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Comparative study on Phytochemical analysis and Antioxidant Activity of yellow and green pulp extract of *Actinidia deliciosa*

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Abstract

Most medicinal plants are unique in their ability to treat and cure various human ailments due to the involvement of numerous useful phytocompounds present in diverse plant components. The main objective of the present work to established the preliminary phytochemical analysis and *in vitro* antioxidant activity of methanolic extract of yellow and green pulp extract of *Actinidia deliciosa*. The results showed that the Preliminary phytochemical screening of the methanolic extract of yellow and green pulp extract of *Actinidia deliciosa* showed the presence of carbohydrates, flavonoids, steroids, terpenoids and tannins, quinones and the absence of phenols saponins and glycosides were respectively. The methanolic extract of yellow pulp extract of *Actinidia deliciosa* showed IC_{50} with minimum concentration and more effective in scavenging DPPH radicals when compared to green pulp extract and control ascorbic acid. Based on these results, these plants have a great importance as an efficient source of therapeutic agents.

Keywords: Actinidia deliciosa, Phytochemicals Antioxidant activity and Therapeutic agents.

1 Introduction

Nowadays plants have been recognized as a great source in herbal medicine, complementary pharmaceutical products and leading for new drugs design. Medicinal plants are the indispensible reservoirs of many chemical compounds either primary or secondary metabolites [1]. These compounds include alkaloids, flavonoids, tannins, terpenoids, steroids, carbohydrates, quinones, coumarins, starch and saponins. Many studies exhibited that these compounds possess antimicrobial, anticancer, anti inflammatory and many other activities [2]. Besides their use as therapeutic agents, medicinal plants could be a potential source of information for many chemical compounds that could be developed as drugs, where the phytochemical analysis or the phytoscreening of these plants attract a great attention of plant researchers in order to contribute in drug research strategies [3]. Oxidative stress, due to inner factors such as reactive oxygen species like hydroxyl, nitric oxide, hypochlorite and superoxide anion radicals, hydrogen peroxide and singlet oxygen and extrinsic factors such as pollution, smoking, ionizing radiation, organic solvents and pesticides is the risk factors leads to numerous several chronic diseases [4]. Kiwifruit (Actinidia deliciosa) isknown the Actinidiaceae family. It is a perennial and deciduous woody vine that is related to the Stellate section of the Actinidia genus. Most of the Stellate species developed south of the Yangzi River, probably related to the subtropical flora of Southeast Asia. The subtropical forests of China were characterized by low amounts of precipitation in winter or low temperatures with high rainfall and high temperatures in summer [5]. Hence this work focused on the preliminary phytochemical analysis and antioxidant activity of methanolic extract of yellow and green pulp extract of Actinidia deliciosa was carried out. 2 Experimental Sections 2.1. Collection of Kiwi fruit The fresh yellow and green kiwi fruit of Actinidia deliciosa were purchased from a local market in Tirupattur, dried and converted into a powder using an electric blender. The dried powders were used for further analysis. The Fig.1. Shows the Actinidia deliciosa (Yellow and green kiwi fruit),

, **Fig.1. *Actinidia deliciosa* (yellow and green kiwi fruit)**

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2.2. Methodology of Extraction of Kiwi fruit

Take 5 grams of yellow pulp extract of *Actinidia deliciosa* + 50 ml of methanol and five grams of green pulp extract of *Actinidia deliciosa* + 50 ml of methanol was placed in a thimble were extracted using Soxhlet apparatus separately. After, these extracts were filtered by Whatman no.1 filter paper. Filtrates were then concentrated in a rotatory evaporator.

The concentrated extracts were further kept at room temperature to dry completely for 2-3 days. Once the extracts dried and kept in clean bottles till further use.

2.3. Preliminary Phytochemical Screening

The methanolic extract of yellow and green pulp extract of *Actinidia deliciosa* solutions were assessed for the existence of the phytochemical analysis by using the following standard methods [6].

1. Detection of Alkaloids:

Mayer's test:

The extract was treated with Mayer s reagent. Formation of a yellow cream precipitate indicates the presence of alkaloids.

