



## PHYTOCHEMICAL AND ANTIBACTERIAL ACTIVITY OF *HYLOCEREUS UNDATUS* (PEEL)

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### Abstract

*Hylocereus undatus* is a cactus plant which possesses fruit as the Red Dragon Fruit or Red Pitaya Fruit, the most widely cultivated vine cactus. In addition, it knows as Red Pitaya or Strawberry Pear cactus fruit as well. Commonly, this fruit is named as pitaya because of the bracts or scales on the fruit skin and hence the name of pitaya meaning ‘the scaly fruit. Phytochemical screening of various solvent of *H.undatus* peel was performed. The study result reveals the presences of alkaloid, terpenoids, flavonoid, cardiac glycoside, quinone. Flavonoid was found in all the solvent. The presences of these phytochemical showed further activity for bacterial pathogen and anticancer activity. Antibacterial activity studies of different solvent of the fruit peel were conducted on different pathogenic bacteria using disc diffusion method. The peel extract of petroleum ether exhibited highest activity against *E.coli* and streptococcus (1.1 cm) zone of inhibition. The minimum activity exhibited by distilled water extract for selected pathogen.

### Introduction

Medicinal plants, also called medicinal herbs, have been discovered and used in traditional medicinal practices in prehistoric time. Plants synthesize hundreds of chemical compounds for function including defence against insects, fungi diseases and herbivorous mammals. Numerous phytochemical with potential or established biological activity have been identified. A medicinal plant is a plant that is used to attempt to maintain health, to be administrated for specific condition or both whether in modern medicine or in traditional medicine (Coghlan *et al.*, 2012). Medicinal plant may provide health benefits to people who consumes them as medicines, and widely used as herbal medicine. Plants is an important source of medicine and plays a key role in world health (Talalay *et al.*, 2001).

Dragon fruit is also rich in flavonoid that act against cardio related, also dragon fruit aids to treat bleeding problems of vaginal discharge. It is also rich in fibres, however it aids in digestion of food. The vitamin B1 in dragon fruit help in increasing energy production and in carbohydrate metabolism. The vitamin B2 in dragon fruit acts as multivitamin; however, it aids to improve and recover loss of appetite. And vitamin B3 present in dragon fruit plays an important role in lowering bad cholesterol level; it provide smooth and moisturizes skin appearance (Wijitra Liatorakoon *et al.* , 2013).

### Materials and Methods

#### Scientific classification

<b>Kingdom</b>	:Plantae
<b>Order</b>	:Caryophyllales
<b>Family</b>	:Cactaceae (Cactus family)
<b>Genus</b>	: <i>Hylocereus</i>
<b>Species</b>	: <i>Hylocereus undatus</i>

#### Description of the plant *Hylocereus undatus*

The plant is climbing cactus vine that grows well in dry area. Because of its epiphytic nature, it grows best in the soil with high level of organic materials. Irs flower bloom only at night, hence the plant is



sometimes also called as “moonflower” or “Lady of the Night”. The flower which bloom for only one night are white and large, measuring 20 cm long or more. They are bell-shaped and are fragrant when in bloom. *Pitahaya* plants can have between four or six fruiting cycle in one year. It can be propagated by seed or by stem cuttings. The dragon fruit has a dramatic appearance, with bright red, purple or yellow skinned varieties and prominent scales. The fruit is oval, elliptical or pear-shaped. The flesh has subtly flavoured sweet taste or sometimes slightly sourish taste. The flesh is either white or red, with edible black seed dotted all over. This fruit is commonly eaten raw and is thought to taste better chilled. It is also served as juice or made into a fruit sorbet. The fruit can be used to flavour drinks, white syrup made of the whole fruit is used to colour pastries and candy. Unopened flower bud can be cooked like vegetables. The dragon fruit reputedly improves eyesight and controls hypertension.



## Methods

Dragon fruit (*H.undatus*) were collected from Trivandrum market.

### Preparation of plant extract

The dragon fruit peel was collected, shade dried and powdered. About 25g of powdered sample was extracted with water, methanol, ethanol and petroleum ether in a soxhlet apparatus at room temperature not exceeding the boiling point of the solvents for 5 cycles. The collected extract was used for further studies.

### Photochemical screening of plant extract

**Test for Tannin** :1ml of extract was taken. To it a drop of freshly prepared  $\text{FeCl}_2$  solution was added. Brownish green coloured was observed.

**Test for Glycosides**:2ml of extract was mixed with 2ml of chloroform and 2ml of acetic acid was added. Then cool in ice and then 3ml of conc. Sulphuric acid was added carefully to form a layer. First violet then blue and finally green colour appears.

