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Antioxidant activity of the aqueous and ethanol extract of Mentha and Guggul plant by DPPH method

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Abstract---Free radicals are atoms or molecules that have one or more unpaired electrons on their outer orbital, are highly reactive, and could damage cells inside the human body. The human body produces antioxidants to neutralize free radicals, but human aging and stress oxidative conditions would increase the formation of free radicals, therefore an exogenous antioxidant is needed. The Plantae family is the largest family in the plant kingdom therefore it has great potential as a source of exogenous antioxidants. The objectives of this research were to determine the antioxidant activities of Mentha and Guggul leaves Aqueous and ethanol extract respectively. Antioxidant activity was determined by the DPPH method and observed results for future research.

Keywords---herbal plant, Mentha, Guggul, antioxidant, solvent, DPPH.

Introduction

Plants or their parts that have medicinal properties have been utilized for thousands of years. According to the latest World Health Organization estimate, more than 80% of people solely use herbal treatments. The phytoconstituents in these medicinal plants are diverse. Phytochemical investigations of medicinal plants have shown a number of beneficial chemical entities such as alkaloids, steroids, flavonoids, saponins, and others that have anti-inflammatory, analgesic, antioxidant, antibacterial, and other pharmacological effects on the human body. Free radicals are extremely reactive atoms or molecules with one or more unpaired electrons on their outer orbital. They can harm cells inside the human body. The human body produces antioxidants to neutralize free radicals, but human aging and stress oxidative conditions have increased the formation of free

radicals, therefore, an exogenous antioxidant is needed [1]. DPPH assay has been extensively used for screening antioxidant activity because it can accommodate many samples in a short period and is sensitive enough to detect active ingredients at low concentrations. DPPH is a common abbreviation for the organic chemical compound 2,2-diphenyl-1-picrylhydrazyl. It is a dark-colored crystalline powder composed of stable free-radical molecules [2]. When DPPH radicals encounter a proton donating substance such as an antioxidant, it would be scavenged and the absorbance is reduced. Thus, the DPPH radicals were widely used to investigate the scavenging activity of some natural compounds [3-4].

Guggul plant is of Plantae, these kingdoms found in India, and Pakistan. Guggul is an endemic species that is found in a small part of the world [5-6]. While other plant *Mentha* is a genus belonging to the family of Lamiaceae, whose plants are among the most aromatic and spread in diverse environments worldwide [7], having simple, characteristic leaves with a pleasant scent. *Mentha* taxonomy is highly complicated and includes about 42 species and 15 hybrids, with hundreds of subspecies and cultivars [8]. Plants of this genus are perennial and are used for essential oil production, mainly in USA, India, China, and Iran [9]. Fresh and dried plant materials of *Mentha* species are widely used in the industry as part of confectionaries, flavor-enhancing agents, pharmaceuticals, cosmetics, etc. [10-11]. Previous research showed that aqueous and methanolic extract of plants gave an antioxidant activity with the DPPH scavenging method [12-13]. The aim of the present study was to evaluate and compare the in vitro antioxidant activities of Guggul and *Mentha piperita* plant Leaves on the basis of scavenging of 2, 2-diphenyl-2-picrylhydrazyl (DPPH) radical. which will be helpful role play in future other research and present Guggul and *Mentha piperita* plant leaf importance with solvents.

Sample collection and extraction method

Fresh Mentha piperita and Guggul plants were obtained from a local botanical nursery in Sidhi and Rewa. Individual leaves were picked off the stem, rinsed with tap water, and dried in the shade for 5 to 6 days. Using a mortar and pestle, the dry samples were finely pulverised. The wet extraction technique is used to remove the solvent from the powdered material [14].

Chemicals

- 1-0.1 Mm solution of DPPH in methanol was prepared and used in the study.
- 2- Butylated Hydroxy Toluene.

Procedure for free radical scavenging activity

The extracts' capacity to neutralise the DPPH radical (1, 1-Diphenyl-2-picrylhydrazyl). The ethanolic extracts were produced as a stock solution at a concentration of 1 mg/ml. Extracts of varied concentrations were added to a methanolic DPPH solution in an equal proportion (0.1 mM) The reaction mixture was incubated at room temperature for 30 minutes, and the absorbance was

measured at 517 nm. As usual controls, BHT was employed. DPPH will degenerate to a yellow tint if free radicals have been scavenged [15]. This feature is used in the experiment to demonstrate free radical scavenging activity.