Wagner s test:

The extract was treated with Wagner s reagent. Formation of brown/reddish brown precipitate indicates the presence of alkaloids.

2. Detection of Flavonoids:

Lead acetate test: Extracts were treated with few drops of lead acetate solution. Formation of yellow color precipitate indicates the presence of flavonoids.

Sulphuric acid test: Extracts were treated with few drops of H_2SO_4. Formation of orange colour indicates the presence of flavonoids.

3. Detection of Steroids: Two ml of acetic anhydride was added to five ml of the extract and then added each with two ml of H_2SO_4. The color was changed from violet to blue or green indicates the presence of steroids

4. Detection of Terpenoids:

Salkowski s Test: Five ml of the extract mixed with two ml of chloroform and then added carefully the 3 ml of concentrated H_2SO_4 to form a layer. An appearance of reddish brown colour in the inner face indicates the presence of terpenoids.

5. Detection of Phenols:

Ferric chloride test: 10ml of the extract was treated with few drops of ferric chloride solution. Formation of bluish black colour indicates the presence of phenol.

Lead acetate test: 10 ml of the extract was treated with few drops of lead acetate solution. Formation of yellow colour precipitate indicates the presence of phenol.

6. Detection of Saponins: About 0.5ml of the extracts was shaken with five ml of distilled water. Formation of frothing (appearance of creamy of small bubbles) shows the presence of saponins.

7. Detection of Tannins: A small quantity of extract was mixed with water and heated on a water bath. The mixture was filtered and ferric chloride was added to the filtrate. A dark green colour was formed. It indicates the presence of tannins.

8. Detection of Carbohydrates: 0.5ml extracts were dissolved individually in five ml distilled water and filtered. The filtrate was used to test the presence of carbohydrates.

2.4. Antioxidant activity of methanolic extract of yellow and green pulp extract of *Actinidia deliciosa*

2.41. DPPH radical scavenging assay

The (2,2-diphenyl-1-picrylhydrazyl)DPPH radical test is used to measure the antiradical power of pure molecules or plant extracts in a model system (organic solvent, room temperature). It measures the capacity of an antioxidant (AH, generally phenolic compounds) to reduce the chemical radical DPPH° by hydrogen transfer. DPPH°, which is initially violet, becomes DPPH-H, pale yellow. The Fig.2. Shows Reaction of DPPH Radical as below,

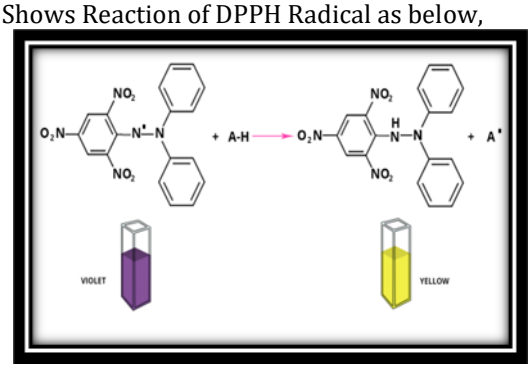

Fig.2. Reaction of DPPH Radical

This was assayed as described by [7]. The reaction mixture prepared containing 50ml of Methanol. DPPH (Diphenyl-2-picryl hydrazyl radical)- 1mM 3 ml of 1mM DPPH in methanol was added to 100µl of yellow and green kiwi pulp extracts with concentrations ranging from 20µl, 40µl, 60µl, 80µl and 100µl. DPPH solution with methanol was used as a positive control (ascorbic acid) and methanol alone acted as a blank. When DPPH reacts with antioxidant in the sample and the color changed from deep purple to light yellow. This was measured calorimetrically at 518 nm. The percentage for scavenging activity was calculated by the following formula: Scavenging activity (%) = A518 (control)-A518 (sample)/X 100 A518 (control).

s3. Results and Discussion

3.1. The Preliminary Phytochemical Analysis of methanolic extract of yellow and green pulp extract of *Actinidia deliciosa*

The preliminary phytochemical screening of methanolic extract of yellow and green of *Actinidia deliciosa* (kiwi fruit) **s**howed the presence of carbohydrates, flavonoids, steroids, terpenoids, tannins,

quinones and the absence of phenols saponins and glycosides were respectively. The Table 1 shows the Preliminary Phytochemical Analysis methanolic extract of yellow and green pulp extract of *Actinidia deliciosa* as follows,

