CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187
https://doi.org/10.5281/zenodo.7657716

Available online at: http://www.iajps.com *Review Article*

CORONOPUS DIDYMUS LINN.: AN INSIGHT INTO CURRENT RESEARCH ON TRADITIONAL USES, PHYTOCHEMISTRY, AND PHARMACOLOGY

Ms.Mamta Dubey[1], Ms Sarika Chaturvedi[2], Ms. Deeksha Shakya[3] , Mr. Himanshu Shakya[4], Ms.Akansha Bhadauria[5]

dubemamta7@gmail.com[1],chaturvedi.sarika2512@gmail.com[2],shakyadeeksha10@gmail.com[3]
himanshuetw58@gmail.com[4], nikki.phr28@gmail.com [5]

Department of Pharmacology, Shri R.L.T Institute of Pharmaceutical Science and Technology, Etawah, Affliated to AICTE and PCI

Article Received: January 2023 **Accepted:** January 2023 **Published:** February 2023

Abstract:

Coronopus didymus was investigated for its activity against cancer, diabetes, infectious bacteria, and oxidative stress. Medicinal plants are commonly used to treat a wide range of infectious human diseases. To test the anticancer, antibacterial, and diabetic activity of the Coronopus didymus extract, four different concentrations of each extract were prepared in acetone, ethanol, and methanol. The greatest antiproliferative and alpha glucosidase inhabitation actions were observed in the ethanol-based extracts, whereas the best antioxidant activities were found in the methanol-based extract Stem extracts in N-hexane, ethanol, and water were found to contain flavonoids, polysaccharides, anthra-glycosides, and saponins, Anthra-glycosides, cardiac glycosides, terpenoids, and saponins were all found in the N-hexane ,ethanolic and aqueous extracts of the roots. Thus, it was determined that since Coronopus didymus is rich in secondary metabolites, it could be used in medicine.

Keywords- *Coronopus didymus, Pharmacological activity, chemical constituent, taxonomy, Plant profile*

Corresponding author:

Ms.Mamta Dubey,

Department of Pharmacology,
Shri R.L.T Institute of Pharmaceutical Science and Technology,
Etawah, Affliated to AICTE and PCI
Ph:7906363940

QR code

Please cite this article in press Mamta Dubey et al, ***Coronopus Didymus linn.: An Insight into Current Research on Traditional Uses, Phytochemistry, And Pharmacology.,*** *Indo Am. J. P. Sci, 2023; 10 (02).*

1.INTRODUCTION:

Natural active compounds from plants, such as secondary metabolites and antioxidants, are abundant [1]. In Karnataka, India, Coronopus didymus (CD) has been utilized as a traditional medicine to treat wounds and allergies. CD has been found to contain 0.003% benzyl cyanide [2], glucotrapaeolin, a glucoside of benzyl isothiocyanate [3] 1,8-dihyroxy anthraquinone [4] at a concentration of glucotrapaeolin, , flavones, chrysoeriol, and chrysoeriol-6 (OAc)-4-b-D-glucoside[5] .The most frequent secondary metabolite in plants, phenolic chemicals are crucial for the pigmentation, growth, and reproduction of the plant as well as its resistance to diseases and predators. This is largely because of their strong astringency and phytoalexin properties. Their anti-allergic, anti-inflammatory, antioxidant, hepatoprotective, antiviral, and anti-carcinogenic activities have been established [6].

Among the leading causes of death globally, cancer is second to only cardiovascular disease in affluent nations (World Cancer Report, 2014). Humans are known to be affected by more than 200 distinct types of cancer. The National Cancer Institute estimates that simply in the U. S., there will be 5.9 million cancer-related deaths and around 16.8 million new cases of cancer reported in 2016. Due to population growth and ageing, the burden of cancer is projected to increase to 21.7 million new cases and 13 million cancer deaths worldwide by 2030, making it the largest hazard to public health among non-contagious diseases. As a result, a lot of money is being spent on cancer prevention, diagnosis, and treatment. The primary objective of several pharmaceutical companies and organizations, like the National Cancer The discovery and development of anticancer agents by identification of cytotoxic compounds is the main focus of many pharmaceutical companies as well as groups like the British Cancer Research Campaign, the European Organization for Research and Treatment of Cancer, and the National Cancer Institute in the United States [7].

