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PHYTOCHEMICAL ANALYSIS OF *BRASSICA RAPA* CHINENSIS LINN. USING *IN VITRO* MODELS

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ABSTRACT

The methanolic extract of *Brassica Rapa* Chinensis (1mg/ml) leaves showed the presence of phytochemicals as Qualitative- secondary metabolites and Quantitative- Phenols, Flavonoids and Tannins and HPTLC analysis-Phenols, Flavonoids.

KEYWORDS

Phytochemicals, *Brassica Rapa* Chinensis and Bok choy.

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INTRODUCTION

Plant secondary metabolites such as flavonoids and terpenoids play an important role in the defence against free radicals[1,2,3]. Recently, natural foods and food-derived antioxidants, such as vitamins and phenolic phytochemicals, against oxidative damage are considered beneficial for human health[4].

Natural products isolate from medicinal plants can remain as essential components in the search for new medicines[5]. Herbalism is a traditional medicinal practice based on the use of plants and plant extracts[6]. These include aromatic substances, most of which are phenols or their oxygen substituted derivatives such as tannins. Many secondary metabolites, of which 12,000 have been isolated. The alkaloids serve as plant defense

mechanism against predation by microorganisms, insects and herbivores. The medicinal plants find applications in pharmaceutical, cosmetic, agricultural and food industries. Many of the herbs and spices are used by humans to season food to yield useful medicinal compounds.

Traditional medicine is an important source of potentially useful new compounds for the development of chemotherapeutic agents[7].

Phytochemicals derived from plants are excellent antioxidants. The phytonutrients found in Bok choy are powerful antioxidants that are capable of strengthening your immune system. Intake of this vegetable could reduce the risk of osteoporosis.

The present study was undertaken to analyse the phytochemicals of the methanolic extract of Bok choy, *Brassica Rapa* Chinensis, both qualitatively and quantitatively.

MATERIAL AND METHODS

Preparation of the sample

Bok choy, *Brassica rapa* Chinensis was obtained from local department store, Coimbatore, Tamilnadu, India. The Fresh leaves were cleaned to remove adhering dust particles, washed under running tap water and rinsed with distilled water. The leaves were shade dried and powdered. 15g of dried powder was extracted in 150ml of methanol for 6 hours using a series of soxhlet extractor. The extract was filtered through Whatmann No.1 filter paper. The filtered sample was concentrated and dried under room temperature, which is denoted as methanolic extract of *Brassica rapa* chinensis. The extract yielded a green residue solid weighing 2.5g and was preserved in a refrigerator at 4°C until further experiments.

Chemicals and instruments

All chemicals used in this study were obtained commercially and were of analytical grade. HPTLC analysis of flavonoids and phenols of methanolic extract of *Brassica rapa* Chinensis was performed using Camag Linomat 5 HPTLC instrument at Dalmia Research centre, Coimbatore.

Phytochemical analysis

Phytochemical analysis of *Brassica rapa* Chinensis leaves such as Qualitative phytochemical analysis of the extract was done by the method of Peach and Tracey[8] and Quantitative estimation of phenols was estimated by Singleton and Rossi[9], flavonoids by the method of Lamaison and Carnat[10] and tannins by Robert[11] were analyzed. HPTLC analysis of flavonoids and phenols of methanolic extract of *Brassica rapa* Chinensis was performed using Camag Linomat 5 HPTLC instrument at Dalmia Research centre, Coimbatore.

RESULTS AND DISCUSSION

Preliminary phytochemical screening revealed the presence of major secondary metabolites. The phytochemical analysis of methanolic extract of *Brassica rapa* Chinensis leaves showed the presence of alkaloids, phytosteroids, phenols, flavonoids, tannins and carbohydrates (Table No.1).

The methanolic extract of *Brassica rapa* Chinensis leaves was evaluated for their biochemical constituents such as phenols, flavonoids and tannins, and the results are presented in Table No.2.

The content of phenolic in the *Brassica rapa* Chinensis was found to be 0.635 ± 0.01mg/g. Polyphenols are products of secondary metabolism of plants and ubiquitous in all plant organs. They arise biogenetically from two main synthetic pathways the shikimate and the acetate pathway[12].

