Phytochemical and antioxidant activity of Coriandrum sativum & Cuminum cyminum at Chhatarpur district (M.P)

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***Abstract*—Apiaceae family is an important family of angiosperm in which vegetables, spices, medicinal use and industrial use plants present it have main aromatic compound in which volatile-oil, alkaloids, coumarins and pollinator bringing family. *Coriander sativum* and *Cuminum cyminum* are most important plant of this family there are presence of phytochemical and antioxidant activity have been given in this paper in *Coriander sativum* whole plant parts have their own phytochemical, antioxidant and ethnomedicinal activity while in *Cuminum Cuminum* seeds are more important. Both plants are used to cure digestive problem antibacterial, anti-diabetic & anti-inflammation etc.**

***Index. Terms*—Antioxidant, Phytochemical, Ethnomedicinal, Pollinators**

I. INTRODUCTION

Apiaceae family is the well-known largest aromatic family of angiosperm. Early it is known as Umbelliferae due it having umbrella like inflorescence Bentham and Hooker Engler and Prantl and Hutchinson named this family Umbelliferae but in APG IV system of classification & International Code of botanical Nomenclature this family on the basis of molecular structure Apium plant name it is placed from Umbelleferae to Apiaceae

Umbelleferae is descriptive name while type genus Apium it is converted in to typical name Apiaceae now it is validated and expected name of this family. Phytochemical properties of

Coriander sativum and Cuminum cyminum are rich with aromatic compound and there are secondary metabolites present mostly in fruits, seeds, leaves and roots. The presence of flavonoids, alkaloids, terpenoids and phenolic compounds these plants have phytochemical impart aromatic medicinal, ethnomedicinal, antioxidant, anti-microbial properties etc., So this present work focused on phytochemical, antioxidant and ethnomedicinal properties of both plants. Chhatarpur district is rural district of Bundelkhand region where 70/population depends on agriculture or agriculture-based occupation, but during study there is lack of proper rain, any small-scale industry or industry peoples are migrating towards. metro cities and are sufferinfg from health issues like digestive disorder, diabeties, ulcer, annemia and cardiac issues the plants of family Apiaceae are important to cure these problems present paper focused on it.

Taxonomic studies are same in both plants both belong to the family Apiaceae umbel inflorescence compound leaf in Coriander leaves are decompounds. Stem hollow, riged and grooved, flower actinomorphic, bisexual, unisexual pentamerous with five petals five sepals and five stamen ovaries are superior, bicarpellary and syncarpus fruit is syzocarpic splitting into two mari-carp.

In phytochemical study there are presence of alkaloids, flavonoids, terpenoids, Tannins, Saponin, Cardiac, Glycoside, Phenols, Quinones, Resins, Carbohydrate, Amino acid, Coumarins and Essential oils in both plants given in table 1.1.

II. PHYTOCHEMICAL TEXT-

Phytochemical test for coriander plant parts (seeds, roots and leaves) of plant A, B, C and D had been done. After drying plants parts aqueous extract prepared and powdered plant material with the help of different chemicals some phytochemical test be done Alkaloids- For alkaloids Mayer's test and Wagner's test will be done.

Mayer's test- A few drops of Mayers' reagent (potassium mercuric iodine) to the extract positive result formation of a creamy white precipitate.

Wagner's test- add Wagner's reagent (Iodine in potassium iodine) the extract- radish-brown precipitate.

Flavonoids- For flavonoids test alkaline reagent test and Shinodqa test will be done alkaline test add a few drops of NaoH solution to the extract intense yellow color found after adding dilute acid it becomes colorless.

Tannins- For Tannis test ferric chloride less will be done add a few drops of 5% ferric chloride solution to the extract then blue black and greenish black color. Found this shows presence of tannins.

Saponins- For saponins foam test will be done first shake the extract with water vigorously then persists forth for more than 10 minutes.

Terpenoids- For terpenoids test Salkowski test will be done add chloroform and Conc. H_2SO_4 to the extract then reddish-brown interface will be found. Phenols- For phenol test ferric chloride test will be done add neutral ferric chloride to the extract then deep blue, green or purple colour indicates phenol test.