Results and Discussion

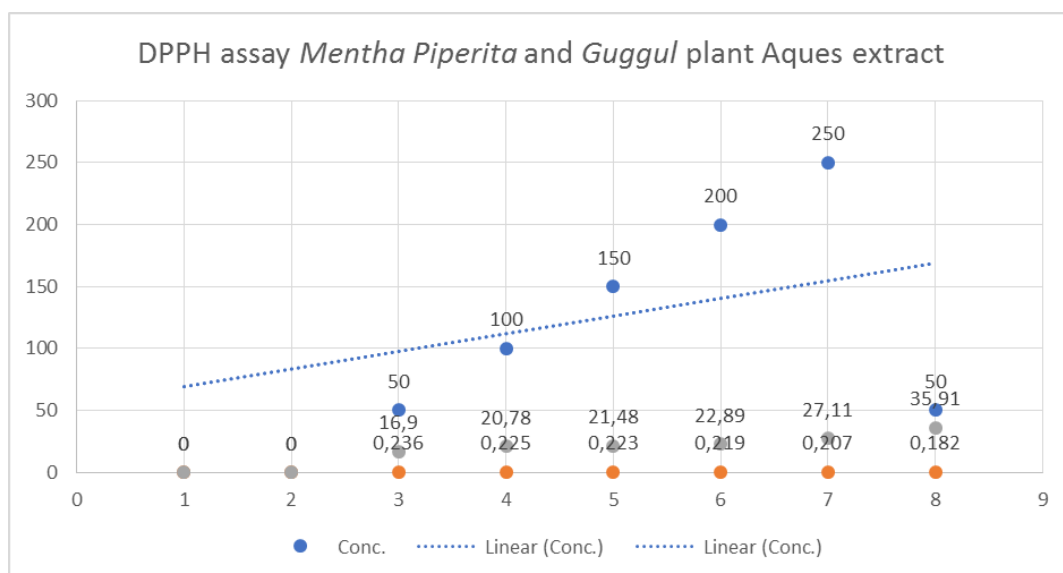
DPPH is a stable nitrogen-centered free radical that can accept an electron or hydrogen radical to become a stable magnetic molecule. DPPH radicals react with suitable reducing agents, then lose colour stoichiometrically with the number of electrons consumed, which is measured spectrophotometrically at 517 nm. Extract strongly scavenged DPPH radical. 1, 1-Diphenyl- 2- picryl hydrazine (DPPH) radical scavenging activity was increased with an increase in the concentration of ethanolic and aqueous leaf extracts of selected plants from (50,100,150,200, 250 µg/ mL) shown in Table nu. 1. The standard was used it is compared with the ethanolic and aqueous extract. The Change in colour of Sodium Nitropruside is directly proportional to the number of antioxidants present in the reaction mixture. The scavenging was found to be dose-dependent. Thus, extract has been established as an antioxidant.

The Change in colour of DPPH- is directly proportional to the number of antioxidants present in the reaction mixture *Mentha Piperita* minimum absorbance of the sample in the aqueous extract was 0.207 in 250 µg / ml conc. And scavenging activity 27.11% whereas maximum absorbance 0.236 in 50 µg / ml, scavenging activity 16.90% Ethanolic extract was found. The same plant in a different- solvent which was ethanolic extract minimum sample absorbance 0.202 in 250 µg / ml and scavenging activity in this cons. Was 28.17%. While maximum absorbance was 0.232 in 50 µg / ml and scavenging activity was in the same conc. 18.31% all mentioned in table no.1 and graph no.1. in this study other *Guggul* plant aqueous extract the active maximum free radical scavenging activity 47.89% and absorbance 0.148 in same 250 µg / ml cons. And the minimum absorbance in the same solvent extract was absorbance 0.182 in 50 µg / ml conc. And in this conc. scavenging activity was 35.91%. Ethanolic extract was found. The same plant in the different solvent which was ethanolic extract minimum sample absorbance 0.134 in 250 µg / ml and scavenging activity in this cons. Was 52.82%. While maximum absorbance 0.171 in 50 µg / ml and scavenging activity was in the same conc. 39.79% all mentioned in table no.1 and graph no.2.

