



# Phytochemical Profile of Ethanolic and Aqueous Extracts of *Capsicum annuum* L. Leaves

<sup>1</sup>Snehal S. Abhang, <sup>2</sup>Dr. Sangeeta S. Tanavade

<sup>1</sup>M. Pharm 2<sup>nd</sup> year, <sup>2</sup>Associate Professor in Pharmaceutical Chemistry Department

<sup>1</sup>Pharmaceutical Chemistry, <sup>2</sup>Pharmaceutical Chemistry

<sup>1</sup>Appasaheb Birnale College of Pharmacy, Sangli, Maharashtra, India, 416416.

## ABSTRACT:

In present study, aqueous and ethanolic extraction, optimization and phytochemical investigation of leaves of *Capsicum annuum* L. was done. According to preliminary phytochemical tests; flavonoids, phenolic compounds, reducing sugars, tannins, diterpenes, coumarins were present in both aqueous and ethanolic extracts of leaves of *Capsicum annuum* L. Also phlobatannins and terpenoids were present in aqueous extract of leaves of *Capsicum annuum* L.

**KEYWORDS:** Extraction, Optimization, Phytochemical Screening of leaves of *Capsicum annuum* L.

## 1.INTRODUCTION:

Since a long time, herbal plants are used for medicinal purposes. The term medicinal plant includes the use of plants for medicinal purposes. The rise in population, scarcity in supply of drugs, excessive cost of some treatments, several synthetic drugs having side-effects have increased the use of plant materials as the source of medicines for a wide variety of human disorders.

The use of herbal treatments is independent of age groups or sexes. The herbs that have medicinal properties provide logical means for the treatments of many diseases which are considered difficult to cure. <sup>[1,2]</sup>

The plant '*Capsicum annuum* L.' belongs to genus "*Capsicum*", species "*C. annuum*" and belongs to family "*Solanaceae*". *Capsicum* is cultivated and collected in almost all the countries. East Africa, West Africa and India are the regions producing the plant on commercial scale. It is a very common plant found in India and it is grown in Andhra Pradesh, Uttar Pradesh, Gujarat, Maharashtra, Assam and Tamil Nadu. Chillies are best grown in warm and humid climate with dry weather. About 8.1 lakh tons of chillies are produced every year in India. <sup>[15,16]</sup>

## 2. MATERIALS AND METHODS:

### 2.1 Collection, drying, authentication of leaves of *Capsicum annuum* L. plant:

#### 2.1.1 Collection and authentication of plant material:

*Capsicum annuum* L. plant was collected from Kadamwadi, Sangliwadi, Sangli. The plant was identified and authenticated by Mr. M. D. Wadmare sir (Associate Professor and H.O.D. of Botany) at Smt. K. W. College, Sangli.

#### 2.1.2 Drying of leaves of *Capsicum annuum* L.:

Leaves were separated from collected plant. Leaves were allowed to shade dry at room temperature. After completing the drying process, the leaves were coarsely powdered.

### 2.2 Extraction of leaves of *Capsicum annuum* L.:

#### 2.2.1 Aqueous extraction:

Aqueous extract was prepared by maceration method. In one beaker, chloroform water about 500 ml was prepared (1:9). 25 gm dried powder was added, stirred and packed with muslin cloth. This solution was stirred 3 times in a day upto 7 days. Then it was filtered, marc was pressed and filtrate was collected. It was stored in refrigerator. This was the aqueous extraction no. 1. Then repeated the same procedure for aqueous extraction no. 2 and 3. [3,4,5]

#### 2.2.2 Chloroform and ethanol extraction:

Chloroform extraction was done by soxhlet apparatus. About 40 gm dried powder was extracted by 400 ml of chloroform. Temperature of heating mantle was set below the boiling point of chloroform. When colourless solvent was observed in thimble, extraction process was stopped. Chlorophyll was removed from leaves of *Capsicum annuum* L. by using chloroform as a solvent. The extract was filled in a glass bottle, packed it, labelled it and stored it at room temperature. Powder was allowed to dry on filter paper. After drying the powder which was treated with chloroform was again treated with ethanol (40 gm powder and 400 ml ethanol). When colourless solvent was observed in thimble, the ethanol extraction process was stopped. All extract was filled in glass bottle, packed it, labelled it and stored it at room temperature. Powder which was treated with ethanol was allowed to dry on filter paper. This was ethanol extract no. 1. Same procedure followed for chloroform and ethanol extract no. 2 and 3. [3,4,5,6,]

### 2.3 Optimization of extracts:

After completing extraction processes of aqueous and ethanolic extracts 1, 2 and 3; all aqueous extracts 1, 2 & 3 were optimized (combined) and stored it in the refrigerator. Also, the ethanolic extracts of 1, 2 & 3 was optimized (combined) and stored it at room temperature.

