ISSN: 2755-0168

Journal of Biotechnology & Bioinformatics Research

SCIENTIFIC Research and Community

Review Article

Open Access

Investigation of Antioxidant Effects of Artemisia Sieberi Essential Oil In Iran

Zahra Kahrarian[1]*, M Mojarrab[2] and Yasser Shahbazi[3]

[1]Department of Biology, Faculty of Science, Razi University Kermanshah, Iran

[2]Associate Professor, Department of Pharmacognosy, School of Pharmacy, University of Medical Sciences, Kermanshah, Iran

[3]Associate Professor, Faculty of Veterinary Medicine, Razi University of Kermanshah, Iran

ABSTRACT

Background: Nowadays, Due to the destructive effects of chemicals on processed foods and increasing multidrug-resistant pathogens (MDRs), the use of essential oils of medicinal plants, is essential. Artemisia is the largest genus of the Asteraceae family, with extensive research on the composition of essential oils, antimicrobial effects and food control of various species of this genus hasdone the purpose of this study was to review the antimicrobial effects of the four essential oils of Artemisia sieberi in Iran.

Materials and Methods: This study data collectionby articles in internal databases such as, Irandoc, SID and external databases including Science Direct, Scopus, PubMed, Elsevier, Google Scholar, Directory of Open Access Be it.

Results: Asteraceae family essential oils are biologically active secondary metabolites including volatile oils, quarines, flavonoids and phenolic carbonic acids that have potent antimicrobial effects. Chemical analysis of essential oils confirmed the four Artemisia species tested in Iran as effective antimicrobial agents. Therefore,the essential oils of these plants can be used as a food preservative and in the control of infectious diseases.

Conclusion: Analysis of the essential oil composition of these plants depends on the geographical diversity of the region and different cultivation conditions. Iran is one of the richest regions of the world in terms of number and variety of these plants, identification, development and optimization of the extract of these plants can play an important role in the health of society, economy and production. This study may focus on the unknown potentials of Artemisia species in Iran.

***Corresponding author**

Zahra Kahrarian, Department of Biology, Faculty of Science, Razi University Kermanshah, Iran, E-Mail: zahra.kahrarian@gmail.com.

Received: September 07, 2020; **Accepted:** September 11, 2020, **Published:** September 24, 2020

Keywords: Essential Oil, Antimicrobial, Artemisia Sieberi

Introduction

Foodborne disease is a global challenge. Every year, millions of people die from eating unhealthy foods. Today, due to the increase useing of chemical preservatives, natural additives have received much attention. Over useing of chemical drugs to treatment of infectious diseases has led to the emergence strains of microbial resistant. Therefore, in order to control the spread of multidrug-resistant pathogens (MDRs), the use of new antioxidant and antimicrobial agents, including plant extracts, as a source of new antimicrobials can be effective. Plant essential oils often contain polypranoids aromatic compounds and sesquiterpenes, Moreover, due to the presence of phenolic groups in their structure, can have antimicrobial effects on pathogenic bacteria [1-5]. Among of the Medical plants, Artemisia is the largest genus of the Asteraceae family that is composed of between 350 and 500 species. Artemisia species are often found in Asia, Europe and North America. Most of these species are found in Asia. As 35 species of them are found in Iran. Artemisia is a sharpy plant that grows in arid and semi-arid regions. This genus is mainly found in the northern and southern hemisphere [6-10]. Artemisia species have been used in traditional Iranian medicine as disinfectant, antibacterial, gastrointestinal and stomach. Previous studies have confirmed the widespread essential oil of this genus as antimicrobial, antifungal, antiviral, antiparasitic, and antioxidant. Monoterpenes, sescopy terpenes, Lactones, flavonoids, quarines, and sterols, polystyrene have been extracted from the chemical compounds of Artemisia species. The antimicrobial mechanism of essential oils of these plant is related to monoterpenoid compounds and affects the structure and function of cell membranes. Cineole is the most abundant compound of artemisia essential oil that is widely used in the preparation of medicinal substances. ایران studies showed the effect of 11 species of Artemisia family on inhibiting the growth of Leishmania majorora in Iran. A. sieberi in the analysis of essential oils, 20 compounds were identified, the most important of which were 1, 8-cinnamol (6.47%), camphor (35.5%) and camphene (8.3%). The antimicrobial effects of essential oils and their extracts on 8 species of gram-positive bacteria have been aproved. Royo et al. showed the essential oil of Artemisia sieberi to its antimicrobial properties. Artemisinin is a sesquiterpene lactone derived from Siberi. Artemisinin has a chemical structure of endoperoxidiaxone

that has biological activity, including antimalarial activity [11-18].

