

COMPARATIVE ANTIOXIDANT PROPERTIES OF METHANOLIC EXTRACT OF RED AND WHITE DRAGON FRUITS

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ABSTRACT

Objective: In the present study we are interested to carry out comparative antioxidant activity of red and white dragon fruits.

Methods: The methanolic extract of both dragon fruits were tested for antioxidant activity by using DPPH method.

Results: The results showed that the methanolic extract of red dragon fruits showed better antioxidant activity than methanolic extract of white dragon fruits.

Conclusion: The red dragon fruit is a good candidate for further investigation.

Keywords: *Hylocereus undatus*, *Hylocereous polyrhizus*, Pitaya, Dragonfruit, Antioxidant

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INTRODUCTION

Antioxidants are man-made or natural substances that may prevent or delay some types of cell damage. The cell damage is caused by the deleterious effect of process mediated by free radicals in cell membranes; by reducing the susceptibility of tissues due to oxidative stress. The higher the antioxidant defences against the free radicals activity, the lower the oxidation stress and will prevent from cell damage [1, 2].

Antioxidants are found in many foods, including fruits and vegetables and they are also available as dietary supplements. Examples of antioxidants are Beta-carotene, Lutein, Lycopene, Selenium, Vitamin A, Vitamin C and Vitamin E.

Vegetables and fruits are rich sources of antioxidants. There is good evidence that a diet with lots of vegetables and fruits is healthy and lowers risks of certain diseases. But it isn't clear whether this is because of the antioxidants, something else in the foods, or other factors. Dragon fruit is one of the fruits that contains antioxidant properties [3].

Dragon fruit, also known as pitahaya or strawberry pear is the fruit of several cactus species, especially of the genus *Hylocereus*. Native to Mexico and Central and South America, these vine-like epiphytic cacti are also found in Taiwan and are also cultivated in Southeast Asian countries such as Malaysia, Vietnam, and the southeast coast of China. They are also found in Taiwan. The flesh, which is eaten raw, is mildly sweet and low in calories. The flavour is sometimes likened to that of the kiwifruit. The fruit may be converted into juice or wine; the flowers can be eaten or steeped as tea. Sesame seed-sized seeds are embedded throughout the flesh. Although the tiny pitahaya seeds are eaten with the flesh, the seeds are indigestible. The red flesh variety is believed to be rich in antioxidants and has an exceptionally high content of soluble fiber [4]. It is considered a good source of vitamin C. The scientific name of these fruits comes in three types all with leathery, slightly leafy skin:

- 1) *Hylocereus undatus*, white flesh with pink skin
- 2) *Hylocereus polyrhizus*, red flesh with pink skin
- 3) *Selenicereus megalanthus*, white flesh with yellow skin

But there is no studies reported so far that shows comparative antioxidant properties of methanolic extract of the flesh of red and white

dragon fruits. Therefore, we decided to carry out detail antioxidants investigation on both type of dragon fruits to show the differences.

MATERIALS AND METHODS

Sample collection and identification

The fruits of red and white dragon fruits were collected from the local market Ipoh, Perak, Malaysia and identified.

Methanol extraction

The collected fruits were washed thoroughly in distilled water to remove contaminants; the peels were removed, then it was cut into small pieces and subjected to extraction (100 g) by maceration in 250 ml of pure methanol (100%) at room temperature with occasional shaking for seven days. The macerates were filtered, and the filtrate was dried at low temperature (40-50 °C) under vacuum. The extracts were stored in air-tight containers at 4 °C until further use.

Qualitative phytochemical screening

The methanolic extracts of white and red dragon fruits were tested for the following qualitative chemical tests for the identification of various phytoconstituents [5, 6].

Tests for alkaloids

1. **Dragendorff's test:** To the extract, 1 ml of Dragendorff's reagent was added. An orange-red precipitate indicates the presence of alkaloid.
2. **Wagner's test:** To the extract, Wagner's reagent was added. Reddish brown precipitate indicates the presence of alkaloid.
3. **Mayer's test:** To the extract, 1 or 2 ml of Mayer's reagent was added. A dull white precipitate indicates the presence of alkaloid.
4. **Hager's test:** To the extract, 3 ml of Hager's reagent was added. Yellow precipitate indicates the presence of alkaloid.

Tests for carbohydrates

1. **Molisch test:** To the extract, 1 ml of α -naphthol solution was added and concentrated sulfuric acid was added along the sides of test tube. Purple or reddish violet colour at the junction between the two liquids indicates the presence of carbohydrates.

Table 1: Yields and nature of methanolic extract of red and white dragon fruits

Plant source	Nature of the extracts	Yield (%)
Red dragon fruits	Pinkish red semisolid	3.56
White dragon fruits	Yellowish white semisolid	3.92

Table 2: Preliminary phytochemical screening of methanolic extracts of red and white dragon fruits

S. No.	Chemical test	Methanolic extract of red dragon fruits	Methanolic extract of white dragon fruits
1	Alkaloids	-	-
2	Carbohydrates	+	+
3	Proteins	+	+
4	Amino Acids	+	+
5	Steroids and Sterols	+	+
6	Glycosides	+	+
7	Flavonoids	+	+
8	Tannins	-	-
9	Triterpenoids	-	-
10	Fixed oils	+	+

Table 3: DPPH radical scavenging activity of methanolic extracts of red and white dragon fruits

Concentration ($\mu\text{g/ml}$)	% of inhibition		
	Methanolic extract of red dragon fruits	Methanolic extract of white dragon fruits	Standard ascorbic acid
1000	70.42	56.66	
500	46.29	26.86	
250	29.19	21.18	
125	10.04	15.94	
IC ₅₀	>600	>800	58.24

Values are mean n=3

RESULTS AND DISCUSSION

Based on the phytochemical screening carried out, both the extracts showed the presence of carbohydrates, protein, amino acids, steroids, glycosides flavonoids, fixed oils and absence of alkaloids, tannins and triterpenoids (table 1 and 2).

In the antioxidant activity, the methanolic extract of red dragon fruits at 1000, 500, 250 and 125 $\mu\text{g/ml}$ showed 70.42%, 46.29%, 29.19% and 10.04% of inhibition, respectively (table 3). The white dragon fruits at 1000, 500, 250 and 125 $\mu\text{g/ml}$ showed 56.66%, 26.86%, 21.18% and 15.94% inhibition, respectively.

The IC₅₀ value of red and white dragon fruits were >600 and <800 $\mu\text{g/ml}$ respectively. This showed the red dragon fruits showed better antioxidant activity than compare to the white dragon fruits. However, the standard ascorbic acid showed better antioxidant activity than both the extracts.

The results indicate that the methanol extract of red and white dragon fruit showed lower to moderate antioxidant activity. At the same time red dragon fruit showed better antioxidant activity than compare to the white dragon fruits. Therefore red dragon fruit is more effective than white dragon fruit. The results of this study showed that red dragon fruit contains more antioxidant properties and is more nutritional. This may be due to the presence of higher amount of phenolic compounds in the extract, which are responsible for the antioxidant properties. So, that's answer the question of why people preferred red dragon fruit more as it is sweeter. Therefore, red dragon fruit can be used to prevent anti-cancer more effectively as it contains more antioxidant properties that will overcome the effects of free radicals towards cells. In conclusion, these findings can form the basis for further studies to identify more detailed antioxidant properties that can be used as medicine to cure diseases.

CONFLICT OF INTERESTS

Declare none

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