Glycosides- Glycosides test will be done by Keller Killani test. Mix the extract with glacial acetic acid, ferric chloride and conc. H_2SO_4 then reddish-brown ring found at the junction. Resins Resins test done by turbidity test carbohydrates carbohydrate test done by molish

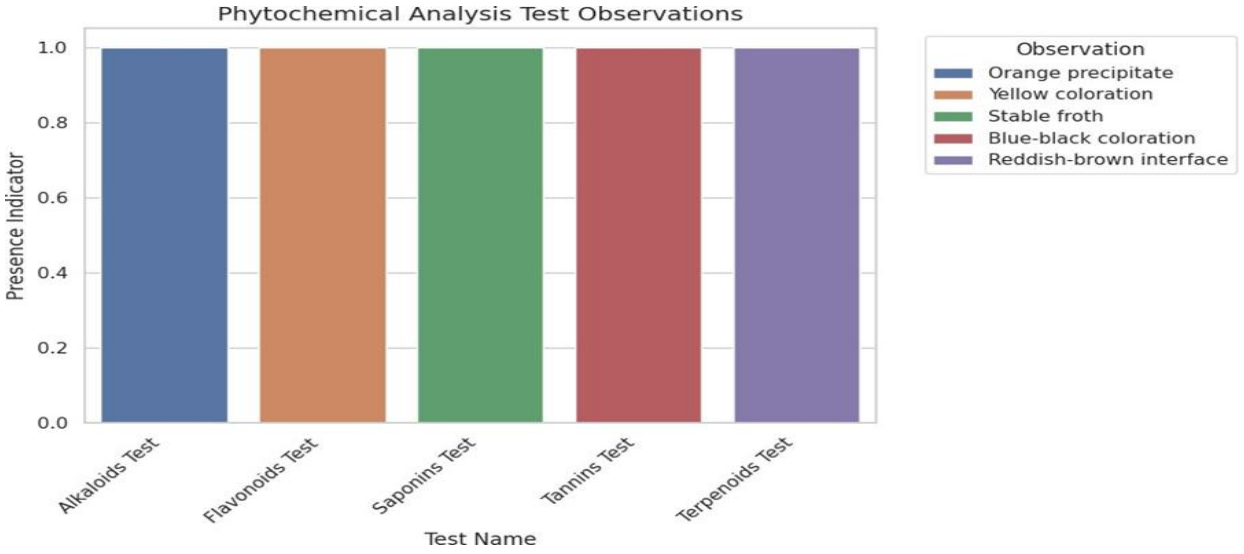
reagent where concentrated H_2SO_4 converts carbohydrates in to violet ring at the interface of the two layers.

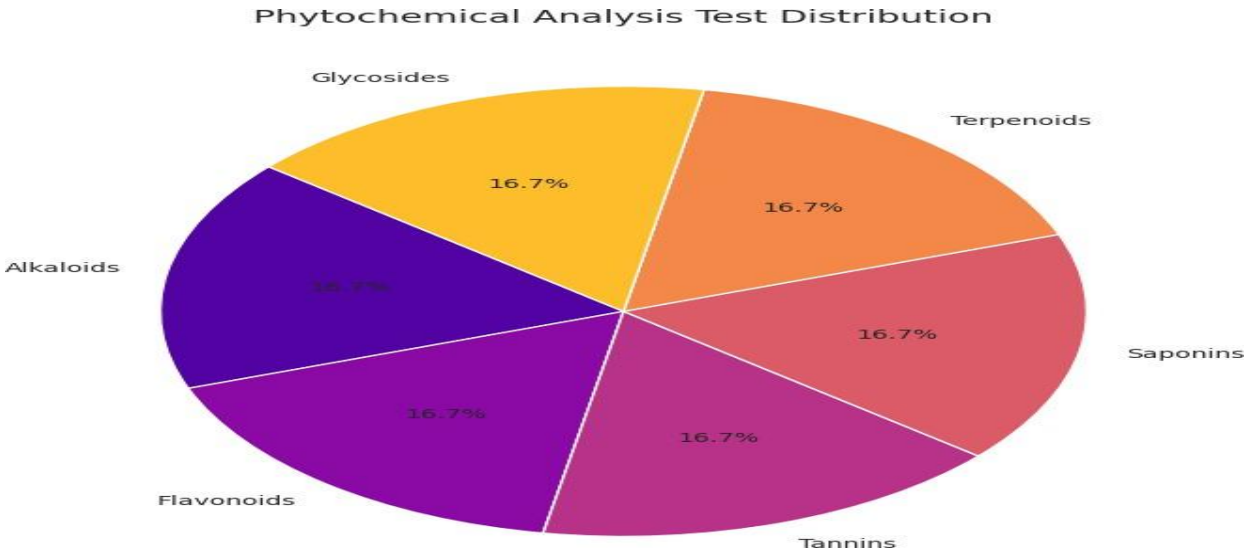
Amino acid- By chromatography with petroleum ether acetone and ninhydrin spray.