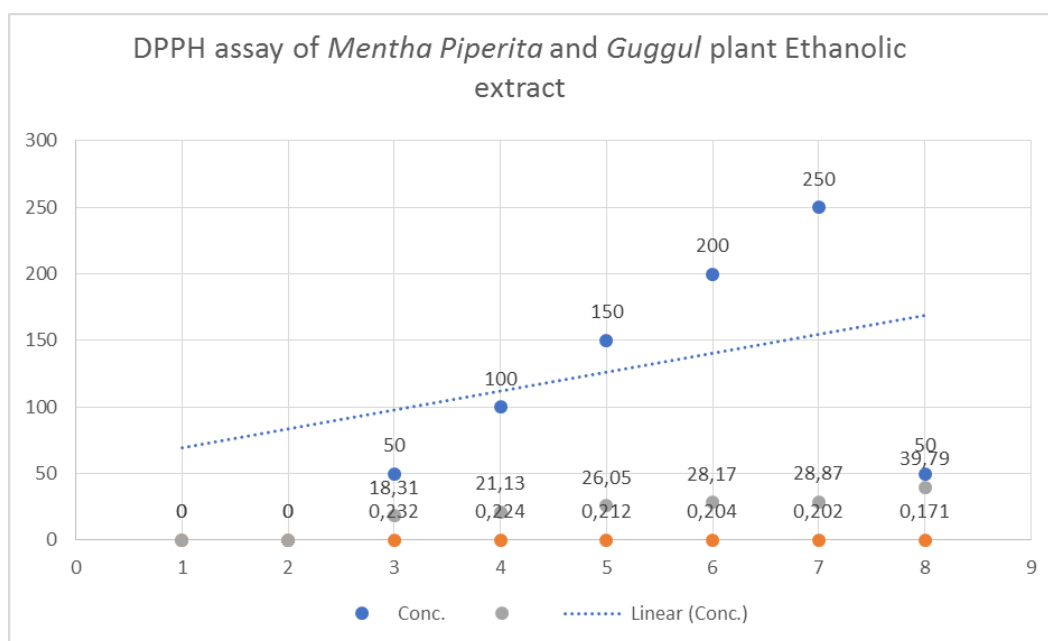
Table 1
DPPH activity of different extract of *Mentha Piperita* and *Guggul* plant leaves

Plant	Conc.	Aqueous extract		Ethanolic extract	
		Absorbance of sample	Scavenging Activity (%)	Absorbance of sample	Scavenging Activity (%)
<i>Mentha Piperita</i>	50	0.236	16.90	0.232	18.31
	100	0.225	20.78	0.224	21.13
	150	0.223	21.48	0.212	26.05
	200	0.219	22.89	0.204	28.17
	250	0.207	27.11	0.202	28.87
<i>Guggul</i>	50	0.182	35.91	0.171	39.79
	100	0.174	38.73	0.164	42.25

	150	0.166	41.55	0.152	46.48
	200	0.152	46.48	0.142	50.00
	250	0.148	47.89	0.134	52.82



Graph 1. Free radical scavenging effects on aqueous extract of *Mentha Piperita* and *Guggul* plant leaves.



Graph 2. Free radical scavenging effects on Ethanolic extract of *Mentha Piperita* and *Guggul* plant leaves

This study determined that Ethanolic extract of leaves of *Mentha Piperita* and *Guggul* plant showed better antioxidant potential by DPPH radical scavenging method we can say this plant is having antioxidant activity

Conclusion

According to the findings of this study, ethanolic extract of Guggul plant leaves had the greatest DPPH scavenging activity of 52.82 percent in 250 concentrations, whereas ethanolic extract of Mentha Piperita had a scavenging activity of 28.87 percent in the same 250 concentrations. We came to the conclusion that the plant extract had antioxidant properties. The current study's findings also suggested that the ethanolic and aqueous extracts of Mentha Piperita and Guggul leaves could be a potential natural source of antioxidants, and that they could be more useful as a therapeutic agent in preventing or slowing oxidative stress-related degenerative diseases. However, further research is needed before this plant's products may be commercialised.

Conflict of interest

The authors declare that there are no conflicts of interest.

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