### 2.4 Preliminary phytochemical screening tests:

Following tests were performed for phytochemical investigation:- [7,8,9,10,11,12,13,14]

## 3. RESULTS AND DISCUSSION:

Table 3.1: Results of phytochemical tests

Sr.No.	Tests	Ethanollic extract	Aqueous extract
<b>Flavonoids</b>			
1.	Alkaline reagent test	+ve	+ve
2.	Lead acetate test	+ve	+ve
3.	FeCl <sub>3</sub> test	+ve	+ve
4.	Ammonia test	+ve	+ve
5.	Conc. H <sub>2</sub> SO <sub>4</sub> test	+ve	+ve
6.	Pew's test	+ve	+ve
<b>Phenolic compounds</b>			
1.	Iodine test	+ve	+ve
2.	FeCl <sub>3</sub> test	+ve	+ve
3.	Lead acetate test	+ve	+ve
4.	Potassium dichromate test	+ve	+ve
5.	Gelatin test	+ve	+ve
6.	Ellagic acid test	+ve	+ve
<b>Alkaloids</b>			
1.	Hager's test	-ve	-ve
2.	Mayer's test	-ve	-ve
3.	Tannic acid test	-ve	-ve
4.	Iodine test	-ve	-ve
<b>Tannins</b>			
1.	Gelatin test	+ve	+ve
2.	Braymer's test	+ve	+ve
3.	10% NaOH test	+ve	+ve
4.	Bromine water test	+ve	+ve
5.	Lead sub acetate test	+ve	+ve
<b>Reducing sugars</b>			
1.	Benedict's test	+ve	+ve
<b>Glycosides</b>			
1.	Borntrager's test	-ve	-ve
2.	Legal's test	-ve	-ve
<b>Carbohydrates</b>			
1.	Barfoed's test	-ve	-ve
2.	Seliwanoff's test	-ve	-ve
3.	Resorcinol test	-ve	-ve
<b>Cardiac glycosides</b>			
1.	Keller-killani test	-ve	-ve
2.	Bromine water test	-ve	-ve
<b>Proteins and amino acids</b>			
1.	Biuret test	-ve	-ve
2.	Millon's test	-ve	-ve
3.	Xanthoproteic test	-ve	-ve
<b>Phlobatannins</b>			
1.	HCL test	-ve	+ve
<b>Saponnins</b>			
1.	Foam test	-ve	-ve
2.	NaHCO <sub>3</sub> test	-ve	-ve
<b>Phytosterols</b>			

1.	Salkowski's test	-ve	-ve
2.	Hesse's response	-ve	-ve
<b>Terpenoids</b>			
1.		-ve	+ve
<b>Triterpenoids</b>			
1.	Salkowski's test	-ve	-ve
<b>Diterpenes</b>			
1.	Copper acetate test	+ve	+ve
<b>Lignins</b>			
1.	Labat test	-ve	-ve
<b>Quinones</b>			
1.	Alcoholic KOH test	-ve	-ve
2.	Conc. HCL test	-ve	-ve
<b>Anthraquinones</b>			
1.	Bortrager's test	-ve	-ve
2.	Ammonium hydroxide test	-ve	-ve
<b>Anthocyanins</b>			
1.	HCL test	-ve	-ve
<b>Carboxylic acid</b>			
1.	Effervescence test	-ve	-ve
<b>Coumarins</b>			
1.	NaOH test	+ve	+ve
<b>Emodins</b>			
1.		-ve	-ve
<b>Gums and mucilages</b>			
1.	Alcohol test	-ve	-ve
<b>Resins</b>			
1.	Turbidity test (Acetone)	-ve	-ve
2.	Turbidity test (HCL)	-ve	-ve
<b>Fixed oils and fats</b>			
1.	Spot test / Stain test	-ve	-ve
2.	Saponification test	-ve	-ve

1. All aqueous and ethanolic extracts of leaves of *Capsicum annuum* L. were successfully prepared, optimized and subjected to phytochemical analysis.
2. All 6 tests of flavonoids were positive for both ethanolic and aqueous extracts.
3. All 6 tests of phenolic compounds were found to be positive for both ethanolic and aqueous extracts.
4. Also, all 5 tests of tannins were positive for both ethanolic and aqueous extracts.
5. Reducing sugars, diterpenes, coumarins were positive in ethanolic extract.
6. Reducing sugars, phlobatannins, terpenoids, diterpenes, coumarins were positive in aqueous extract.