Antioxidants Activity test- in *Coriandrum sativum* & *Cuminum cyminum,* will be done by DPPH assay and ABTS assay. DPPH Assay- In DPPH assay with the help of oil methanol will be taken and mixed 1ml. of extract with 3ml DPPH solution and incubate in dark for 30 minutes then with the help of UV-Vis spectrophotometer the presence of lower absorbance shows higher antioxidant activity.

Table-1.1Phytochemical test of *C. sativum, C. cyminum,*

Phytochemical	*C. sativum*	*C. cyminum*
Alkaloids	+	+
Flavenoids	+	+
Tannins	+	+
Saponin	+	+
Terpenoids	+	+
Cardiac	+	+
Glycoside	+	+
Phenolds	+	+
Quinones	+	+
Resins	+	+
Carbohydrate	+	+
Amino acid	+	+
Coumarins	+	+
Essential oil	+	+

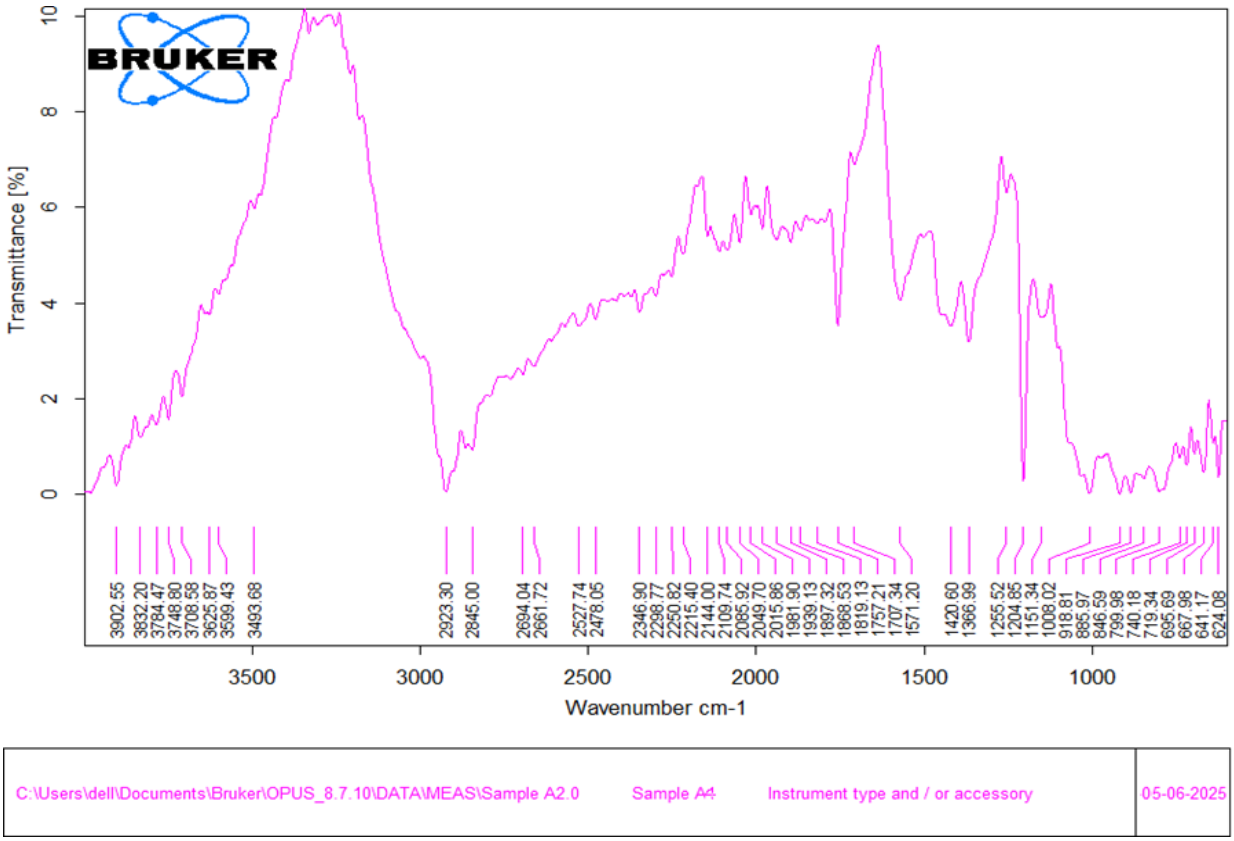




Antioxidant properties of presence of secondary metabolites vitamins these compounds have antioxidant properties after seeing antioxidant DPPH & FTIR these plant shows following antioxidant peaks which are given in table 1.2

