophotometer. Extract Preparing

The leaves of Salvia officinalis were finely grinding a Grinder mill.

III. RESULT AND DISCUSSION:

Antioxidant activities

Oxidative stress plays an important role in the initiation and progression of several diseases, such as cancer, cardiovascular disorders, diabetes, and neurological diseases. Enhanced oxidative stress occurs when the generation of ROS by mitochondrial electron-transport chain, NADPH oxidase, uncoupled nitric oxide syntheses, and xanthine oxidase, exceeds the potential of antioxidant defenses including catalase, glutathione per oxidase, and superoxide dismutase activities. Natural antioxidants protect cells against ROS over production and therefore can counteract oxidative stress-mediated tissue damage. Evidence from several studies suggests that S. officinalis has potent antioxidant activities. Enriching the drinking water of rats with S. officinalis extract increases resistance of rat hepatocytes against oxidative stress. It protects hepatocytes against dimethoxy naphthoquinone- and hydrogen peroxide-induced DNA damage through elevation of glutathione peroxidase activity. The most effective antioxidant constituents of S. officinalis are carnosol, rosmarinic acid, and carnosic acid, followed by caffeic acid, rosmanol, rosmadial, genkwanin, and cirsimaritin. The radical scavenging effect of carnosol is comparable to that of α-tocopherol. The superoxide scavenging activity of the rosmarinic acid derivatives are 15–20 times more than trolox, a synthetic water-soluble vitamin E. In streptozotocin-induced diabetic rats, rosmarinic acid increases activities of pancreatic catalase, glutathione peroxidase, glutathione-S-transferase, and superoxide dismutase. In addition to rosmarinic acid, other flavonoids of S. officinalis particularly quercetin and rutin have strong antioxidant activities.

Pharmacological activities

1. Improvement of cognitive functions.
2. Improvement of mood and cognitive functions after single dose.
3. Improvement of memory and attention.
4. Improvement of prospective memory and cognitive performance.
5. Reduction of the throat pain intensity.
6. Reduction of the blood levels of total cholesterol, triglyceride, LDL and VLDL; Increase of HDL level.
7. Reduction of the blood levels of glucose, HbA1c, total cholesterol, triglyceride, and LDL; Increase of HDL level.
8. Reduction of 2 h postprandial glucose and total cholesterol; No effect on fasting glucose, HbA1c, triglyceride, LDL and HDL.
9. Reduction of total cholesterol and LDL; No effect on fasting glucose; Increase of HDL level.

IV. CONCLUSION:

Today, there is lot of medicines and herbal-based treatment all over the world. Therefore numerous experimental and clinical studies are being undertaken on medicinal plants and there is a need for updating and integrating the findings. In this article effort has been made to discuss available pharmacological findings that have been frequently reported for *S. officinalis*. The effectiveness of *S. officinalis* as an antinociceptive, hypolipidemic, and memory-enhancing medicinal plant has been confirmed with clinical trials. The possible therapeutic applications for these effects of *S. officinalis* need to be elucidated in future studies. Also, further works is necessary to understand the exact mechanisms responsible for *S. officinalis* effects, its toxicity, and drug-drug interactions.

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