INTERNATIONAL ASSOCIATION OF BIOLOGICALS AND COMPUTATIONAL DIGEST
International & Peer-Reviewed Journal
E-ISSN: 2583-3995

A REVIEW ON SECONDARY METABOLITES, ANTIOXIDANT AGENT AND ANTIBACTERIAL ACTIVITY OF SALVADORA OLEOIDES L.

Ramesh Pattni*, Hitesh Kumarkhaniya, Bharat Maitreya, Nainesh Modi

Department of Botany, Bioinformatics and Climate Change Impacts Management, School of Sciences, Gujarat University, Ahmedabad-380009, Gujarat, India.

Corresponding Email Id: kumarkhaniyahitesh123@gmail.com

ABSTRACT

Plants provide all the basic necessary things which are used in routine life. Many drugs are extracted from plants which are helpful in curing many diseases such as diabetes, cancer, inflammation, headache, fever, skin disease, etc. The present review reveals that many secondary metabolites are present in huge amounts and play an important role as antioxidant agents and show antibacterial activity against many bacterial strains. It will be helpful for the extrication of biologically active compounds from the Salvadora genus.

Keywords: Phytochemicals, Anti-oxidant activity and Anti-bacterial activity

1. INTRODUCTION:

India has great diversity. Many types of ecosystems are present in our country. Deserts are one of the unique ecosystems due to the low availability of water, still many plants grow in an arid ecosystem. Phytochemicals are derived naturally from plants. It can help humans, such as four thousand phytochemicals cataloged and distributed by protective function, chemical characteristics, and medicinal properties (Meagher and Thomson,1999).

Phytochemicals are derived from plants such as organic carotene, sterol, and organic sulfur (Guan et al., 2021). Plants provide many primary needs such as shelter, clothing, food, and flavor. Ecological functions of phytochemical secondary metabolites have many bearings on potential medicinal effects for humans (Barboza et al., 2009)

The remaining organic chemicals, such as alkaloids, terpenes, flavonoids, lignans, steroids, curcumins, saponins, phenolics, flavonoids, and glycosides, are consist as secondary metabolites components. phytochemicals are categorized based on their function, a single compound may serve as both an antioxidant and an antibacterial agent (Siddiqui and Moid, 2022).

Phytochemicals in secondary metabolites prevent chronic diseases such as cancer, diabetes, cardiovascular disease, a bacterial disease, and fungal disease. the protective role of phytochemicals is associated with antioxidant activity since the overproduction of oxidants in the human body is involved in the pathogenesis of many diseases (Zhang et al., 2015)

Phytochemicals generally produce a naturally organic compound useful a many importance of ecologically, economically, etc. The current review paper is study based on secondary metabolites on their used like as antioxidant, antibacterial and antifungal.

Table 1: list of secondary metabolites, their amount and radical scavenging activity of different parts of plant.

Sr No.	Plant	Plant part	Secondary metabolites /Antioxidant method	Activity	Reference
1	Salvadora persica L.	Leaves	DPPH	1.26 to 1.78 mg/g	Sharma & Ramawat, 2013

		Fruit	TPC	22.2 mg/g	Khanam, et al., 2022
		Root	DPPH	4.8 µg/ml	Mohamed et al.,2013
		Stem	DPPH	3 µg/ml	Noumi et al., 2011
		Root	ABTS	1.6 µg/ml	Mohamed et al., 2013
		Leaves	ABTS	8.4µg/ml	Kumari, & Parida, 2016
			DPPH	46.5µg/ml	
		Root	H202	43.9µg/ml	
		Leaves	H2O2	65.5±26.46 %	
		Root	Gallic acid	42.4±0.11 µg/ml	
		Aerial plant	DPPH	51.60±2.58 %	Khanam et al., 2022
			TPC	16.20±0.81 µg/ml	
			TFC	2.44±0.12 µg/ml	
		Fruit	DPPH	54.30±2.72 %	
			TPC	22.20±1.11 µg/ml	
			TFC	6.17±0.31 µg/ml	
2	Salvadora olioides L.	Aerial plant	DPPH	46.90±2.34 %	
			TPC	11.90±0.50 µg/ml	
			TFC	1.72 µg/ml	
		Fruit	DPPH	52.70±2.63 %	
			TPC	19.20±0.96 µg/ml	
			TFC	52.70±2.73 µg/ml	
3	Salvadora persica L.	Stem	TTC	0.39 mg/g	Noumi et al., 2011
			Carotenes	460 µg/ml	
4	Salvadora persica L.	Leaves	TPC	15.4±0.76 µg/ml	Kumari, & Parida, 2016