Materials and Methods

In this study, the method of studying and collection data through articles in internal databases including: SID, external databases Science Direct, Scopus, Google Scholar, PubMed, Elsevier and Directory of Open Access.

Results

In the analysis of essential oil A. sieberi in Iran the following compounds have shown in Table 1 [19].

Table 1:Components of essential oil of species A. sieberi

Components Species

-Hydrodistillation: Camphor (22.0), 1, 8-cineole (19.3), cis-davanone (15.0), camphene (4.6), terpinene-4-ol (3.2),

Microwave assisted hydrodistillation: Cis-davanone (29.8), camphor (20.8), 1, 8-cineole (13.8), geranyl acetate (5.7), terpinene-4-ol (3.0)

Vakiliano et al. (2019) investigated the antimicrobial activity of Artemisia sieberi essential oil collected from Kerman province and its effect on hydatid cyst that is a parasitic disease caused by Echinococcus granulosus, Surgery is one of the treatment methods. The present study was performed to evaluate the effect of A. sieberi. The results showed that different concentrations of aqueous extract of A. sieberi has antiparasitic activity in different time periods and there is a significant difference with the negative control group. However, the greatest effect was observed at a concentration of 75 mg [20].

Table 2: Concentrations

Time	25g/ml	50g/ml	75g/ml
2min	±1.4	±1.4	±2.73
2min	576.8	76.8	580
5min	1078±3.18	78±3.18	90±.0.79
10min	±24.9	±24.9	±1.27
10min	86.4	86.4	92.6

Emami et al, 2012, showed that the aqueous extract of A. sieberi has more anti-leishmaniasis effect than pure Artemisinin. Heidari et al. (2013) investigated the effect of Artemisia sieberi and artemisinin essential oils against Leishmania major. The lethal concentration (LC50) was determined to be 25 and 50 g/ml/ml, respectively. The antiparasitic effect of this plant extract was observed. Khosravi et al. (2009) showed that A. sieberi in treating Pityriasis versicolor,also Showed A. sieberi has an inhibitory effect on Ricicandida albicans, Microsporum canis, Microsporumgypseum, Trichophyton rubrum and Trichophyton mentagrofytes. In addition, they reported that A. sieberi is effective against Trichomonas gallinae in poultry In addition, they reported that A. sieberi is effective against Trichomonas gallinae. Yousefi et al., 2017), antimicrobial activity of A. essential oil sieberi were tested against various,gram positive bacteria, gram-negative bacteria, yeasts and fungi by disk diffusion method. Gram-positive bacteria and fungi were sensitive than gram-negative. Among gram-positive bacilli, Listeria monocytogenes and Bacillus cereus among gram-positive cocci, Streptococcus were more susceptible than other. The antimicrobial properties of this essential oil showed that the essential oil of A. sieberi has good potential in the food industries. Mahboubian et al. 2015 showed the antifungal activity of Artemisia sieberi essential oil from different regions of Iran against dermatophyte fungi. in order to, five samples of essential oils of A. Sieberi was analyzed at different times by GC-FID and GC-MS. gypseum, T. rubrum and M. Canis compared to other essential oils of A. sieberi are more sensitive than, there was no significant difference between the optimal antimicrobial activity of A. sieberi essential oil with different chemical compounds. Therefore, A. sieberi can be used as a topical antifungal agent in the treatment of skin infections. Khodadadi et al., 2014 evaluated the antifungal effect of Artemisia sieberi and monensin granular extract in laboratory coccidiosis. The results showed that $P < 0.05$ significantly reduced the parasitic effect of inoculated broilers [21-27].

