Phytochemical screening and analysis of antioxidant activity of extract of Hylocerous Undatus (Dragon Fruit) peel using In- vitro test system

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ABSTRACT

Free radicals are produced when biomolecules including proteins, lipids, carbohydrates, and nucleic acids oxidize. These radicals are the main cause of degenerative illnesses in living things. So, antioxidants scavenge these free radicals and shield cells from harm in order to reduce the oxidation of biomolecules. The goal of the current study was to investigate the phytochemical screening and free radical scavenging ability of a Hylocerous Undatus (peel) extract in vitro. A Soxhlet extractor was used to extract the ethanol from the peel of Hylocerous Undatus. The phytochemical components of Hylocerous Undatus were then displayed using phytochemical screening. The Fenton reaction was also used to calculate the overall antioxidant activity. Plant extract's antioxidant activity was tested using ascorbic acid, a common reducing agent. These results show that the extract from Hylocerous Undatus (peel) has both antioxidant and hydroxyl radical scavenging properties in an in vitro test system.

KEY WORDS: *Extraction, Ethanolic Extract, , Antioxidant Activity, Hylocerous undatus, Phytochemicals*

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INTRODUCTION

Plants have been utilized as traditional remedies for a very long time because they are significant sources of active ingredients that have therapeutic effects and may be employed as agents to prevent a wide range of human ailments [1].

Over 70% of India's population still relies on traditional medicine. Ten percent of all plant species are utilized to make cosmetics and medications. Plants are a key source of medicinal materials, serving as both the population's raw medication supply and separated active ingredients that may be supplied in standardized dose forms [2]. Not only are medicinal plants essential for medical care, but they are also crucial for the creation of novel medications.

The common name for Hylocerous undatus is dragon fruit. Its original source was in Latin America. It is a member of the family Cataceae [3]. Dragon fruit comes in three different varieties: Hylocerous megalanthus, which has yellow peel, white pulp, and black seeds; Hylocerous undatus, which has pink/red peel, red pulp, and black seeds; and Hylocerous costaricensis, which has pink/red peel, red pulp, and black seeds [4]. Dragon fruit may be regarded as a very nutrient-dense fruit because of its high fiber and magnesium content and incredibly low calorie count [5].

Recent research has focused more on hylocerous undatus because of its micronutrients, which have anti-poroliferative and antioxidant qualities [6]. Antioxidants are compounds that prevent free radicals from damaging cells, which can lead to chronic diseases including dementia, cancer, and other illnesses. Hylocerous undatus is said to have anti-toxin properties, lower the risk of heart conditions, prevent diabetes, and cancer.

As far as we are aware, the market is filled with synthetic antioxidants such as butylated hydroxyanaisole (BHA) and butylated hydroxytoluene (BHT), yet their safety has been questioned in light of liver damage and other illnesses. The need for natural antioxidants rises as a result [7]. Finding and creating novel therapeutic agents is crucial for our future. The purpose of this study was to examine the phytochemical components and use the fenton reaction to measure the antioxidant activity of Hylocerous undatus.

MATERIAL AND METHODS

Plant Material: *Hylocerous Undatus* were purchased from local market of Bhopal and authenticated.

Chemicals and Reagents: The reagents used were of highest purity (>99.95%) and purchased from companies of Baddi.

Preparation of Extract: The fruits were carefully cut in half and skinned. After drying, the fruit's peel was ground into a powder. Then, using a soxhlet extraction apparatus, peel extracts were treated with 50% ethanol. After removing the surplus solvent, the liquid extract was dried at 50°C in a hot air oven. An airtight box was used to store the dried extract.

Phytochemical Screening: To analyses phytochemical constituents of ethanolic extracts of *Hylocerous Undatus,* alkaloids saponins, glycosides, proteins, phytosterols, phenolic content, flavonoids, terpinoids and tannins were tested.