Phenolic compounds are known to be powerful chain-breaking antioxidants[13]. It had been reported that the antioxidant activity of plant materials is well correlated with the content of their phenolic compounds[14].

The flavonoid content was found to be 0.012± 0.005mg/g. Numerous studies have showed the consumption of foods high in phenolics can reduce the risk of heart disease by slowing the progression of atherosclerosis due to their antioxidative properties[15]. The tannins content was found to be 0.347±0.01mg/g.

During growth and maturation period in plants some substances can be found in structure of them which they have essential role in plant fortune.

These substances are called plants secondary metabolites. One of the most important of secondary metabolites is tannins. Hydrolyzable tannins (decomposable in water, with which they react to form other substances), yield various water-soluble products, such as gallic acid and protocatechuic acid and sugars. Gallotannin or common tannic acid, is the best known of the hydrolyzable tannins[16].

Polyphenolic compounds have an important role in stabilizing lipid oxidation and are associated with antioxidant activity[17]. The phenolic compounds may contribute directly to antioxidative action[18]. It is suggested that polyphenolic compounds may exhibit inhibitory effects on mutagenesis and carcinogenesis in humans[19].

Flavonoid antioxidants function as scavengers of free radicals by rapid donation of hydrogen atom radicals. Many of the pharmacological effects of flavonoids are related to their interaction with several enzymes[20,21] and to their antioxidant activity, which can be due to their ability to scavenge free radicals[22,23] to chelate metal ions[24] and to synergistic effects with other antioxidants.

The above results indicated the presence of considerable levels of pharmacologically important secondary metabolites such as phenols, flavonoids and tannins.

The results of the HPTLC analysis showed that the methanolic extract of *Brassica rapa* Chinensis leaves were found to be rich in phenols and flavonoids. Hence, the methanolic extract of *Brassica rapa* Chinensis leaves may possess radical scavenging capacity, and can serve as antioxidant by donating an electron and serving as a quencher.

The present investigation showed the phytochemicals present in methanolic extract of *Brassica rapa* Chinensis leaves.

Table No.1: Screening of phytochemicals in methanolic extract of *Brassica rapa* Chinensis leaves

S.No	Test	Result
1	Alkaloids	+
2	Phytosteroids	+
3	Phenols and Flavonoids	+
4	Tannins	+
5	Carbohydrates	+

Table No.2: Levels of phytochemical constituents in the methanolic extract of *Brassica rapa* Chinensis leaves

S.No	PHENOLS (mg/g)	FLAVONOIDS (mg/g)	TANNINS (mg/g)
1	0.635 ± 0.01	0.012± 0.005	0.347±0.01

Table No.3: HPTLC Peak table analysis for the phenolic profile of methanolic extract of *Brassica rapa* Chinensis

S.No	Track	Peak	Rf	Height	Area	Assigned substance
1	STD	1	0.71	660.2	15074.3	Quercetin standard
2	MEBRC	1	0.06	118.7	3343.9	Unknown
3	MEBRC	2	0.10	163.6	3078.0	Unknown
4	MEBRC	3	0.13	264.3	9637.2	Phenolic 1
5	MEBRC	4	0.21	163.9	4868.1	Phenolic 2

6	MEBRC	5	0.28	110.9	3010.7	Phenolic 3
7	MEBRC	6	0.34	12.0	386.1	Phenolic 4
8	MEBRC	7	0.42	41.1	1393.7	Phenolic 5
9	MEBRC	8	0.53	47.3	1810.6	Phenolic 6
10	MEBRC	9	0.60	97.5	2603.2	Phenolic 7
11	MEBRC	10	0.65	125.5	3347.5	Phenolic 8
12	MEBRC	11	0.72	148.3	4948.3	Phenolic 9
13	MEBRC	12	0.65	125.5	3347.5	Phenolic 10
14	MEBRC	13	0.72	148.3	4948.3	Phenolic 12
15	MEBRC	14	0.97	126.8	4016.6	Phenolic 13