Discussion

According to the researches done in Iran on Artemisia plants. Therefore, this research has been done with the aim of reviewing the researches done in Iran in the field of antimicrobial effects of Artemisia species essential oil. Confirmed the existence of significant chemical differences between the essential oils of different species of Artemisia. There are antimicrobial agents. Most of the antimicrobial properties in the studied essential oils are due to monoterpene compounds. All Artemisia species are rich in terpenoiod. The amount of compounds of genus Artemisia due to ecological differences such as latitude and longitude, altitude, temperature, humidity, climate and soil; metabolic pathways and biosynthesis affect the active ingredients in these plants and as a result, secondary metabolites are also biosynthesized under different environmental conditions. Currently, the increase of multidrug-resistant pathogens (MDRs) is a major problem in the world. MDR bacteria such as Escherichia coli, Enterobacter, Klebsiella are usually resistant of antibiotics. Gram-negatives such as Salmonella, Shigella, and Escherichia coli are major pathogens responsible for food poisoning, as a result there is a greater need to discover new natural druges. Research in this field, including the analysis of essential oil composition of different parts of these plants and its effects on microbial agents, due to the presence of flavonoids and volatile oils in the essential oils of these plants have potential antibacterial, fungal and viral activity. Effect of Artemisia species essential oil on gram positive and gram negative Bacteria Considering in studies, it seems that the MIC of essential oils on gram-positive bacteria is higher than gram-negative [28-32]. Further research should be done in the field of analysis and identification of essential oils of different parts of these plants.

References

1. Garcia-Canas V, Simo C, Herrero M, Ibañez E. Cifuentes A (2012) Present and future challenges in food analysis: Foodomics. Anal Chem 84: 150-10159.
2. Nedorostova L, Kloucek P, Kokoska L, Stolcova M, Pulkrabek J (2009) Antimicrobial properties of selected essential oils in vapour phase against food borne bacteria. Food Control 20: 157-160.
3. Dupont BF, Dromer F, Improvisi L (1996) The problem of resistance to azoles in candida. journal of medical mycology 6: 12-19.
4. Zenati F, Benbelaid F, Khadir A, Bellahsene C, Bendahou M (2014) Antimicrobial effects of three essential oils on multidrug resistant bacteria responsible for urinary infections. J Appl Pharm Sci 4: 15-18.
5. Habibi Z, Ghanian S, Ghasemi S, Yousefi M (2013) Chemical composition and antibacterial activity of the volatile oil from seeds of Artemisia annua L. from Iran. Nat Prod Res 27: 198-200.
6. Abad MJ, Bedoya M, Apaza L, Bermejo P (2012) The Artemisia L. genus: A review of bioactive essential oils. Molecules 17: 2542-2566.