- **Test for Saponins:** About 0.5g of extract was boiled with 5ml distilled water and filtered. The filtrate was mixed with 2.5ml distilled water and vigorously shaken to form froth. The frothing was mixed with 3 drops of olive oil and again vigorously shaken. Emulsion was observed, which confirms the presence of saponins.
- **Test for Glycosides:** A small portion of the extract was hydrolysed 3ml of hydrochloric acid and kept in water bath for 1hour. Then it was treated with 2ml of Fehling solution (1ml of Fehling solution A and 1ml of Fehling solution B). Redcolour precipitate was obtained, which shows the absence of Glycosides.
- **Test for Flavonoids:** A small portion of extract was treated with few drops of sulphuric acid. Orange colour was obtained, which confirms the presence of Flavones.
- **Test for Protein:** A small portion of extract was mixed with 3ml of distilled water. In sample mixture 1ml nitric acid was added, heated for 1minute and cooled under tap water. The sample mixture was made alkaline with 40% NaOH. Orangeprecipitate was obtained, which confirms the presence of protein.
- **Test for Terpinoids:** About 5g of extract was mixed with 2ml of chloroform. Then 3l of H_2SO_4 was added to the sample mixture. Reddish brown colour obtained, which confirms the presence of terpinods.
- **Test for Alkaloids:** A small portion of the extract was hydrolysed with hydrochloric acid and filtered. The filtrate was treated with Mayer's reagent. Orange precipitate was obtained which confirms the presence of Alkaloid.
- **Test for Phenolic compound:** A small portion of extract was mixed with 5ml of distilled water and treated with ferric chloride. Violet colour is obtained, which confirms the presence phenolic compound.
- **Test for Tannins:** About 0.5 of extract was mixed with 1ml of distilled water. The sample mixture was boiled for few minutes and filtered. A few drops of 0.1% ferric chloride was added to the filtrate. Brownish green colour obtained, which confirms the presence of tannins.

Deoxyribose assay to assess OH- radical scavenging activity:
Hylocerous undatus peelextract (10–100µl/ml) was tested using an assay technique described by Halliwell et al., 1987 to measure its OH– radical scavenging ability.[8] The

initial stage in this methodology was to combine 100µl of deoxyribose (3 mM), 50µl of Fecl3+ (0.1 mM), 50µl of EDTA, and 100µl of H2O2 in a reaction mixture. To keep the pH at 7.4, 1 ml of PBS was added to the volume. At 38°C, the reaction mixture was incubated for one hour. Following the incubation period, the reaction mixture was heated for 20 minutes with the addition of 0.5 ml each of 0.1% and 5% TCA. The absorbance was measured in a UV spectrophotometer at 532 nm. Ascorbic acid was utilized as the standard, and the IC50 value of the extract was compared to its value. Lower absorbance of the reaction mixture indicates higher level of free radical scavenging activity. The result was expressed as percentage (%) inhibition of TBARS.

RESULT AND DISCUSSION

In the contemporary pharmaceutical businesses, these conventional plant remedies have a prominent place. With its origins in traditional medicine, morden allopathic medicine is expected to find and market many significant novel treatments in the future, just as it has done thus far, by following leads from traditional knowledge and experiences. The few negative effects of herbal medications have led to a rise in their demand.

Phytochemical Screening: These compounds are produced by plants as self-defense, but many phytochemicals have also been shown in recent studies to offer protection against human illnesses [9]. The principal secondary metabolites were evaluated for in the peel extract of Hylocerous undatus. Visual observation of the color change or precipitate development following the addition of particular chemicals served as the basis for the tests.

Table 1 displays the outcomes of the phytochemical screening of the peel extract from Hylocerous undatus. Hylocerous undatus can be regarded as a rich source of phytonutrients because the extract has demonstrated beneficial outcomes.

Antioxidant Activity: The outcomes demonstrate how the hydroxyl radicals generated by the fenton reaction are affected by the peel extract of Hylocerus undatus and the control solution. Table 2 shows the fraction of the peel extract from Hylocerous undatus that can scavenge free radicals. The generation of OH-radicals is inhibited by the extract of Hylocerous undatus peel.

It was shown that when the extract concentration increases, so does the free radical OH-scavenging activity. Studies show that the peel of fruits and vegetables has higher levels of vitamins, minerals, fiber, phytonutrients, and antioxidants than the other portions. The plant extract demonstrated a high level of antioxidant potential in vitro, making it a viable natural antioxidant source.
Ascorbic acid was utilized as the standard, and the IC50 value of the extract was compared to its value. (Table 3)

Table 1. Phytochemical analysis of *Hylocerous undatus* peel extract

S.No.	Phytochemical constituents	Extract of Pulp of *Hylocerous Undatus*	
1	Glycosides	+Ve	