			TFC	3.82±0.12 µg/ml	
			Total Glucose Content	1852±212.92 mg/g	
			Total protein Content	12.5±3.5mg/g	
			Total dopamine Content	18.01±6.56	
			Total malic acid Content	282.40±38.17 mg/g	
			Total fumaric acid Content	592±164.38 mg/g	
			Total carotenoid Content	2.5±0.5mg/g	
5	Salvadora olioides L.	Aerial plant	Gallic acid	1254.4±11.1 mg/g	Khanam et al., 2022
			Caffeine acid	16.4±0.8 mg/g	
			Ferulic acid	22.6±1.4 mg/g	
			catechin	131.5±5.90 mg/g	
			rutin	302.7±7.023 mg/g	
			quercetin	24.16±0.89 mg/g	
6	Salvadora olioides L.	Fruit	Gallic acid	1265±36.0 mg/g	
			Caffeine acid	14.6±0.8 mg/g	
			Ferulic acid	27.9±0.9 mg/g	
			Catechin	72.0±2.7 mg/g	
			Rutin	302.7±1.023 mg/g	
			Quercetin	24.16±0.89 mg/g	

Above table shows the number of secondary metabolites such as rutin, quercetin, catechin, phenol, flavonoid, tannin, carotene, caffeine, malic acid, and Ferulic acid is present in Salvadora genus. Here, also determines the amount of bioactive compound which play a vital role in various physiological activity. Antioxidant activity such as DPPH and ABTS estimated in different plant parts with various solvent extraction.

2. ANTI-BACTERIAL ACTIVITY:

Agents which interfere with the growth, development and reproduction of bacteria. These antibacterial agents are used to disinfect surfaces and decrease harmful bacteria. Such chemicals like chlorine, phenols, and such drugs have antibacterial properties.

Table 2: list of antibacterial activity of various plant parts against the different pathogen.

Sr No.	Plant	Plant part	Pathogen		Reference
1	Salvadora persica L.	Stem	S.epidermidis	9±0 mm	Noumi et al., 2011
			S. aureus	9.66±0.57 mm	
			M. leteus	9±0 mm	
2	Salvadora olioides L.	stem	E. coli	12.5	Kumar et al., 2012
			S. epidermidis	12.5	
			K. pneumonia	12.5	
			P. mirabiis	25.0	
			B. subtills	6.25	
3	Salvadora olioides L.	Leaves	s.aureus	8.9mm	Sheth, 2016
			B.subtilis	9.4mm	
			E. coli	8.6mm	
			P.aeruginosa	11.3mm	
			s.aureus	8.8mm	

			B.subtilis	9.8mm	
			E. coli	8.6mm	
			P.aeruginosa	11.2mm	
4	Salvadora olioides L.	Leaves	E. coli	16mm	Lakho et al., 2021
		Root	E. coli	9mm	
		Bark	E. coli	5mm	
5	Salvadora persica L.	Stem	Streptococcus mutans	1.56mm	Al-Bayati and Sulaiman, 2008
			Ps. aeruginosa	6.25mm	
			Strep.pyogenes	3.12mm	
			C.albicans	6.25mm	
			Lacto acidophilus	6.25mm	
			Strep. aureus	3.12mm	
6	Salvadora persica L.	Bark	E. coli	14mm	Miri et al., 2016
			S. aureus	12mm	
7	Salvadora persica L.	Stem	S. mutans	6mm	Balto, 2017
			S. salivarius	7mm	
			S. sanguis	9mm	
			Streptococcus	8mm	

			S. mutans	4mm	

CONCLUSION

The present review shows the phytochemicals study of Salvadora oleoides L. Every plant has any phytochemicals available for the improving human health. However, the single plant contains hundreds or thousands of bioactive metabolites. These Secondary metabolites consist many several activities like antioxidant, antibacterial, anti-inflammatory activity and also help in effective in treating various disease. This plant has not required more water for the survival and sustainable for unwonted environment and stress of water, heat etc.
So, this plant has many medicinal uses and does not require maintenance for the plant to easily grow.