**Thus, It can be concluded that; the leaves of *Capsicum annuum* L. has major chemical constituents which are flavonoids, phenolic compounds and tannins.**

#### 4. ACKNOWLEDGEMENT:

Author is thankful to Guide Dr. Smt. S. S. Tanavade Madam, Dr. M. S. Kondawar Sir (H.O.D. of Pharmaceutical Chemistry Department), Principal Dr. S. A. Tamboli Sir and D. L. Patil Sir, 'Appasaheb Birnale College of Pharmacy, Sangli' for providing necessary facilities to carry out this research work. Author is also thankful to Mr. M. D. Wadmare Sir (Associate Professor and H.O.D. of Botany) at 'Smt. K. W. College, Sangli' for authentication of the plant.

#### REFERENCES:

1. Abayomi Sofowora, Eyitope Ogunbodede, et al. 2013. The Role and Place of Medicinal Plants in the Strategies for Disease Prevention. African Journal of Traditional, Complementary and Alternative Medicines:AJTCAM, 10(5):210-229.
2. Oladeji O. 2016. The Characteristics and Roles of Medicinal Plants: Some Important Medicinal Plants in Nigeria. Natural Products: An Indian Journal, 12(3):102.
3. Harmaninder Kaur. 2018. Review on the extraction methods used in medicinal plants. International Journal of Advanced in Management, Technology & Engineering Sciences, 8(3):1314-1320.
4. Abdullahi R. Abubakar, Mainul Haque. 2020. Preparation of Medicinal Plants: Basic Extraction and Fractionation Procedures for Experimental Purposes. Journal of Pharmacy & Bioallied Sciences, 12(1):1-10.
5. Qing-Wen Zhang, Li-Gen Lin, et al. 2018. Techniques for extraction and isolation of natural products: A comprehensive review. Chinese Medicine, 13:20.
6. Siti Nuurul Huda Mohammad Azmin, Zainuddin A. Manan, et al. 2016. Herbal Processing and Extraction Technologies. Separation & Purification Reviews, 45:305-320.
7. Junaid R Shaikh, MK Patil. 2020. Qualitative tests for preliminary phytochemical screening: An overview. International Journal of Chemical Studies, 8(2):603-608.
8. K. Sahira Banu, Dr. L. Cathrine. 2015. General Techniques Involved in Phytochemical Analysis. International Journal of Advanced Research in Chemical Science (IJARCS), 2(4):25-32.
9. Thilagavathi. T, Arvindganth. R, et al. 2015. Preliminary Phytochemical Screening of Different Solvent Mediated Medicinal Plant Extracts Evaluated. International Research Journal of Pharmacy, 6(4):246-248.
10. U. S. Mahadeva Rao, Muhammad Abdurrazak, et al. 2016. Phytochemical Screening, Total Flavonoids and Phenolic Content Assays of Various Solvent Extracts of Tepal of *Musa paradisiaca*. Malaysian Journal of Analytical Sciences, 20(5):1181-1190.
11. Tinky Sharma, Binjita Pandey, et al. 2020. Phytochemical Screening of Medicinal Plants and Study of the Effect of Phytoconstituents in Seed Germination. Tribhuvan University Journal, 35(2):1-11.
12. Laila Khamsatul Muharrami, Fatimatul Munawaroh, et al. 2020. Phytochemical Screening of Ethanolic Extract: A Preliminary Test on Five Medicinal Plants on Bangkalan. Journal Pena Sains, 7(2):96-102.
13. GA Ayoola, HAB Coker, et al. 2008. Phytochemical Screening and Antioxidant Activities of Some Selected Medicinal Plants Used for Malaria Therapy in Southwestern Nigeria. Tropical Journal of Pharmaceutical Research, 7(3):1019-1024.
14. Neha Grover, Rishikesh Meena, et al. 2014. Physiochemical Evaluation, Phytochemical Screening and Chromatographic Fingerprint Profile of *Woodfordia fruticosa* (L.) Kurz Extracts. International Journal of Pharmaceutical Sciences and Research, 5(7):2772-2782.
15. [https://en.m.wikipedia.org/wiki/Capsicum\\_annuum](https://en.m.wikipedia.org/wiki/Capsicum_annuum) (Accessed on 2022).
16. C. K. Gokhale, A. P. Purohit, et al. Pharmacognosy. Nirali Prakashan. 52<sup>nd</sup> edition. 14.122-14.124.