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Research Article

Evaluating the total flavonoids, Reductive ability and antibacterial potentials of Salvia officinalis aqueous extract

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Abstract:

The four types of Bacteria were used in this study. Two Gram – and two Gram + (Staphylococcus aureus, Pseudomonas aeruginosa; Escherichia coli, Streptococcus). The reductive ability (rutin) , and total flavonoids were increased as the concentration of extract was increased. Moreover, the antimicrobial of methanol extracts was also increased as the concentration increased. This study gives an idea for this plant which had been used for a long time in folk medicine.

Keywords:

S.officinalis, Flavonoids concentrations, Reductive ability, Antibacterial ability.

Introduction

Salvia officinalis L., the regular sage is the most agent species inside the family of Labiatae. The plant is for the most part diffuse in the Mediterranean Basin, in South East Africa and in Central and South America, where it is to a great extent developed for culinary and therapeutic purposes.

Healing properties of sage are especially perceived since most punctual occasions and its utilization as a tonic, stimulant, carminative, disinfectant and antihydrotic is accounted for (Keller 1996, Kintzios 2000). Additionally, sage cell reinforcement impacts have been illustrated (Madsen, Bertelsen et al. . 1997, Cuppett and Hall 1998, DEANS and SIMPSON 2000, L.- N. Li 2000). A few phytochemical examinations (Giannouli and Kintzios 2000, ULUBELEN 2000, , Lu and Foo 2001) have been done on S. officinalis and two noteworthy substance classes of auxiliary metabolites have been

Distinguished as normal results of the plant: terpenoids and phenolic. Among the terpenoids, the unstable oil delivered in the aeronautical pieces of the plant has particularly obtained enthusiasm for the expansive scope of utilizations in fragrant healing and in the nourishment business (Dweck 2000, Giannouli and Kintzios 2000, Barnes and Anderson 2002). S. officinalis is considered to have the most elevated measure of basic oil contrasted with alternate species (Giannouli and Kintzios 2000)and it has been demonstrated that emission of the oil is related with the nearness of four unique kinds of particular glandular trichomes on the leaves of the plant, as prove by morphological examinations (Venkatachalam, Kjonaas et al. 1984, Avato, Fortunato et al. 2005). Despite the fact that S. officinalis is a standout amongst the most industrially vital species inside the Labiatae family, the use of biotechnological strategies for the engendering of this species to recoup high significant

metabolites shows up rather restricted. To the best of our insight, just a couple of concentrates on the creation in vitro of the cancer prevention agent dynamic mixes have been embraced (Hippolyte, Marin et al. 1992, Kintzios, Nikolaou et al. 1999, Kintzios 2000, Santos-Gomes, Seabra et al. 2002). Data with respect to the piece of basic oils from in vitro recovered clones of S. officinalis is rather absent. The present paper gives an account of the synthesis of the fundamental oils from in vitro shoots of S. officinalis and micro-propagated plants from a similar clone. In addition, morphological subtleties of the Plants are the most seasoned companions of humankind. They gave sustenance and safe house as well as served the humankind to fix distinctive afflictions, and as per the world wellbeing association (WHO), around seventy five percent of the total populace depends upon customary cures (for the most part herbs) for the social insurance of its kin (Calixto 2005).

Sage has an exceptionally long history of viable restorative uses and is an essential local home grown solution for clutters of the stomach related framework. Its disinfectant characteristics influence it a successful swish for the mouth where it to can recuperate sore throats and ulcers. The leaves connected to a hurting tooth will frequently soothe the torment. The entire herb is antihydrotic, clean, antispasmodic, astringent, carminative, stimulant, tonic and vasodilator. Sage is likewise utilized inside in the treatment of inordinate lactation, night sweats, over the top salivation (as in Parkinson's illness), bountiful sweat (as in tuberculosis), nervousness, sorrow, female sterility and menopausal issues (Phillips 1990). Remotely, it is utilized to treat creepy crawly nibble, skin, throat, mouth and gum contaminations and vaginal release. The fundamental oil from the plant is utilized in little portions to expel overwhelming accumulations of bodily fluid from the respiratory organs and blended in embrocation for treating ailment.

In bigger portions, be that as it may, it can cause epileptic fits and happiness. The leaves influence phenomenal tooth cleaners, to have sterile properties and can mend ailing gums (Abdulatif, AL-Ahmed et al. 2010). In this paper, an examination had been accomplished for estimating of all out flavonoids, reductive capacity at that point, and antibacterial action for this plant.

Material and Methods: **Plant collection, recognizable proof and extraction:**

The aerial parts of the Sage plant were gathered from the nearby markets, and had been distinguished by National Herbarium of Iraq.

The plant leaves were washed with refined water. The leaves were air-dried, and after that powdered utilizing an espresso processor. Fifty grams of the leaf powder were separated for three hours in 250 ml of the refined water utilizing the Soxhlet device and the wellspring of warming was a warm water bath (45°C). The leaf extract solution was then vanished at 45°C utilizing a rotary evaporator, and the resultant crude extract wasfrozen at - 20°C until use.