Table 1: The Preliminary Phytochemical Analysis

Phytochemical Constituents	Methanolic extract of *Actinidia deliciosa*	
	Yellow	Green
Carbohydrates	+	+
Alkaloids	-	-
Flavonoids	+	+
Steroids	+	+
Terpenoids	+	+
Tannins	+	+
Quinones	+	-
Saponins	-	-
Glycosides	-	-
Phenols	-	-

Indicates: + Present and – Absent

Sisodiya and Shrivastava reported that the cold methanolic extract of *Actinidia deliciosa* kiwi fruit was found effective in extracting maximum number of secondary metabolites such as the presence of alkaloids, tannins, flavonoids, glycosides, saponinins and terpinoids [8]. The phytochemical analysis of both methanolic extracts *Actinidia deliciosa red* kiwi fruit revealed excellent presence of steroids, cardiac glycosides, terpenoids, flavonoids and carbohydrates were respectively [9].

3.2. Antioxidant activity of methanolic extract of yellow and green pulp extract of *Actinidia deliciosa*

Antioxidants play a significant role in inhibiting against various diseases. The significant antioxidant properties have been showed that the phytochemicals are necessary for the reduction in the occurrence of numerous diseases [10]. The results of DPPH radical scavenging activity showed the IC_{50} ranges of methanolic extract of of *Actinidia deliciosa* (yellow pulp) were found to be 28µg when compared to control ascorbic acid 24µg and green pulp extract 36µg were respectively. The Fig.3.Shows the Antioxidant activity of methanolic extract of yellow and green pulp extract of *Actinidia deliciosa* as below,

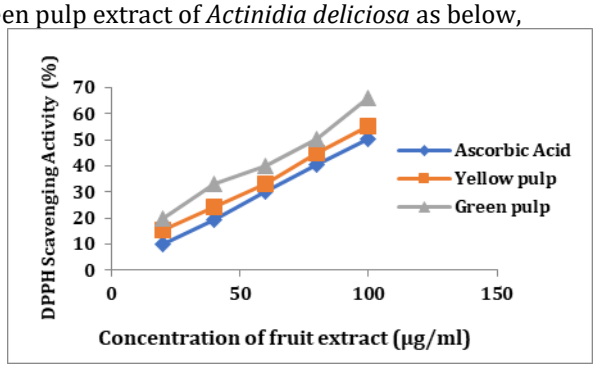

Fig.3. Antioxidant activity of *Actinidia deliciosa*

Our study reveals that all *F. religiosa* extracts inhibited free radicals and boosted decreasing antioxidant capacity in a content-dependent approach. The highest DPPH radical scavenging activity was found in *L. alata* bark followed by seeds, rind, leaves, whole fruit, and flesh [11]. The results showed that, compared to aqueous extract, a methanolic fruit extract of *A squamosa* has a higher percentage of inhibition of DPPH radical scavenging activity when compared to control ascorbic acid. The results obtained in the *in vitro* models clearly suggest that methanol extract has higher antioxidant activity than the aqueous extract due to a higher presence of phenolic and flavonoid constituents in the methanol extract were respectively [12]. Antioxidants are compounds that inhibit or delay oxidation of other molecules by inhibiting both initiation and propagation of oxidizing chain reactions [13]. They protect organisms against radicals and are vital in neutralizing the destruction caused by radicals [14]. Flavonoids and other phenolic compounds (proanthocyanidins, rosmarinic acid, hydroxycinnamic derivatives) of plant origin have been reported to act as scavengers and inhibitors of lipid peroxidation [15].