Table No.4: HPTLC Peak table analysis for the flavonoid profile of methanolic extract of *Brassica rapa* Chinensis

S.No	Track	Peak	Rf	Height	Area	Assigned substance
1	STD	1	0.45	335.4	13222.6	Rutin standard
2	MEBRC	1	0.03	15.6	102.7	Unknown
3	MEBRC	2	0.09	137.7	6425.9	Flavonoid 1
4	MEBRC	3	0.18	11.1	192.9	Flavonoid 2
5	MEBRC	4	0.34	145.7	5830.8	Flavonoid 3
6	MEBRC	5	0.52	25.1	893.5	Flavonoid 4
7	MEBRC	6	0.58	69.9	3851.7	Flavonoid 5
8	MEBRC	7	0.77	20.3	955.1	Flavonoid 6
9	MEBRC	8	0.96	59.3	1584.6	Flavonoid 7

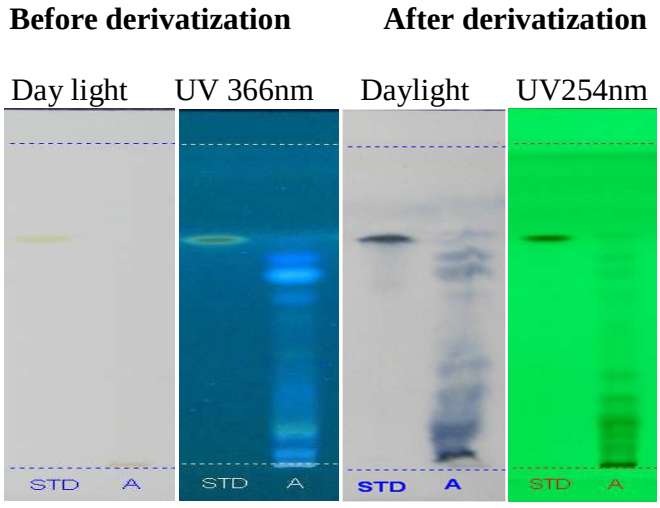

Figure No.1: Chromatogram of phenols

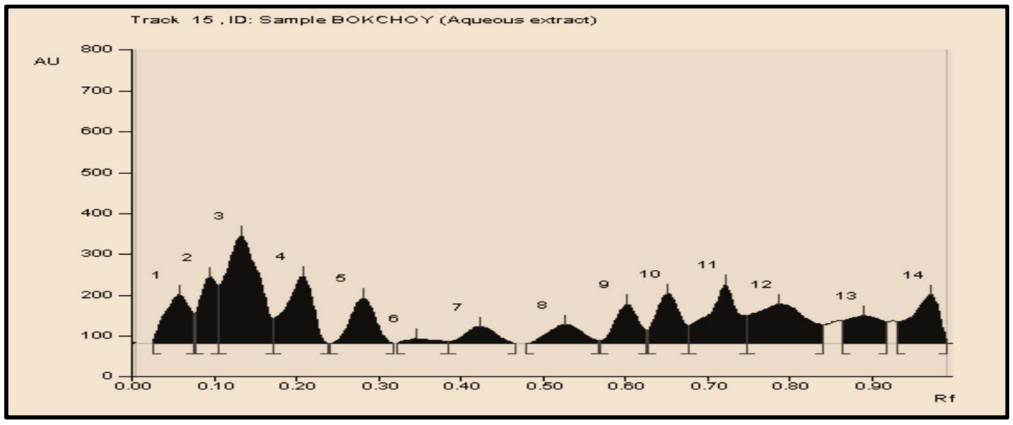

Figure No.2: Methanolic extract of *Brassica rapa* Chinensis leaves Peak densitogram display (Scanned at 254nm)