**Test for Alkaloid (Dragendroff's test)**:To 2.8ml of extract add few drops of dragendroff's reagent. Orange brown precipitate was formed.

**Test for Cardiac glycoside (keller kiliani test)**:5ml of extract was treated with 2ml of glacial acetic acid containing a drop of  $\text{FeCl}_2$  solution. This was under layered with 1ml of conc  $\text{H}_2\text{SO}_4$ . A brown ring



interface indicates deoxy sugar characteristic of cardenoid. A violet ring may appear below the brown ring. While acetic acid layer a greenish ring may form just gradually throughout the thin layer.

**Test for Sterol:** 5ml of extract was mixed with 2ml of chloroform and 3ml conc H<sub>2</sub>SO<sub>4</sub> was added carefully to form a layer. Appearance of golden yellow colour indicates the presence of triterpenes.

**Test for Flavonoid:** 5ml of extract and 5ml of alcoholic solution was added. Then freshly prepared FeCl<sub>2</sub> solution was added. Blackish red colour was formed.

**Test for Saponin:** 1ml of each extract was taken and added 10ml of distilled water in a test tube and left undisturbed for 20 minutes. Persistent froth was observed.

**Test for Terpenoid:** 2ml of extract was mixed with 2ml of chloroform and 2ml of conc H<sub>2</sub>SO<sub>4</sub> was added carefully to form a layer. Then heat for 2 minutes. Finally greenish colour appears.

**Test for Phenol (Nitrate test):** Plant extract is treated with few drops of 15% acetic acid and a few drops of 5% sodium nitrate solution appearance of muddy or niger brown colour indicates the presence of phenol.

**Test for Protein** The extract was treated with few drops of Millon's reagent, formation of white precipitate indicates the presence of protein.

**Fat and Oil test** A spot placed in Whatman filter paper number 1 and folded at two sides see the spot detection on both sides. This shows the presence of fats or oil content.

**Test for Carbohydrate :** The substance was mixed with equal volume of Fehling's A and B solution was heated in water bath. Formation of blue colour is the indication of presence of sugar.

**Test for Coumarins:** To the extract 10% of sodium hydroxide was added. Formation of yellow colour indicates presence of coumarins.

**Test for Amino acid:** 1ml of extract was taken. To this few drop of Ninhydrin was added. Purple colour was observed.

#### **Antimicrobial screening of plant extract**

The bacterial strains were obtained from Microbial type culture Collection (MTCC).

#### **Disc Diffusion Method**

The bacterial activities of different extract were studied by disc diffusion method. Lawns of each organism were prepared on nutrient plates. The concentrated plant extract were dissolved in DMSO and were added to sterile filter paper disc (size 5mm) and allow the solvent to evaporate after each addition. The disc were then placed on air dried surface of the medium. The plates were then incubated at 24 hour at 37°C. After incubation the degree of sensitivity is determined by measuring the zone of inhibition of ground around the disc.



## Result

### Phytochemical Analysis

**Table 1. Phytochemical analysis of *Hylocereus undatus***

Sl No.	Test conducted	Ethanol	Methanol	Petroleum ether	Distilled water
1	Tannin	–	–	–	–
2	Alkaloid	+	+	–	+
3	Phenol	–	–	–	–
4	Terpenoids	+	+	–	–
5	Saponins	–	–	–	–
6	Steroids	–	–	+	–
7	Carbohydrate	–	+	–	+
8	Protein	–	+	–	+
9	Amino acid	–	–	–	–
10	Flavonoids	+	+	+	+
11	Cardiac glycoside	+	+	–	–
12	Glycoside	–	–	+	–
13	Quinone	+	–	–	+
14	Fats and oil	–	–	–	–
15	Courminis	+	+	–	–

### Antimicrobial Activity

**Table 2. Antimicrobial activity of *Hylocereus undatus***

Sl.no	Organisms	Ethanol (cm)	Methanol (cm)	Petroleum ether (cm)	Distilled water (cm)
1.	<i>Bacilli</i>	0.2	0.1	0.2	0.3
2.	<i>Staphylococcus</i>	0.4	0.5	0.1	0.1
3.	<i>Streptococcus</i>	0.1	0.4	1.1	0.7
4.	<i>E.coli</i>	0.7	0.7	1.1	0.1
5.	<i>Salmonella</i>	0.1	0.1	0.1	0.1
6.	<i>Proteus</i>	0.4	0.3	0.1	0.1
7.	<i>Pseudomonas</i>	0.5	0.1	0.1	0.1
8.	<i>Lactobacillus</i>	0.1	0.1	0.1	0.3