Fractionation, Chromatographic Screening and Quantification of bioactive compounds from the imperative medicinal plant *Salvia officinalis*

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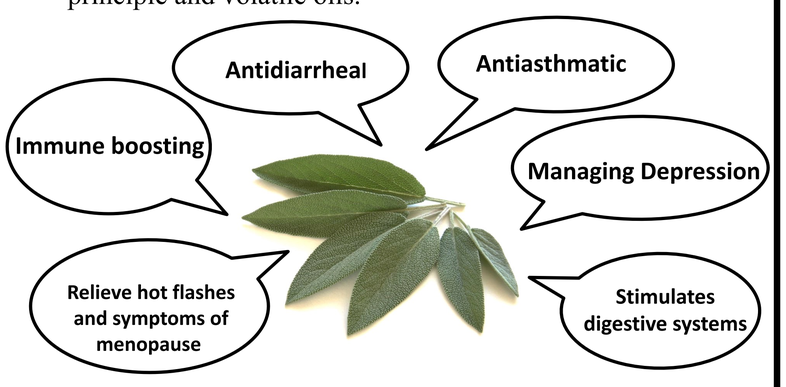
Background

- ✓ Screening of ethanobotanical plants is a pre-requisite to evaluate their therapeutic potential and it can lead to the isolation of new bioactive compounds. [1]
- ✓ *Salvia officinalis* is one of the most popular medicinal and culinary herbs used in the Arab world. [2]
- ✓ In general it contains chemical constituents mainly flavones, phenolic acids, lupeol, beta-sitosterol, estrogenic principle and volatile oils.



Traditional uses of Miramia

Problem

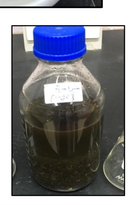
- ✓ *Salvia officinalis*, is reported to possess wide range of pharmacological properties such as anti-hyperlipidemic, anti-inflammatory, antioxidant, anti-hepatotoxic, in gastric-disorders and as a memory enhancer. [3]
- ✓ In spite of extensive traditional as well as pharmacological use of *S.officinalis,* published literature lack information about the phytochemical components of the herb growing in Asir region of Saudi Arabia.

Hypothesis

Present study including the qualitative and quantitative investigation of phytochemicals of *S.officinalis* growing in the Asir region of Saudi Arabia may aid in the exploration of the bioactive elements that are responsible for the therapeutic properties of Sage.

Preparation of Extract

1 **70 g of leaf powder was placed in a stoppered container with the solvent ethanol 95%.**

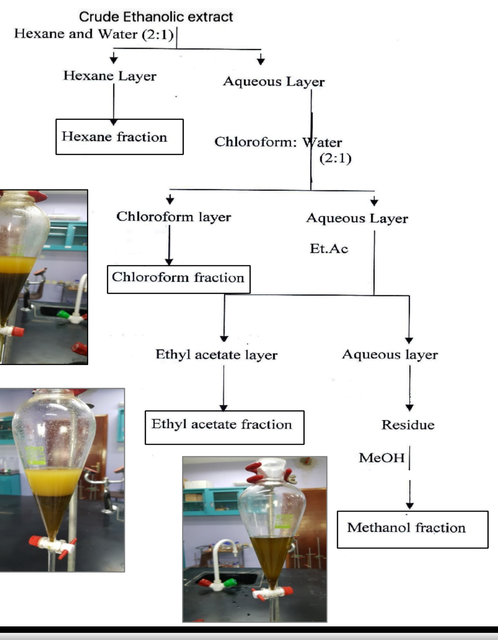


2 **Allowed to stand at room temperature for a period of seven days with frequent agitation to get the extract from Maceration technique.**

3 **The mixture was then strained, the marc is pressed and filtered**

4 **Extract was evaporated under reduced pressure and temperature by a rotary evaporator.**

Fractionation



Result-I

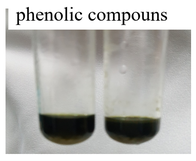
Table-1: Phytochemical screening of all fractions