Before derivatization **After derivatization**

Day light UV 366nm Day light UV 366nm

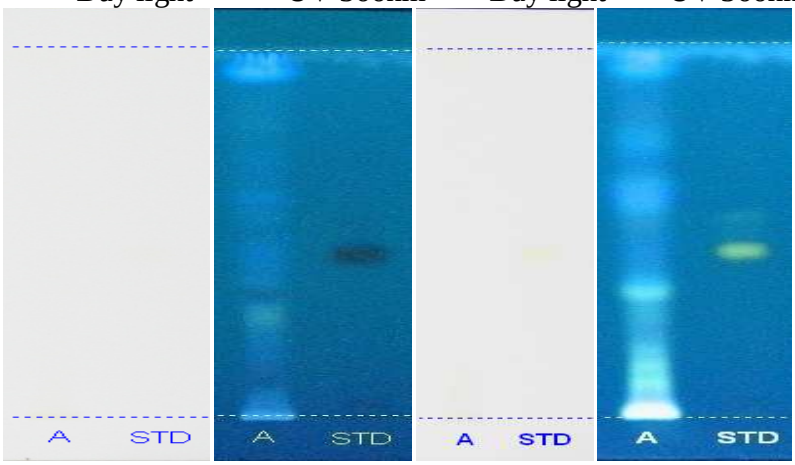

Figure No.3: Chromatogram of flavonoids

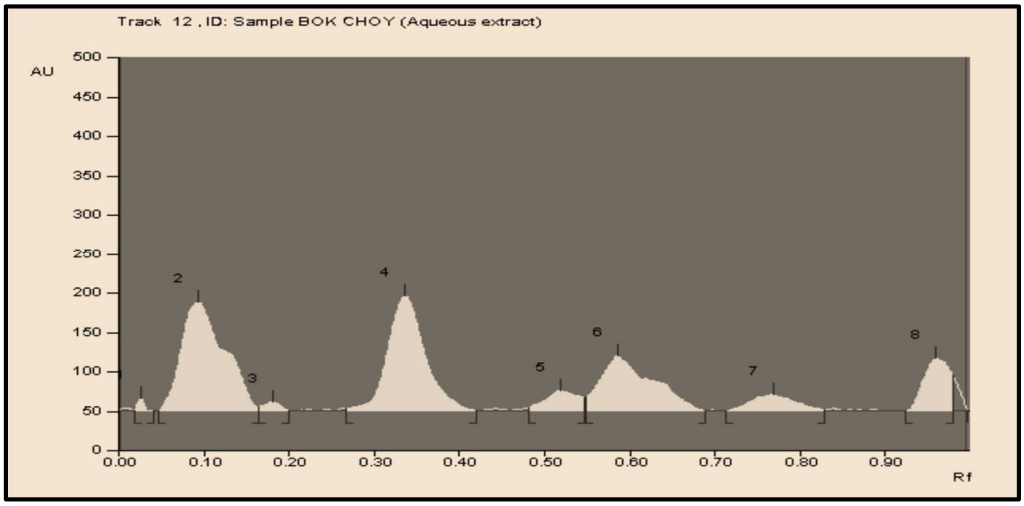

Figure No.4: Methanolic extract of *Brassica rapa* Chinensis Peak densitogram display (Scanned at 254nm)

CONCLUSION

The phenolic and flavonoid content of the methanolic extract were estimated and the extract was also analysed by HPTLC to obtain the phenolic and flavonoid profile. The results should that the methanolic extract was found to contain significant quantities of phenols and flavonoids.

Biologically active metabolites represent a therapeutic revival, they bring adjuvant therapy to conventional treatment synergizing and potentiating classical treatments as chemotherapy. They may bring a paradigm shift in our medical way to maintain health in patients, not only focusing on treating the problem when it occurs, but also by preventing its occurrence. Recent research is focusing much on the pharmacological aspects of plants. Thus it could be said the *Brassica rapa* Chinensis has a very high therapeutic potential and stands as a potent source for scientific investigations.

The methanolic extract of *Brassica rapa* Chinensis leaves may be a useful antitumor agent which might be due to the presence of the secondary metabolites and other phytochemicals.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

FUTURE SCOPE

A Systemic approach is needed for identifying the structure of active constituent's presents in *Brassica rapa* Chinensis.

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