7. Bora KS, Sharma A (2011) The genus Artemisia: A comprehensive review. Pharm Biol 49: 101-109.
8. Jose AM, Miguel BL, Apaza L, Bermejo P (2012) The Artemisia L. Genus: A review of bioactive essential oils. Molecules 17: 2542-2566.
9. Mozafarian V (2008) Research institute of forests and Rangelands. 1st ed. Tehran. Flore of Iran 199-260.
10. Valles J, McArthur ED (2001) Artemisia systematics and phylogeny: Cytogenetic and molecular in sights. USDA Forest Service Proceedings RMRS-P-21. 67-74.
11. Nezhadali M, Parsa M (2010) Study of volatile compounds in Artemisia Sagebrush from Iran using HS/SPME/GC/MS. Int J Environ Sci Dev 3: 287-289.
12. Maham M, Moslemzadeh H, Jalilzadeh-Amin G (2014) Antinociceptive effect of the essential oil of tarragon (Artemisia dracunculus). Pharm Biol 52: 208-212.
13. Rustaiyan A, Ezzatzadeh E (2011) Sesquiterpene lactones and penta methoxylated flavone from Artemisia kulbadica. Asian J Chem 23: 1774-1776.
14. Morris J.A, Khettry A, Seitz Ew (1979) Antimicrobial activity of aroma chemicals and essential oils. Journal of the American Oil Chemists's Society 56: 595-603.
15. Gordanian B, Behbahani M, Carapetian J, Fazilatim M (2013) Evaluation of Cytotoxicity ofSagebrush Plain Extract on HumanBreast Cancer MCF7 Cells. Armaghane Danesh 18: 241-251.
16. Emami SA, Taghizadeh SZ, Ahi A, Mahmoudi M (2012) Inhibitory activity of eleven Artemisia species from Iran against Leishmaniamajor parasites. Iran J Basic Med Sci 15: 807-81.
17. Royo P, Martin-Casabona, Martinez E, Andonegui M (1999) In vitro susceptibility of Mycobacterium Kansasii to the difluorinatedquinolone of spoufloxacin using a broth microdilutionand macrodilution MIC system. Int J TubercLung Dis 3: 349-53.
18. Goudarzi M, Rahbari S, Hadadzadeh H, Yeganeh Parsat M, Shafiyi A, Pourmaydani (2005) A Study the effect of leaf and extract of Artemisia annua on coccidiosis in broiler chickens. J Vet Res (University of Tehran) Artemisia 61: 339-344.
19. Hosseini M, Akbarzadeh A, Hashemi Moghaddam H, Mohammadi Nafchi A, Ashayekhi HA, et all. (2016) Chemical composition of the essential oils from the aerial parts of Artemisia sieberi by using conventional hydrodistillation and microwave assisted hydrodistillation: A comparative study. J Essent Oil Bear Plants 19: 32-45.
20. Vakilia Z, Radfarb M H, Bakhshaeia F, Sakhaeec E (2019) In vitro effects of Artemisia sieberi on Echinococcus granulosus protoscolices Experimental Parasitology 197: 65-67.
21. Emami SA, Rabe SZT, Ahi A, Mahmoudi M (2012) Inhibitory activity of eleven Artemisia species from Iran against leishmania major parasites. Iran. J Basic Med Sci 15: 807.
22. Heydari FE, Ghaffarifar F, Soflaei S, Dalimi A (2013) Comparison between in vitro effects of aqueous extract of Artemisia seiberi and artemisinin on Leishmania major. Jundishapur J Nat Pharmaceut Prod 8: 70-75.
23. Khosravi A, Shokri H, Darabi M, Kashani A, Mansouri P, et all. (2009) Comparative study on the effects of a new antifungal lotion (Artemisia sieberi essential oil) and a clotrimazole lotion in the treatment of Pityriasis. Versicolor Journal de Mycologie Médicale/J Med Mycol 19: 17-21.
24. Khosravi A, Shirani D, Mahmoudi M (2003) Evaluation of the Use of Artemisia Sieberi Essence on the Treatment of Cats and Dogs with Dermatophytosis.
25. Youssefi M, Tabari MA, Moghadamnia A (2017) Vitro and in vivo activity of Artemisia sieberi against Trichomonas gallinae Iranian. J Veterinary Res 18: 25.
26. Mahboubi M, Kazempour N (2015) The antifungal activity of Artemisia sieberi essential oil from different localities of Iran against dermatophyte fungiActivité antifongique de l'huile essentielle de Artemisia de différentes localités en Iran contre des dermatophytes 25: 65-71.
27. Khodadad Pirali Kheirabadi, Jahangir Kaboutari Katadj, Shahab Bahadoran, Jaime A Teixeira da Silva, Amir Dehghani Samani, et all. (2014) Comparison of the anticoccidial effect of granulated extract of Artemisia sieberi with monensin in experimental coccidiosis in broiler chickens Experimental Parasitology. 141: 129-133.
28. Kundan Singh Bora1, Anupam Sharma (2011) The Genus Artemisia: A Comprehensive Review Pharmaceutical Biology 49: 101-109.
29. Rahimi-Nasrabadi M, Gholivand MB, Niasarv M, Vatanara A (2010) Chemical composition of the essential oil from aerial parts of echinophora platyloba dc from Iran. J Med Plants 9: 53-56.
30. Obaidat MM, Bani Salman AE (2017) Antimicrobial Resistance Percentages of Salmonellaand Shigella in Seafood Imported to Jordan: Higher Percentages and More Diverse Profiles in Shigella. J Food Prot 15: 414-419.
31. Jin H, Yan-Ling Z, Li-Mei S, Feng-Jiao H, Xiao-He X (2005) Anexperiment on standardized cell culture assay in assessing theactivities of Composite Artemisia capillaries Tablets againsthepatitis B virus replication in vitro. Chinese J Integr Med 1: 54-56.
32. Shahriyary L, Yazdanparast R (2007) Inhibition of blood platelet adhesion, aggregation and secretion by Artemisia dracunculusleaves extracts. J Ethnopharmacol 114: 194.