ACKNOWLEDGMENT

We are thankful to the Head of the Department, Dr. Bharat Maitreya and Dr. Nainesh Modi for guidance and support.

REFERENCES

1) Al-Bayati, F. A., & Sulaiman, K. D. (2008). In vitro antimicrobial activity of Salvadora persica L. extracts against some isolated oral pathogens in Iraq. Turkish Journal of Biology, 32(1), 57-62.
2) Balto, H., Al-Sanie, I., Al-Beshri, S., & Aldrees, A. (2017). Effectiveness of Salvadora persica extracts against common oral pathogens. The Saudi dental journal, 29(1), 1-6.
3) Barboza, G. E., Cantero, J. J., Núñez, C., Pacciaroni, A., & Ariza Espinar, L. (2009). Medicinal plants: A general review and a phytochemical and ethnopharmacological screening of the native Argentine Flora. Kurtziana, 34(1-2), 7-365.
4) Guan, R., Van Le, Q., Yang, H., Zhang, D., Gu, H., Yang, Y., ... & Peng, W. (2021). A review of dietary phytochemicals and their relation to oxidative stress and human diseases. Chemosphere, 271, 129499.
5) Khanam, A., Ahmad, A., Iftikhar, N., Ali, Q., Fatima, T., Alswailmi, F. K., & Akhtar, J. (2022). Variation in Phenolic Profile, Antioxidant, and Anti-Inflammatory Activities of Salvadora oleoides Decene. and Salvadora persica L. Fruits and Aerial Part Extracts. Life, 12(9), 1446.
6) Kumar, S., Dhankhar, S., Arya, V. P., Yadav, S., & Yadav, J. P. (2012). Antimicrobial activity of Salvadora oleoides Decne. against some microorganisms. Journal of Medicinal Plants Research, 6(14), 2754-2760.
7) Kumari, A., & Parida, A. K. (2016). Metabolite profiling of the leaf extract reveals the antioxidant and nutraceuticals potential of the halophyte Salvadora persica. RSC advances, 6(57), 51629-51641
8) Lakho, J. A., Taj, A., Rind, N. A., & Naqvi, S. H. A. (2021). Phytochemical Analysis of Salvadora oleoides and Withania somnifera: An Insight into Their Antioxidant and Antimicrobial Capabilities. Journal of Drug Design and Medicinal Chemistry, 7(1), 5-11.
9) Meagher, E., & Thomson, C. (1999). Vitamin and mineral therapy. Medical Nutrition and Disease, 2nd ed., G Morrison and L Hark, Malden, Massachusetts: Blackwell Science Inc, 3358.
10) Miri, A., Dorani, N., Darroudi, M., & Sarani, M. (2016). Green synthesis of silver nanoparticles using Salvadora persica L. and its antibacterial activity. Cellular and molecular biology, 62(9), 46-50.
11) Mohamed, S. A., & Khan, J. A. (2013). Antioxidant capacity of chewing stick miswak Salvadora persica. BMC complementary and alternative medicine, 13, 1-6
12) Noumi, E., Snoussi, M., Trabelsi, N., Hajlaoui, H., Ksouri, R., Valentin, E., & Bakhrouf, A. (2011). Antibacterial, anticandidal and antioxidant activities of Salvadora persica and Juglans regia L. extracts. Journal of Medicinal Plants Research, 5(17), 4138-414
13) Sharma, V., & Ramawat, K. G. (2013). Salinity-induced modulation of growth and antioxidant activity in the callus cultures of miswak (Salvadora persica). 3 Biotech, 3, 11-17.

14) Shahidi, F., Janitha, P. K., & Wanasundara, P. D. (1992). Phenolic antioxidants. Critical reviews in food science & nutrition, 32(1), 67-103.
15) Sheth, m. n. 2016 individual and combined antibacterial activity of leaves of salvadora oleoides and salvadora persica
16) Siddiqui, A., & Moid, 2022 H. An Introduction on Phytochemical Analysis and their Type
17) Zhang, Y. J., Gan, R. Y., Li, S., Zhou, Y., Li, A. N., Xu, D. P., & Li, H. B. (2015). Antioxidant phytochemicals for the prevention and treatment of chronic diseases. Molecules, 20(12), 21138-21156.