4. Conclusion

It can be concluded that the Preliminary phytochemical screening of the methanolic extract of yellow and green pulp extract of *Actinidia deliciosa* showed the presence of carbohydrates, protein, amino acids, flavonoids, steroids, terpenoids and tannins, quinones and the absence of phenols saponins and glycosides were respectively. The DPPH radical scavenging activity of methanolic extract of yellow pulp extract of *Actinidia deliciosa* showed IC_{50} with minimum concentration and more effective in scavenging DPPH radicals when compared to green pulp and control ascorbic acid. Kiwi is one of the most popular delicious foods having a large number of medicinal properties. It is an excellent package of bioactive compounds, nutrients and minerals, which make it a sound dietary supplement. It is useful in management of various diseases such as inflammation, HIV, hypertension, asthma, cancer and diabetes. Further, the individual active compounds can be isolated by chromatographic techniques and the fractions shall be evaluated separately for FTIR, NMR to identify the compound functional group, nature and structure for converting as a new active drug.

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Conflict of Interest: Nil

References:

[1] Soham, S. M. Anand, A. K. Swapnil, V. D. Padma, L. Y. Sahab, K.M. Raghav, A.Jain, "Medicinal ,Phytochemical Analysis of Alcoholic Whole

Fruit Extracts of *Actinidia Deliciosa"*, *Journal of Scientific Research*, (2020) 6(41), 179-185.

[2] Mansoori, N. Singh, S. Kumar D. Tarun, K. Thankur, Alkan, S. Narayan and A.Kumar, "Phytochemical Characterization and Assessment of crude extracts from *L. camara* for Antioxidant,Antimicrobial activity", *Frontiens in Agonomy*, (2020)(3), 582- 585.

[3] Aliyu, A.B., Musa, A.M., Abdullahi, M.S., Ibrahimi H. And Oyewale, A.O."Phytochemical screening, antibacterial activities of *V. ambigua, V.blumeoides, V. oocephala", A. P. Pharma.Drug Res.,*(2018),68 (1), 67-73.

[4] Zawawy, N.A."Antioxidant, Antitumour, Antimicrobial studies and quantitative phytochemical estimation of ethanolic extracts of selected fruit peels", *International Journal of Current Microbiology and Applied Sciences,* (2017), 4(5) 298-309.

[5] Tyagi, S., Nanher A.H. and Sahay, S."Kiwi fruit, Health benefits and medicinal importance", *Rashtriya krishi*, (2015), 10(2), 98-100.

[6] Raaman N., "Phytochemical Techniques", *New Publishing Agency, New Delhi,*(2006),19 (24), 32 40.

[7] Elizabeth, K. and Rao, M.W.A."Oxygen radical scavenging activity of Curcumin", *International Journal of Pharmaceuticals*, (1990), 58(4), 237-240.

[8] Sisodiya, D. and Shrivastava, P."Phytochemical screening, thin layer chromatography and quantitative estimation of bioactive constituents in aqueous extract of *M. hexandra* (Roxb.) dubard", *Inter. J. Rec. Sc. Res.*, (2020), 9(1), 283–286.

[9] Nandhakumar. E and Indumathi, P."*In vitro* antioxidant activities of methanol and aqueous extract of *Annona squamosa* (L.) fruit Pulp", *International of Acupuncture and meridian studies*,(2013),6(3), 142-148.

[10] Felioglu, Y.S., Mazza, G., Gao L. and D. Oomah, "Antioxidant activity and total phenolics in selected fruits, vegetables and grain products", *Journal Agriculture Food Chemistry,*(2018),4(1), 143-147.

[11] Vasundhara, S., Kumar H.V. and Rao, J.M."Influence of milk and sugar on antioxidant potential of black tea", *Food Res Int.* (2008), 41), 134-138.

[12] Formica, J.V. and Jegelson, W."Review of the biology of quercetin and related bioflavonoids", *Food Chemistry Toxicology*, (2021),3 (2), 10-15.

[13] Isabelle, M., Lee, B., Lim, L., Koh, M. T., Huang, W. P. D. and C.N. Ong, "Antioxidant activity and profiles of common vegetables in Singapore", *Food Chemistry,* (2019),12(4), 993–1003.

[14] Joshi V.K. and Kumar, A."Antimicrobial, Antioxidant and phytochemical screening from fruit and vegetable wastes", *International journal of food fermentation Technology,* (2017),2(2), 123-136.

[15] Prakash, V., Mishra, P.K. and M. Mishra, "Screening of medicinal plant extracts for antioxidant activity",*Journal of medicinal plants*, (2019),3(8), 608-612.