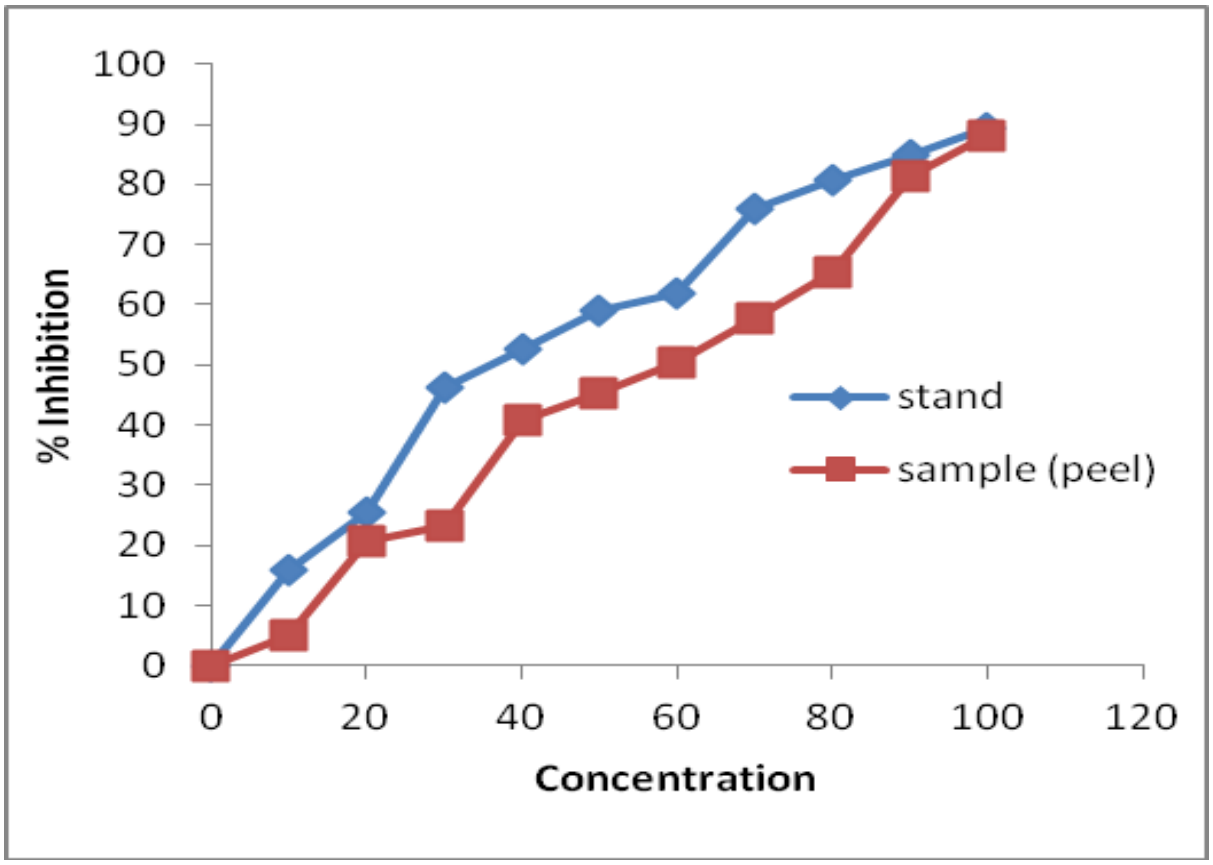
2	Terpinoids	+Ve	
3	Proteins	+Ve	
4	Flavonoids	+Ve	
5	Phenols	+Ve	
6	Phytosterols	+Ve	
7	Saponins	+Ve	
8	Tannins	+Ve	
9	Alkaloids	+Ve	

Table 2. Antioxidant activity of *Hylocerous undatus* peel extract

Concentration (µg/ml)	**Ascorbic acid (Mean±SE)**	***Hylocerous undatus* peel (Mean±SE)**
10	17.0±0.4	6.13±0.1
20	24.6±0.8	21.8±0.9
30	47.2±0.3	22.8±1.1
40	53.7±1.3	41.3±0.8
50	58.1±3.0	43.4±0.3
60	62.8±0.2	49.3±0.1
70	76.9±0.4	56.8±2.6
80	80.1±0.2	66.3±0.4
90	83.9±0.6	80.9±0.2
100	88.5±0.2	87.9±0.9

Table 3. IC_{50} Value of Peel Extracts

S.No.	**Group**	**IC_{50} Value**
1.	Standard (Ascorbic acid)	43.6(µg/ml)
2.	Sample (*Hyloceru undatus*- peel)	58.5(µg/ml)



Graph 1. Antioxidant activities of Hylocerous undatus peel

CONCLUSION

Plant extract demonstrated a high level of antioxidant potential, making it a valuable natural antioxidant source. There are millions of plants in the globe, the majority of which have not yet been thoroughly studied. As we know, these medicinal plants are utilized in traditional medicine because of their phytochemical components, which have therapeutic benefits. We may utilize Hylocerous undatus for thorough research to determine its potential for treating a variety of human ailments since it is a rich source of phytochemical components and has a strong antioxidant activity.

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