Determination of Total Flavonoids

Absolute flavonoids content was spectrophoto-synthetically decided in the

Aqueous concentrate of *S.officinalis* as rutin (flavonoids standard) proportionate by aluminum chloride colorimetric strategy as depicted by(Sakanaka, Tachibana et al. 2005). The methanol extract (3.2 mg) was dissolved up in 5 ml of half methanol, trailed by addition of 1 ml of a 5% (w/v) sodium nitrite arrangement. After 6 min, 1 ml of a 10% (w/v) aluminum chloride arrangement was included and the blend was permitted to represent a further 5 minutes before 10 ml of a 10% (w/v) NaOH arrangement was included. The blend was made up to 50 ml with refined water and blended well. At that point the absorbance was estimated at 450 nm with a spectrometer after 15 min. A comparative technique was connected to six fixations (2.5, 5, 10, 20, 40 and 80 µg) of rutin, and from which a standard bend was readied.

Reductive Ability:

The method portrayed by (Fu, Chen et al. 2010) was embraced to assess the reductive ability, in which 1 ml of every grouping of the plant extract (0.02, 0.04, 0.08, 0.16, 0.32, 0.64 and 1.28 mg/ml) was blended with 1ml of 0.2M phosphate cushion (pH 6.6) and 1.5 ml of 1% potassium ferricyanide, and afterward hatched at 50°C for 20 minutes.

1ml of 10% trichloroacetic corrosive was added to the blend to stop the response. The blend was centrifuged for 10 minutes at 3000 rpm and 2.5 ml of the supernatant were blended with 2 ml of distilled water and 0.5 ml of freshly arranged 1% Ferric chloride. From that point onward, the absorbance was estimated at 700nm. A similar technique was connected to Trolox arrangements (standards). All tests were done in triplicates.

Assurance of antibacterial action:

Muller Hinton agar medium was set up by dissolving 38g of the medium in 1000 ml distilled water (D.W.), at that point, warmed to bubbling to dissolve the medium totally. The last pH of the medium was acclimated to 6.8 by utilizing a pH meter. At that point, the medium was sterile via autoclaving (121°C) and 15 Ibs weight for 15 min, blend a long time before pouring. The Muller Hinton agar was poured in petri-dish. After hardening, plates were kept at 4°C to give a firm surface to wells making which were later loaded up with 100 µL of various fixations S.officinalis aqueous extract (Flores Santurio, Kunz de Jesus et al. 2014).

In the present investigation, four bacterial species were utilized Staphylococcus aureus, Pseudomonas aeruginosa; Escherichia coli, Streptococcus. This provided from College of Biotechnology/Al-Nahrain University.

Single colony from each kind of microbes demonstrated above was developed on supplement agar for 18-24 hrs. also, exchanged to a cylinder containing 5ml of Normal saline and blended well by vortex, at that point bacterial development was contrasted and McFarland tube. The turbidity of the standard arrangement tube number was equal to a bacterial inoculums convergence of 1.5×108 cell/ml (Ibraheem, Mhawesh et al. 2018). By utilizing cotton swab, a pinch of bacterial culture from ordinary saline was exchanged to Muller Hinton agar arranged above and streaked multiple times by turning the plate around 60° between the streaking, to guarantee even conveyance of the inoculums, the vaccinated plates were put at room temperature for 10 min to permit ingestion of abundance dampness (Ziad, Elias et al. 2011). At that point, by utilizing sanitized Pasteur pipette making wells (the wells were masterminded in order to evade the improvement of covering of restraint zones) which were loaded up with 100 µl of Plant extricate with various fixation (100, 200 and 300 mg/ml) and the plates were hatched at 37ºC for 18-24 hours. After hatching, the hindrance zone was estimated by a ruler to decide their distances across in millimeters; at that point the outcomes were recorded (Frey and Meyers 2010).

Results: The total flavonoids were measured by spectrophotometer at 700 nm and figure 1 represents the results:-

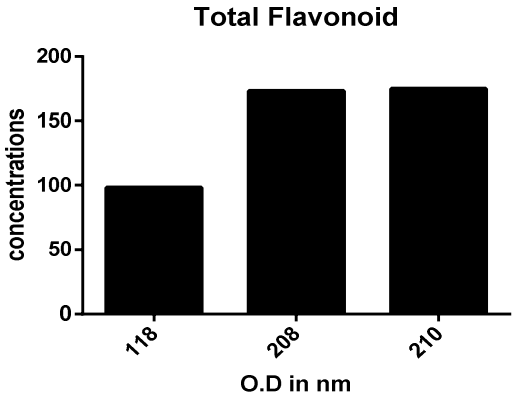

Figure 1: the total flavonoids for three extracts of Sage plant.