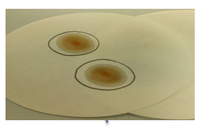
S.No	Phytochemicals	Tests	Observation	n-Hexane	Chloroform	Ethyl acetate	Methanol
1.	Test for Saponins	Foam Test	Presence of froth	-	-	-	+
2.	Test for Phenolic Compounds	Ferric chloride Test	green and blue color	-	+	+	+
		Lead Acetate Test	Bulky white ppt	-	-	+	+
3.	Alkaloids	Dragendorff test	Prominent yellow orange spot	-	+	+	+
		Wagner test	Reddish brown ppt	-	+	+	+
		Mayer test	Turbid cream extract is obtained	-	+	+	+
4	Test for flavonoids	Shinoda test	Effervescence and orange to the red color	-	-	+	+
5.	Test for glycosides	Killer-Killani test	Reddish brown color	–	–	–	–
		Borntrager's test	Rose red color appears in upper layer	–	–	–	–
6.	Test for Tannins	Gelatin solution test	white precipitate	-	-	+	+
		Ferric chloride test	blue color	-	-	+	+
7.	Test for Carbohydrates	Molisch's test	violet ring	-	-	+	+
		Fehling's solution Test	red precipitate	-	-	+	+
		Barfoed's test	red precipitate	-	-	+	+
8.	Test for Sterols	Salkowaski reaction	reddish brown ring	+	+	+	+
		Libermann-Burchards reaction	Brown ring	+	+	+	+

Positive Foam Test methanol

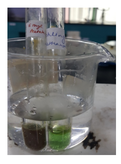
Phytochemical Test Results

Positive Ferric chloride Test for phenolic compouns





Positive Dragendorff test

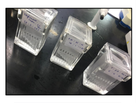


Fehling Test positive Negative

Result-II

Table-2 : Thin Layer Chromatographic studies

S. officinalis leaves	Solvent system	Extract R_f value	Standard R_f value
Methanol etract	Ethyl acetate: water: Methanol (10: 1: 1.35)	3 Spots- 0.28 0.54 0.91	0.27 (R) 0.91 (Q)
Methanol extract	Toluene: Ethyl acetate: Acetic acid: Formic acid (3:2: 0.05: 0.15)	4 Spots- 0.25 0.41 0.61 0.69	0.26 (Q)



Standardization of extract using Flavonoid Rutin

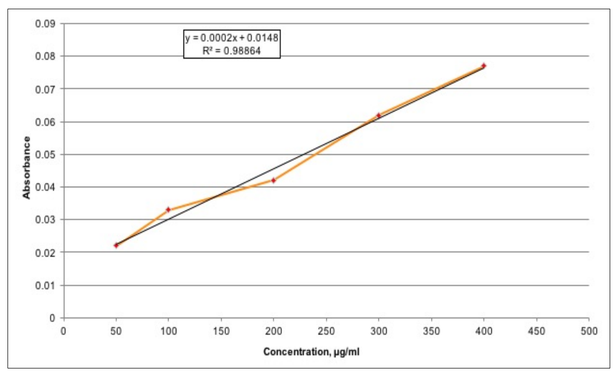


Table-4 : Flavonoids content of the methanol extract

Extract	Flavonoid content (in µg/ml)
Methanol extract	317.66

Observation and Conclusion

- ✓The phytochemical screening revealed that *S. officinalis* growing in the Asir region possess different classes of chemical compounds which may be attributed to different pharmacological properties of this plants.
- ✓The TLC analysis confirmed the presence of rutin and quercetin in the methanol fraction.
- ✓Quantitative estimation proved that the leaf contains a promising amount of flavonoid which may be the reason that sage has found increasing application in food formulations.
- ✓Further work of this study would be the correlation of the relationship of these active constituents for possible biological activities.

References

✓A. Ghorbani, M. Esmaeilizadeh Pharmacological properties of *Salvia officinalis* and its components, Journal of Traditional and Complementary Medicine, 2017, 7 433-440.

✓David O. Kennedy, Phytochemicals for Improving Aspects of Cognitive Function and Psychological State Potentially Relevant to Sports Performance, Sports Medicine 2019, 49 (1) 39–58.

Acknowledgement

Shadma Wahab and co-authors declare sincere gratitude toward King Khalid University, Abha, Saudi Arabia, for providing the opportunity to carry out research.