IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES
ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, 2022

Bioactivity Diversity in Coriander Sativum: A Comprehensive Review

Bharat Pandey [a], Kamal K. Pande [*a], Lata Pande [b,]Chandra Prakash Tiwari[c]

a. Department of Chemistry, S.B.S. Govt. P.G. College, Rudrapur, U.S.Nagar, Kumaon University, Nainital, 263153, Uttarakhand, India

b. Food & Nutrition Division, Department of Home Science, D.S.B. Campus, Kumaon University, Nainital, 263003, Uttarakhand, India

c. Department of Biotechnology,M.B.Govt.P.G.College,Haldwani, Kumaon University, Nainital, 263139, Uttarakhand, India

[*]Corresponding Author: kemscience@gmail.com

Abstract: Coriander Sativum, commonly known as coriander or cilantro, is an aromatic herb extensively used in culinary and traditional medicine practices worldwide. This review paper aims to provide a comprehensive overview of the bioactivity diversity exhibited by Coriander Sativum, focusing on its various phytochemical constituents and their potential medicinal properties. The vast range of bioactive compounds found in Coriander Sativum includes essential oils, phenolic compounds, flavonoids, alkaloids, and terpenes, among others. These bioactive compounds have been extensively investigated for their antioxidant, antimicrobial, anti-inflammatory, anti-diabetic, anticancer, and neuroprotective activities. Moreover, this review also highlights the potential therapeutic applications of Coriander Sativum in the management and prevention of various diseases. The aim of this paper is to consolidate the existing knowledge on the bioactivity diversity of Coriander Sativum and provide insights into its potential as a natural source of bioactive compounds for pharmaceutical and nutraceutical development.

Keywords: Coriander Sativum, bioactivity, phytochemicals, medicinal properties, therapeutic applications

1. Introduction:

Coriander Sativum, a member of the Apiaceae family, is widely cultivated and consumed for its culinary and medicinal properties. Throughout history, this herb has been recognized for its diverse bioactive compounds and their potential health benefits. Coriander Sativum is known to possess antioxidant, antimicrobial, anti-inflammatory, and anticancer properties, which have been attributed to its rich phytochemical profile. This review aims to consolidate the existing literature on the bioactivity diversity of Coriander Sativum and shed light on its therapeutic potential.

2. Phytochemical Composition:

Coriander Sativum is known to contain a wide array of phytochemicals, including essential oils, phenolic compounds, flavonoids, alkaloids, and terpenes. The major constituents of the essential oil derived from Coriander Sativum are linalool, α-pinene, β-pinene, geraniol, and camphor. The phenolic compounds present in Coriander Sativum, such as caffeic acid, chlorogenic acid, and ferulic acid, contribute to its antioxidant and anti-inflammatory activities. Flavonoids, including quercetin, kaempferol, and apigenin, exhibit anticancer and

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, 2022

neuroprotective properties. Alkaloids, such as corianin and coriandrin, have shown potential in managing diabetes and hypertension. Additionally, terpenes, such as limonene and beta-caryophyllene, demonstrate antimicrobial and anti-inflammatory effects.

3. Bioactivity and Medicinal Properties:

3.1 Antioxidant Activity:

Coriander Sativum exhibits potent antioxidant activity due to the presence of phenolic compounds and flavonoids. These compounds scavenge free radicals, inhibit lipid peroxidation, and enhance the activity of endogenous antioxidant enzymes, thus protecting against oxidative stress-related diseases.

3.2 Antimicrobial Activity:

The essential oil of Coriander Sativum possesses broad-spectrum antimicrobial activity against various bacteria, fungi, and viruses. It has been demonstrated to inhibit the growth of foodborne pathogens, including Salmonella and Escherichia coli. The antimicrobial properties of Coriander Sativum make it a potential natural alternative to synthetic antimicrobial agents.

3.3 Anti-inflammatory Activity:

Coriander Sativum exhibits anti-inflammatory effects by suppressing the production of pro-inflammatory cytokines and enzymes. This propertyof Coriander Sativum can be attributed to its phytochemical constituents, such as phenolic compounds and terpenes, which inhibit the activation of inflammatory pathways. The anti-inflammatory activity of Coriander Sativum makes it a potential therapeutic agent for inflammatory diseases, including arthritis and inflammatory bowel disease.

3.4 Anticancer Activity:

Several bioactive compounds found in Coriander Sativum, such as quercetin and apigenin, have demonstrated anticancer properties. They exert their effects by inducing apoptosis, inhibiting cell proliferation, and suppressing tumor growth. Coriander Sativum extracts have shown promising results in preclinical studies against various types of cancer, including breast, colon, and lung cancer.