Table 1.2 FTIR data of sample A-3

Functional Group	FTIR Bands (cm^{-1})	Assignment of Peaks
Alcohols, Amines	3500-3000	associated with O-H and N-H stretching vibrations
Carbonyl group	3200-3400 (br)	=C-O-H Stretching
Methyleen group	2850 (m)	-CH stretching
ketones, aldehydes, esters	1750-1650	Carbonyl (C=O) stretching vibrations
	1423-1755	Scissor like bending of CH_2
Alkane	1150-1366 (s)	-CH stretching out of plane
	674-1013	May due to C-C linkage



The HPLC purified fraction of Dhaniya (*Coriandrum sativum*) subjected with FTIR analysis and result of same were interpretated in table (write the table name). Active fraction (C-1) of Dhaniya (*Coriandrum sativum*) contained hydroxyl and amino functional group with aryl ether and alkyl group (Table and fig.).

Name of Plant	DPPH	Phenolic contents	Flavonoids contents
Jeera (*Foeniculum vulgare*)	71.64±0.25	44.86±0.08	30.08±0.05
Dhaniya (*Coriandrum sativum*)	66.73±0.20	40.60±0.07	30.82±0.06

III. INTERPRETATION OF PHYTOCHEMICAL ANALYSIS OF DHANIYA (CORIANDRUM SATIVUM)

Phytochemical analysis of Dhaniya typically reveals a rich presence of bioactive compounds such as flavonoids, tannins, saponins, and alkaloids, which justify its traditional uses in herbal medicine for antimicrobial, anti-inflammatory, antioxidant, and digestive benefits. Coriander comprises several chemical components, such as coumarins, flavonoids, and phenolic acids. The presence of coumarins enhances the plant's antioxidant and other advantageous characteristics.

Interpretation of Phytochemical Analysis of Jeera (*C. cumminum*)

Different investigations made in the most recent decades approve its wellbeing useful impacts especially in diabetes, dyslipidemia, hypertension, respiratory issues, fiery illnesses, unfavolrably susceptible rhinitis, dyspepsia, metabolic disorder, diabetes mellitus, provocative infections, and various kinds of human disease. Cumin (Jeera) seeds contain various secondary metabolites known for their antioxidant, antimicrobial, anti-inflammatory, and digestive properties.

The essential oils and terpenoids contribute to cumin's characteristic aroma and medicinal uses. Flavonoids and phenolics provide antioxidant benefits. Alkaloids

and glycosides, may contribute to therapeutic effects.

Antioxidant Activity of Spices viz *Coriander sativum* and *Cuminum cyminum* DPPH assay

The 1, 1-diphenyl-2-picryl hydrazyl (DPPH) is a relatively stable radical, widely used as the model system to investigate the scavenging activities of several natural antioxidant compounds. Radical scavenging activity increased with increasing percentage of the free radical inhibition. To select potential strains ability of different kinds of plants to produce bioactive substances were screened for DPPH assay. Which was followed by Dhaniya (*Coriandrum sativum*) (*Coriandrum* (66.73 %) DPPH is a stable free radical at room temperature and accepts an electron or hydrogen radical to become stable diamagnetic molecule.

The phytochemical analysis of Coriandrum sativum and *Cuminum cyminum* so presence of secondary metabolites given in table 1 these secondary metabolites phytochemical contribute significantly to their antioxidant potential. Both plant shows strong free radicals scavenging activity due to their high phenolic and flavonoids contain as given earlier by Anita et al. (2012) and Badr et al. (1990) Which helps in reducing oxidative stress and preventing cellular damage. Chahal et al. (2018) and Deepak et al. (2013) *Coriandrum sativum* have notable antioxidant activity due to have linalool, quercetin and phenolic compound Grachkar et al. (2007) and Hajlaoui et al. (2021). While *Cuminum cyminum* rich in Cumin aldehyde terpenes and flavonoids that enhance its radical scavenging and reducing power

Thus *C. sativum* and *C. cuminum* are not only the member of family apiaceae spices but also possess therapeutic value as natural antioxidant supporting there traditional using ethnomedicine and diseases protection. The leaves of Coriander are important and seeds are also important of both the plants.

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