It seems from figure 1 that as the concentration of each sample increased the flavonoids increased. The results in figure 2 referred to reductive ability for sage plant extract. It seems from the figure that

sage reductive ability increased as the concentration for each sample increased.

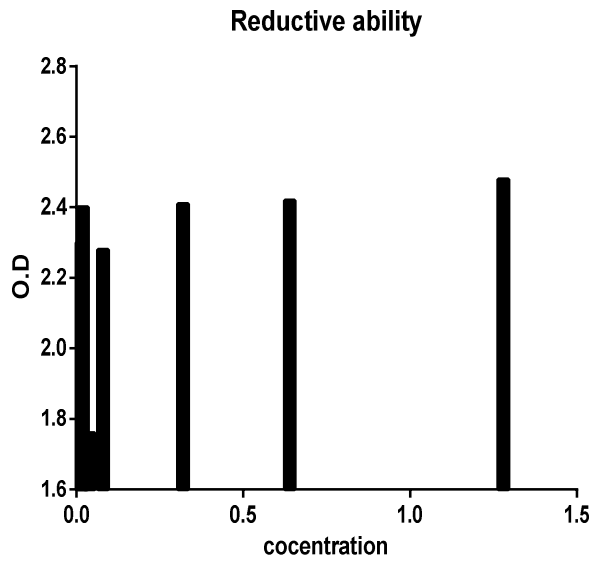

Figure 2: reductive ability for Sage plant extract.

The results in figure 3. Indicated that sage plant even with aqueous solution had antimicrobial activities against gram – or Gram + bacteria.

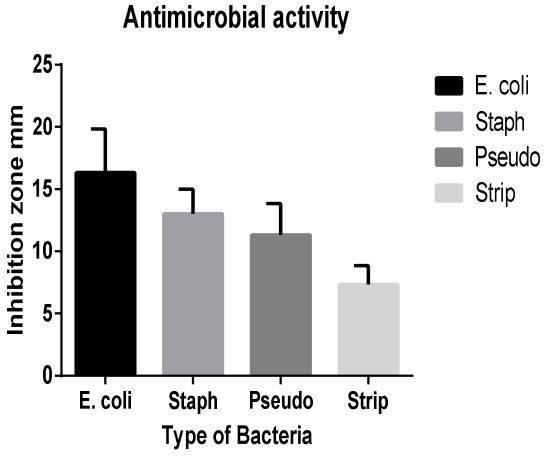

Fig 3: Antimicrobial activities for Aqueous extract of sage on bacteria.

It seems from figure above that the higher concentration 500mg/l was the most effective in all bacteria used followed by 250mg/l then 125mg/l however, the most effectuate bacteria was E.coli .

Discussion:

It has been known that a variety of plant extract has antioxidant activities to scavenge free radicals that cause diseases via lipid peroxidation, protein peroxidation and DNA damage (Hsu, Chan et al. 2007). Phenolics are found in large quantities in the plant kingdom, and they have been proposed to have multiple biological functions, including antioxidant activity (Franco, Galeano-Díaz et al. 2014). Phenolics, such as flavonoids, phenolic acids, stilbenes, lignans, lignin and tannins that are especially common in leaves, flower tissues, and woody parts such as stems and barks have strong antioxidant activity (Khulood W. Abbood 2015). Chemical analysis of sage (S. officinalis) aqueous extract revealed some of these constituents (steroids, tannins, glycosides, flavonoids, saponines and terpens) have attracted considerable interest as dietary constituents and the results of clinical studies have indicated their possible role in preventing cardiovascular diseases and several kinds of cancer (R.El-Ezzy, *et al.* 2010). Further studies revealed that natural products such as flavonoids and phenolics have been observed to be efficient free radical scavengers and lipid peroxidation inhibitors (Egert and Rimbach 2011), and probably, the best described and most useful property of almost every group of flavonoids is their capacity to act as antioxidants; protecting the body against reactive oxygen species (Ibraheem, Mhawesh et al. 2018).

Different aromatic plants (for instance, *Origanum dictamnus, Nepeta melissifolia, Salvia officinalis, Thymus vulgaris* and *Rosmarinus officinalis*) also have antioxidant ability because they possess a good amount of total proanthocyanidin, flavonoids and polyphenols (Chrpova, Kouřimská et al. 2010). Accordingly, there has been an increasing interest in the natural antioxidants, namely phenols, present in medicinal and dietary plants, that may help prevent oxidative damage (Ibraheem, Mhawesh et al. 2018). Flavonoids, tannin, saponin then triterpenic acids exhibited a good antimicrobial residences in opposition to longevity both Gram-positive and Gram-negative microorganism certain as *E. coli* or Salmonella *typhimurium.*

The aqueous extract in the above experiment, indicate high flavenoids which have good antimicrobial activities. This activates may be linked to the presence of essential oil compounds which affect many bacteria in varying degree (R. M. I. Al-Ezzy 2017).

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