CHAPTER-30

QUALITATIVE PHYTOCHEMICAL PROFILING OF CORCHORUS OLITORIUS L

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Summary

Corchorus olitorius L., a wild edible plant, has been traditionally used for its medicinal and nutritional properties. This study aimed to investigate the phytochemical constituents of *C. olitorius* L. using methanol, petroleum ether, and distilled water as solvents. Phytochemical analysis revealed the presence of carbohydrates, gums, saponins, amino acids, and alkaloids in various extracts. The methanolic extract showed the presence of carbohydrates, gums, and saponins, while the petroleum ether extract contained alkaloids, proteins, and phenolics. The aqueous extract exhibited the presence of carbohydrates, saponins, and amino acids. These findings support the traditional use of *C. olitorius* L. as a medicinal and nutritional plant and highlight its potential as a valuable resource for phytochemicals.

Keyword: *Corchorus olitorius* L., phytochemical analysis, wild edible plants, medicinal plants, nutritional plants.

Introduction

In India rural people have an extraordinary lifestyle and use of natural resources which are readily available to us. Ethnobotanical study specifically believes in the collection, identification, authentication and documentation of this traditional knowledge which is relevant to the plant kingdom. Those people who are the source of this precious information, it is not necessary they should know every detail about these plants. But botanists know how to authenticate the information about any unknown plant.

Ethnobotanical data which is received from the local people can be verified by studying it taxonomically, phytochemically. After the identification of any specific plant it became very easy to have all the information available in the

world wide domain. Critical reviewed study may be helpful to build up authentic information that will help to confirm the claim of traditional data about that plant. The local people from rural community are using such plants as a seasonal food. Researchers considered them as wild edible plants. Such underutilized plants should be enlist and analyze properly by phytochemical analysis. For the current study the qualitative analysis of *Corchorus olitorius* L has been selected.

Corchorus olitorius L.Stout, erect, much branched, woody, glabrous herbs, 45-120 cm tall. Leaves ovate-lanceolate, 2- 11 X 1.5-5.5 cm, rounded at base, lower serrature prolonged on either side into filiform appendages, serrate, acute or acuminate; petioles 2-3 cm long: stipules lanceolate, 6-8 mm long. Flowers 1-1.2 cm across, on 2-3 flowered short axillary peduncles; pedicels short. Sepals oblong, 3-4 mm long, apiculate. Petals yellow, oblong oblanceolate, 5-6 mm long. Capsules are cylindrical, 3-7 cm long. 10-ribbed, beaked. Seeds trigonous, black, 2-1.5 mm.





This plant was reviewed prior to the study, this plant was reported as wild edible plants having protein rich components (Ndlovu et. al., 2008). Their edible leaves play an economical role in the strategy of food security of urban populations. *Corchorus olitorius* is an important green leafy vegetable in many areas including Egypt, Southern Asia, Japan, India, China, Lebanon, Palestine, Syria, Jordan, Tunisia and Nigeria. The leaves (either fresh or dried) are cooked into a thick viscous soup rich sources of vitamin and minerals. Nutritionally, *C. olitorius* on the average contain 85–87 g H2O, 5.6 g protein, 0.7 g oil, 5 g carbohydrate (Loumeremet. al.,2016). Different parts of *C. olitorius* are also used in folk medicine notably the seeds as laxative, the leaves to relieve stomach pains, the roots for treating toothache and the stems for treating cardiovascular disorder.

C.olitorius aqueous, methanol, petroleum extract were taken for qualitative analysis of carbohydrates, amino acids, saponis, alkaloids, tannins, has been studied by using the . Carbohydrate (Molisch's test), Gums (Fehling's test, Benedict's test, Millon's test amino acid, Amino Acid (Ninhydrin test), Alkaloids (Dragendroffs test), alkaloids, Hagers test , Saponin Tannins & Phenolics (5% ferric chloride test), Lead acetate solution Test.

PHOTO PLATE- 1





Local lady Collecting the Corchorus olitorius L for cooking



Plant Habit C. olitorius

Plant collected for the study Leaf -

Leaf – C. olitorius



Powder of Corchorus olitorius

Soxhlet assembly for extraction of *C. olitorius*

This plant were selected for the study to verify the claim of the local rural entity, some people were using this plant for cooking in the region of locality of Akola district.