Coronopus didymus a weed of the Brassicaceae family is commonly known as “wartcress” or “swinecress” [8]. Cough, bruises, trauma, arthrosis, bronchitis, external ulcers, cancer, rheumatism, stomach, and urinary issues have all been traditionally treated with this herb. It has been used to relieve fever and inflammation, purify the blood, ease muscle discomfort, and eliminate catarrh [9, 10]. Additionally, Coronopus didymus has been said to have anti-inflammatory, anti-tumor, anti-malarial, antioxidant, and anti-fungal effects. Due to its high biomass, it is also said to have phytoremediation properties for zinc, lead, and cadmium in addition to its medicinal and curative qualities [11].

2. Plant profile

2.1. Biological source

It consist of the flower and fruit of coronopus didymus

2.2. Geographical Source

The continent of South America

2.3. Family

Brassicaceae

2.4. Common name

Lesser swine cress, swine wartcress [12]

3. Taxonomy

Kingdom-Plantae
Phylum- Tracheophyta
Class-magnoliopsida
Order-Brassicales
Genus-Lepidium L.[13].

4. Macroscopy

Annual or biannual, 15 to 30 cm long, scattered or procumbent, frequently slightly foetid, mainly branching from below, glabrous or hairy. Upper leaves are similar or pinnatifid and only 3-5-jugate, 1.5-3 cm long, sessile or subsessile; lobes sinuate serrated, frequently only on one side. Basal and lower leaves are rosulate, pinnatisect, stalked, 6-10 jugate, and 5-10 cm long. Racemes 30–60 flowers per raceme, thick, fruit racemes up to 8 cm long (often considerably shorter). Little, 1 mm wide flowers on a short, filiform pedicel that is 3–4 mm long in fruit. There are no petals and only 2 or 4 viable stamens. Siliculae are 1.5 mm long, 2.5 mm wide, broader than long, and bilobed; valves are globose, reticulately [14].

5. Phytoconstituent from coronopus didymus

The identification and quantification of polyphenols were done using high-performance liquid chromatography (HPLC). Chlorogenic acid, benzoic acid, and quercetin were all detected in the extracts in different amounts among the nine primary identified polyphenols. Chlorogenic acid, kaempferol, ferulic acid , coumarin and benzoic acid were identified in acetone-based extracts. Chlorogenic acid , HB acid , caffeic acid , benzoic acid and rutin were identified in ethanol-based extracts. Chlorogenic acid, HB acid , kaempferol , ferulic acid , quercetin and benzoic acid were identified in methanol-based extracts.

Examination of cronopus didymus extracts showed the presence of various phytochemicals like

flavonoids, tannins, phenols, glycosides, saponins, terpenoids and steroids. One of the major groups of plant metabolites are phenolic compounds [15].

6. Pharmacology

Antioxidant activity

Many investigations showed at Different concentrations (1 mg/mL, 0.1 mg/mL, 0.01 mg/mL, 0.001 mg/mL) of plant extracted in three solvents (acetone, ethanol, methanol) were evaluated for their free radical scavenging ability using 0.3 mM DPPH. Gallic acid (0.3 mM) was used as a standard. All the tested concentrations exhibited significant radical scavenging activity in a concentration-dependent manner. The highest concentration of 1 mg/mL of methanol- and ethanol-based extracts demonstrated a maximum radical scavenging activity of 56.7% and 52.7%. The lowest concentration of 0.01 mg/mL exhibited almost negligible antioxidant activity. Extracts dissolved in methanol and ethanol performed better than the extracts dissolved in acetone with IC50 values of 0.73 mg/mL and 0.86 mg/mL, respectively.