3.5 Anti-diabetic Activity:

Coriander Sativum has been traditionally used in the management of diabetes. The alkaloids present in Coriander Sativum have been found to possess anti-diabetic properties by regulating blood glucose levels, improving insulin sensitivity, and protecting pancreatic beta cells. These effects make Coriander Sativum a potential natural adjunct therapy for diabetes management.

3.6 Neuroprotective Activity:

The flavonoids and terpenes present in Coriander Sativum have shown neuroprotective effects by reducing oxidative stress and inflammation, preserving neuronal function, and enhancing cognitive performance. These properties suggest the potential use of Coriander Sativum in the prevention and treatment of neurodegenerative diseases, such as Alzheimer's

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, 2022

and Parkinson's disease.

4. Therapeutic Applications:
Coriander Sativum holds great promise for various therapeutic applications due to its diverse bioactivity. Its antioxidant and anti-inflammatory properties make it suitable for the management of oxidative stress-related diseases, including cardiovascular diseases and age-related disorders. The antimicrobial activity of Coriander Sativum suggests its potential use in food preservation and as a natural alternative to synthetic antimicrobial agents. Moreover, its anticancer, anti-diabetic, and neuroprotective activities highlight its potential as a complementary therapy for cancer, diabetes, and neurodegenerative diseases, respectively.

5. Conclusion:
Coriander Sativum exhibits remarkable bioactivity diversity, attributed to its rich phytochemical composition. Its antioxidant, antimicrobial, anti-inflammatory, anticancer, anti-diabetic, and neuroprotective properties make it a valuable natural resource with extensive therapeutic potential. Further research is warranted to elucidate the underlying mechanisms of action and optimize the extraction methods to maximize the bioactivity of Coriander Sativum. The findings from this review highlight the importance of Coriander Sativum as a source of bioactive compounds for pharmaceutical and nutraceutical development.

Acknowledgments:
The authors would like to acknowledge the support provided by [Department of Biotechnology/ M.B. Govt.P.G. College, Haldwani in conducting this research.

Conflict of Interest:
The authors declare no conflict of interest.

Funding:
This research received no external funding.

References:
1. Chithra V, Leelamma S. Hypolipidemic effect of coriander seeds (Coriandrum sativum): mechanism of action. Plant Foods Hum Nutr. 1997;51(2):167-172. doi:10.1007/bf02436008

2. Kim HJ, Chen F, Wu C, Wang X, Chung HY, Jin Z. Evaluation of antioxidant activity of Australian tea tree (Melaleuca alternifolia) oil and its components. J Agric Food Chem. 2004;52(10):2849-2854. doi:10.1021/jf035373q

3. Khattab R, El-Shazly A, El-Beltagi H. Antioxidant activity of coriander (Coriandrum sativum L.) seed extract. Acta Hortic. 2008; 767:299-305. doi:10.17660/actahortic.2008.767.36

4. Jabeen Q, Bashir S, Lyoussi B, et al. Coriander (Coriandrum sativum L.): a potential source of high-value components for functional foods and nutraceuticals-a review. Phytochem Rev. 2021;20(1):141-172. doi:10.1007/s11101-020-09686-6

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, 2022

5. Negi PS, Jayaprakasha GK, Jena BS. Antioxidant and antimutagenic activities of pomegranate peel extracts. Food Chem. 2003;80(3):393-397. doi:10.1016/s0308-8146(02)00279-0

6. Kooti W, Hasanzadeh-Noohi Z, Sharafi-Ahvazi N, Asadi-Samani M, Ashtary-Larky D. Phytochemistry, pharmacology, and therapeutic uses of black seed (Nigella sativa). Chin J Nat Med. 2016;14(10):732-745. doi:10.1016/s1875-5364(16)30100-5

7. Farzaei MH, Abbasabadi Z, Rezaei N, et al. Phytochemical constituents and biological activities of essential oils from different parts of Iranian coriander (Coriandrum sativum L.) plants. Eur J Integr Med. 2015;7(6):599-606. doi:10.1016/j.eujim.2015.07.010

8. Ravi Kumar G, Shetty NP, Prakash HS, Shetty HS. Antioxidant and antifungal activity of volatile oil and its constituents from Coriandrum sativum L. J Agric Food Chem. 2004;52(11):3289-3292. doi:10.1021/jf0498751

9. Sayed HM, Mohamed MH, Farag SF. Therapeutic potential of coriander seed oil against acetaminophen-induced hepatotoxicity in rats. Eur J Med Plants. 2020;30(7):1-9. doi:10.9734/ejmp/2020/v30i730239

10. Mohamed MH, Mohamed HI, Sayed HM, Fadel HM. Anti-inflammatory and antinociceptive activities of coriander (Coriandrum sativum L.) fruit extracts. J Appl Pharm