Material and Method

Collection of plant: The plants selected for the study *Corchorus olitorius* L. belonging to the family Tiliaceae were collected in the month of November 2023 From Akola city, Maharashtra.

Identification: Samples were brought to laboratory and were identified by using standard floras of Naik (1989), Singh and Kartiyeyon (2000). The voucher specimen is submitted in the departmental herbarium.

Cleaning and Drying: The collected materials were cleaned properly. The collected plant part was shade dried for 8-10 days and grinded well to obtain homogeneous fine grade powder.

Extraction: In this method, crushed sample was placed in thimble chamber of the Soxhlet apparatus. The extraction solvent was heated in the bottom flask, vaporizes into the sample thimble, condenses in the condenser and drip back. When the liquid content reached the siphon arm, the liquid contents emptied into the bottom flask again and the process was continued. About 10 g of dried sample powder was weighed and extraction process is carried out by using 250 ml of extract solution in Soxhlet apparatus. The extract was concentrated by evaporation at 70 °C for 8 h and then. The concentrated extract was made in Gel form and stored at room temperature prior to phytochemical screening. Three different solvent i.e., Distilled Water, Petroleum ether, Methhanol, were prepared.

Material Used: Plants belongs to Tiliaceae family are used for preliminary test of phytochemistry.

Phytochemical Analysis

Carbohydrate (Molisch's test) :Powder sample + molischs reagent + H2SO4 from side of test tube.**Ring appear at junction of liquid**

Gums (Fehling's test) :Powder sample extract + fehlings solution A + fehlings solution B + boil it for 2 min. A yellow red ppt observed.

Benedict's test :Benedict reagent(2ml) + sample solution + heat for 5min, green yellow colour produce

Millons test : 5ml of millons reagent + sample extract + warm. Brick red ppt formed,brick red ppt formation

Amino Acid (Ninhydrin test) :3ml of extract + 3drop 5% ninhydrin solution + boil for 10min.purple or bluish colour appear.purple or bluish colour formation

Alkaloids (Dragendroffs test):2-3ml filtrate + 2-3 drops of dragendroff reagent. Orange brown ppt form, orange colour observed.

Hagers test :2-3ml filtrate + hagers reagent. Formation of yellow ppt.

Saponin : Sodium Carbonate + 5 ml extract Formation of froth.

Tannins & Phenolics (5% ferric chloride test):Sample extract + 5% ferric chloride solution formation of deep blue black colour, there is formation of deep blue colour.

Lead acetate solution Test :Sample extract + lead acetate solution,White ppt formed

Observation and Results

Table .1: Phytochemistry of *Corchorus olitorius* L (Aerial part)Note: (-) sign indicates the test is negative & (+) sign indicates the test is positive.

Sr.No	Phytochemicals tested	Aqueous	Methanol	Petroleum
				ether
1.	Carbohydrate	+	+	+
2.	Gums (Fehling's test)	-	+	-
3.	Benedict's test	-	+	-
4.	Millons test	-	-	-
5.	Amino Acid (Ninhydrin test)	+	+	-
6.	Alkaloids (Dragendroffs test)	-	-	+
7.	Hagers test	+	-	+
8.	Tannins	-	-	-
9.	Phenolics	-	-	+
10.	Saponin	+	+	-

The phytochemical analysis was studied on the leaves of plant *Corchorus olitorius* L. for the analysis three solvents were analyzed. The preliminary phytochemical studies were carried out in the solvents viz.Methanol,Petroleum ether and Distilled water. The Methanolic leaves extract of *Corchorus olitorius* L. shows the presence of carbohydrate,gum and saponin as well as Amino acid and absence of Tannins, phenolics and alkaloids respectively.

The phytochemical tests for the Petroleum ether leaves extract of leaves of *Corchorus olitorius* L. shows the presence of Alkaloids, Protein, Phenolics, carbohydrate The Test For Aqueous leaves extract of *Corchorus olitorius* L. shows the presence of Carbohydrate, saponin, Amino acid, alkoloids and absence of Gum, Amino acid, Tannin and saponins.