The ethanol extract showed high radical scavenging activity towards DPPH and ABTS radicals with IC_{50} values of (7.80×10^2) and (4.32×10^2) µg/mL, respectively [4].

Antidiabetic activity

The antidiabetic activity of C. didymus was evaluated using the alpha glucosidase enzyme, one of the key enzymes involved in Type II diabetes. The extract showed significant hypoglycemic activity in normal and diabetic mice in a dose dependent manner. This may be due to the presence of various constituents like saponins, flavonoids and tannins [16].

Anticancer activity

The antiproliferative potential of C. didymus extracts was evaluated using an MTT assay. For this purpose, different concentrations (1 mg/mL, 0.1 mg/mL, 0.01 mg/mL, 0.001 mg/mL) of plant extracted in acetone, ethanol and methanol were exposed to the Molecules 2022, 27, 6263 5 of 10 HepG2 cancer cell line. All the concentrations exhibited potential antiproliferative activity against HepG2 cells in a concentration-dependent manner. The extracts prepared in methanol and acetone at a concentration of 1 mg/mL inhibited cell proliferation by 70.22% and 69.59%, respectively. The effect on morphology of HepG2 cells are shown [11].

Anti-inflammatory activity

Coronopus didymus effectively inhibited carrageenan-induced oedema. In addition, the extract also inhibited oedema induced by different photogenes, including substance P, PGE2, dextran and bradykinin. Based on these reports, it could be inferred that the anti-inflammatory action of the studied extract might be due to an inhibition of the different mediators involved in the inflammatory events [9].

Antipyretic activity

A strong antipyretic effect was obtained by the aqueous extract of CD in a dose-dependent manner. The antipyretic action of the extract's flavonoids may be due to their ability to lower elevated body temperatures, as demonstrated by numerous past investigations [17, 18]. Pyrexia may be related to increased oxidative stress since, according to a previous study, a rise in body temperature is linked to higher levels of lipid peroxide. They also claimed that taking antioxidant supplements reduced the oxidation of lipids. [19].

Antiallergic Activity

In the antiallergic activity, aqueous extract of CD was found to inhibit the granulation of mast cells induced by non-immunological and immunological stimulus [20].

CONCLUSION:

This review systematically summarizes the latest findings on the botany, traditional uses, phytochemistry and pharmacology, of coronopus didymus. Lesser swine-cress or coronopus didymus is native to South America and has been introduced nearly worldwide. Regarding the use as a medicinal and edible plant, there are records in the dietary histories it is eaten as a vegetable, and also used as a medicinal plant, to treat a range of conditions from cancer to gangrene to hemorrhoids. This study shows that coronopus didymus possess anti-cancer, antioxidant, Antidiabetic, antipyretic antiallergic, and anti-inflammatory activity. The plant can be used as a source of oral drug against respiratory tract infections;however, further studies are required to isolate the active principle from the crude extract for proper drug development Hepatotoxin (CCl4) produced marked liver damage, which was evidenced by substantial enzymatic changes in serum and liver samples. CD (200, 400 mg/kg) significantly re-versed the CCl4 induced changes, and the results were com-parable to that of silymarin (standard). The hepatoxin elevated levels of AST, ALT and hepatic lipid peroxides were markedly reduced and depleted hepatic GSH levels were partly restored by the extract.

REFERENCES:

1. Riaz M, Zia ul-Haq M, Saad B, Anthocyanins and human health : biomolecular and therapeutic aspect Berlin springer verlag 2016-p-1-19
2. Inam-ul-haque, J. Chem. Soc. Pakistan, 11, 80—81 (1989).
3. De Ruiz R. E. L., Fusco M., Sosa A., Ruiz S. O., Fitoterpia, 65, 181— 182 (1994).
4. McDowall F. H., Mortan I. D., McDowell A. K. R., New Zealand J. Sci. Tech., A28, 305—307 (1947).
5. Prabhakar K. R., Srinivasan K. K., Padma G. M. R., Pharm. Biol., 40, 490—493 (2002).
6. Mandal SM, Chakraborty D,Dey S, phenolic acid act as signaling molecule in plant microbe symbioses . Plant signalBehav 2010; 5(4): 359-368
7. Hafiza Noreen , Muhammad Farman , James S.O. Mc Cullagh , Bioassay-guided isolation of cytotoxic flavonoids from aerial parts of Coronopus didymus , Reserch Gate.2017 23(2): 155-164
8. Prabhakar, K.R.; Veeresh, V.P.; Vipan, K.; Sudheer, M.; Priyadarsini, K.I.; Satish, R.B.S.S.; Unnikrishnan, M.K. Bioactivity guided fractionation of Coronopus didymus: A free radical scavenging perspective. Phytomedicine 2006, 13, 591–595.
9. Busnardo, T.C.P.M.; Padoani, C.; Mora, T.C.; Biavatti, M.W.; Fröde, T.S.; Bürger, C.; Claudino, V.D.; Dalmarco, E.M.; de Souza, M.M. Anti-inflammatory evaluation of Coronopus didymus in the pleurisy and paw oedema models in mice. J. Ethnopharmacol. 2010, 122, 519–525.
10. Borges, M.S.; Freitas, M.D.; Cardoso, S.; Citadini-, V.; Bó, S.D.; Amaral, P.D.A. Ethnobotanical study of selected medicinal plants used for the treatment of respiratory diseases in Southern Brazil. J. Med. Plant Res. 2021, 15, 22–34.)
11. Saima Muzammil , Yunsheng Wang , Muhammad Hussnain Siddique , Errum Zubair , Sumreen Hayat , Muhammad Zubair , Arpita Roy , Rabia Mumtaz , Muhammad Azeem , Talha Bin Emran and Muhammad Qasim Shahid, . Polyphenolic Composition, Antioxidant, Antiproliferative and Antidiabetic Activities of Coronopus didymus Leaf Extracts. Polyphenolic Composition, Molecules 2022, 27, 6263, 2-10
12. Ghias Uddin, Jawad Ali, SaniaFeroz and Abdur Rau Phytochemical and pharmacological study ofCoronopus didymus L. Topclass Journal of Herbal Medicine, Jan., 2014, Vol. 3(1) pp. 1-4, 26
13. Lepidium didymum L.Taxonomic Serial No. 515763 integrated Taxonomic Information System Report
14. http://www.worldfloraonline.org/taxon/wfo-0000621702
15. Wajidullah, Naveed Akhtar , Syed Shaukat Ali , Sajjad Ahmed, Samin Jan, Barkatullah, Muhammad Azim Khan and Muhammad Saleem Khan, phytochemical analysis of Lepidium didymium, research gate ,2017. 23(2): 155-164
16. Tereza Cristina Pamplona Mosimann Busnardoa , Cristina Padoani a , Ticiana Camila Moraa , Maique Weber Biavatti b , Tânia Silvia Fröde b , Cristiani Bürger a , Vanessa D. Claudinoa , Eduardo Monguilhote Dalmarco b , Márcia Maria de Souzaa, Anti-inflammatory evaluation of Coronopus didymus in the pleurisy and paw oedema models in mice, Journal of Ethnopharmacology 128 (2010) 519–525
17. Sudheer mantena ,Srinivas mutalik ,hullegala srinivasa. Antiallergic, Antipyretic, Hypoglycemic and Hepatoprotective Effects of Aqueous Extract of Coronopus didymus LINN, biological Pharma bulletin 2005 , vol 28(3)468-472
18. Brasseur T., J. Pharm. Belg., 235—241 (1989).
19. Vimala R., Nagarajan S., Alam, Susant J., Indian J. Exptl. Biol., 35, 1310—1314 (1990).
20. Brzezinska S. E. J. Physiol. Pharmacol., 52, 275—284 (2001)