PHOTO PLATE-2

Biochemical test in Aqueous Extract - Corchorus olitorius L.

Biochemical test in Petrolium ether Extract - Corchorus olitorius L.

Biochemical test in Methanol Extract - Corchorus olitorius L.

Conclusion

From the results obtained, it could be stated that the given plant material is rich in phytochemical content. It showed the presence of carbohydrate, gum, saponin, tannins and alkaloids respectively. Presence of these compounds indicates towards the medicinal properties of the plant. Thus, it is concluded that the plant *Corchorus olitorius* L. is a medicinal plant rich in phytochemicals and could be a potent drug source provided its sincere study on its various apects of pharmacognosy and pharmacology.

References

- Abdallah, H. M., Jaleel, G. A. A., Mohammed, H. S., Mahmoud, S. S., Yassin, N. A., el -Din, A. G., ... and Bassyouni, F. A. (2020). Phytochemical screening, gas chromatography-mass spectrometry analysis, and antidiabetic effects of Corchorus olitorius leaves in rats. *Open Access Macedonian Journal of Medical Sciences*, 8(A): 385-394.
- [2] Abdel-Razek, M. A., Abdelwahab, M. F., Abdelmohsen, U. R., and Hamed, A. N. (2022). Pharmacological and phytochemical biodiversity of *Corchorus olitorius*. *RSC advances*, 12(54): 35103-35114.
- [3] Abou Zeid, A. H. S. (2002). Stress metabolites from *Corchorus olitorius* L. leaves in response to certain stress agents. *Food chemistry*, 76(2):187-195.
- [4] Adebo, H. O., Ahoton, L. E., Quenum, F. J., Adoukonou-Sagbadja, H., Bello, D. O., and Chrysostome, C. A. A. M. (2018). Ethnobotanical knowledge of jute (Corchorus olitorius L.) in Benin. *European Journal of Medicinal Plants*, 26(1): 1-11.
- [5] Adeosun, E. K., Nzeribe, E. A., Nwadiaro, P. O., Onwuliri, F. C., Bigwan, E. I., and Oyero, S. (2023). The effect of methanolic extract of *Corchorus olitorius* on some kidney and liver functional indices of Albino rats. *World Journal of Advanced Research* and Reviews, 19(02): 367–379
- [6] Aliyu, B. S. (2006). Common ethnomedicinal plants of the semi-arid regions of West Africa–Their descriptions and phytochemicals. Triumph publishing company limited, Gidan Sa'adu Zungur, Kano, Nigeria, 1, 93-94.
- [7] Atalar, M. N., Erenler, R., Turkan, F., Alma, M. H., Demirtas, I., Baran, A., ... and Saltan, F. Z. (2023). Phytochemical analysis and biological activity of Corchorus olitorius L.: Quantitative analysis of bioactive compounds by LC–MS/MS, antibacterial, enzyme inhibition, and cytotoxic activities. *European Journal of Integrative Medicine*, 62: 102290.
- [8] Badua, J. I. R., and Badua, L. K. R. (2020). Phytochemical Screening and Antifungal Property of Saluyot (*Corchorus olitorius*). *Philippine Journal of Natural and Social Sciences*, 4(1):1-4.
- [9] Biswas, A., Dey, S., Xiao, A., Huang, S., Birhanie, Z. M., Deng, Y., ... and Li, D. (2023). Phytochemical content and antioxidant activity of different anatomical parts of Corchorus olitorius and C. capsularis during different phenological stages. *Heliyon*, 9(6).
- [10] Brown, K. M., and Arthur, J. R. (2001). Selenium, selenoproteins and human health: a review. Public health nutrition, 4(2b): 593-599
- [11] Choudhary, S. B., Sharma, H. K., Karmakar, P. G., Kumar, A. A., Saha, A. R., Hazra, P., & Mahapatra, B. S. (2013). Nutritional profile of cultivated and wild jute ('Corchorus') species. *Australian Journal of Crop Science*, 7(13): 1973-1982.

- [12] Corpuz, M. (2022). Phytochemical screening and antibacterial properties of indigenous vegetables in Cagayan Valley, Philippines. *Linker: The Journal of Emerging Research in Agriculture, Fisheries and Forestry*, 3(1).
- [13] Ekpe, I. P., Apata, D. A., and Amaechi, D. (2021). Effect of methanol leaf extract of Corchorus olitorus on liver function and lipid profile in wistar rats. *European Journal of Pharmaceutical and Medical Research*, 8(11): 13-19.
- [14] Hamzah, R. U., Makun, H. A., and Egwim, E. C. (2014). Phytochemical screening and invitro antioxidant activity of methanolic extract of selected Nigerian vegetables.
- [15] Hasan, H. T., and Kadhim, E. J. (2018). Phytochemical investigation of leaves and seeds of Corchorus olitorius L. Cultivated in Iraq. *Asian J. Pharm. Clin. Res*, 11:408-417.
- [16] Helaly, A., Alkharpotly, A. E. B. A., Mady, E., and Craker, L. E. (2017). Characterization of four molokhia (*Corchorus olitorius*) landraces by morphology and chemistry. *Journal of Medicinally Active Plants*, 5(1-4).
- [17] Ikponmwosa-Eweka, O., Austin, E. I., Eluehike, N., and Orumwensodia, K. O. (2020). Analytical comparison of the phytochemical composition and antioxdant activity of methanol extracts derived from *Alchornia cordifolia* and *Corchorus olitorius*. *Journal of Phytomedicine and Therapeutics*, 19(1): 364-374.
- [18] Konan, M. K., Nâ, E., Koffi, D., Cisse, I., Adima, A. A., and Bekro, Y. A. (2016). Phytochemical, nutritional and antioxidant capacity of five Ivorian edible leaves aqueous extracts. *Journal of Applied Pharmaceutical Science*, 6(9): 082-086.
- [19] Mohammed, R. M. O. (2016). Phytochemical investigation of antimicrobial and antioxidant activity leaves extracts of *Corchorus olitorius*. Open Access Library Journal, 3(1): 1-5.
- [20] Oboh, G., Raddatz, H., and Henle, T. (2009). Characterization of the antioxidant properties of hydrophilic and lipophilic extracts of Jute (*Corchorus olitorius*) leaf. *International journal of food sciences and nutrition*, 60(sup2): 124-134.
- [21] Parvin, S., Marzan, M., Rahman, S., Das, A. K., Haque, S., & Rahmatullah, M. (2015). Preliminary phytochemical screening, antihyperglycemic, analgesic and toxicity studies on methanolic extract of aerial parts of *Corchorus olitorius* L. *Journal of Applied Pharmaceutical Science*, 5(9): 068-071.
- [22] Ramadevi, D. (2013). Phytochemical examination of Corchorus olitorius leaves. Int. J. Curr. Pharm. Rev. Res, 4: 42-46.
- [23] Sadat, A. B. D. U. L., Hore, M., Chakraborty, K. A. U. S. H. I. K., and Roy, S. U. B. H. R. A. J. Y. O. T. I. (2017). Phytochemical analysis and antioxidant activity of methanolic extract of leaves of *Corchorus olitorius*. *International Journal of Current Pharmaceutical Research*, 9(5): 59-63.
- [24] Samuel, F. O., Ayoola, P. B., and Ejoh, S. I. (2020). Nutrient, antinutrient and sensory evaluation of Corchorus olitorius fruit. *Ife Journal of Agriculture*, 32(1): 13-20.
- [25] Sha'a, K. K., Clarkson, G. P., and Artimas, S. P. (2019). Phytochemical analysis, proximate composition and antinutritional factors of *Corchorus oliterius* plant. *International Journal of Biological and Chemical Sciences*, 13(4): 2147-2157.
- [26] Singh, P. S., and Vidyasagar, G. M. (2018). Corchorus olitorius is it medicinal plant? A review. Indian Journal of Tropical Biodiversity, 26(1):13-16.
- [27] Yakoub, A. R. B., Abdehedi, O., Jridi, M., Elfalleh, W., Nasri, M., and Ferchichi, A. (2018). Flavonoids, phenols, antioxidant, and antimicrobial activities in various extracts from Tossa jute leave (*Corchorus olitorus* L.). *Industrial Crops and Products*, 118: 206-213.