

## MASTER'S THESIS

### 量天尺不同部位的抗氧化活性比较研究

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# 量天尺不同部位的抗氧化活性比较研究

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## 量天尺不同部位的抗氧化活性比较研究

### 摘要

量天尺是热带雨淋地区独特的植物，具有被人所知为火龙果的果实。量天尺根据其果实不同的颜色可以分为四种，白肉火龙果，红肉火龙果，紫肉火龙果，白肉黄皮火龙果。量天尺的花为霸王花，是常用于煲汤的材料。因此，量天尺整个植物集“水果”，“花卉”，“蔬菜”，“保健”，“医药”为一体，有很高的营养和经济价值。量天尺具有生长周期短，结果快，数量多，生长条件简单，等特征，因此被人们称为经济植物。基于这个优点，充分利用量天尺能够给人们带来高的经济效益。根据目前的研究情况，有很多学术报道关于火龙果的抗氧化活性以及其保健功能，其次是花和茎。大多数的文献报道说明火龙果的抗氧化活性主要来源于甜菜红碱，和多酚类化合物。根据文献报道，紫肉和红肉火龙果比白肉和黄皮火龙果有更高的抗氧化活性。这个说明虽然白肉火龙果含高含量的维生素 C 和维生素 E，但是根据实验维生素对抗氧化作用的活性却没有太大的影响。除了抗氧化活性，火龙果也有解重金属中毒的功效，预防脑细胞变性，预防高血压，抑制痴呆症的发生，清热降火等作用。除了火龙果有很好的抗氧化作用以外，量天尺的霸王花，长列于药膳的一种，也有很好的抗氧化作用，含高含量的多酚类化合物和植物甾醇类化合物，有清肺、止咳、化痰之功效。除了霸王花，量天尺的茎也含有多酚类化合物和植物甾醇，从而有潜在作为做保健品和化妆品。但是对于抗氧化活性而言，目前还没有文献报道火龙果，霸王花，和量天尺茎的活性比较。大多数研究只是集中在火龙果。基于量天尺不同部位的抗氧化活性与保健功能，本研究的主要目的是了解量天尺不同部位的抗氧化活性，从而对量天尺不同部位的产品开发提供初步的依据。

本研究对香港市场上售的霸王花，火龙果，与量天尺茎的抗氧化活性做了比较。将样品干燥粉碎后，用超声提取方法以 70%乙醇于 33°C 超声提取 30 分钟，5 次。提取物浓缩以后，用 70%乙醇在复溶配成 50 mg/mL，与 0.06 mM DPPH 避

光反应 180 分钟，在 515 nm 紫外波长下测紫外吸收。本研究考察了溶剂，提取次数，反应浓度，对照品对结果的影响。实验表明，红肉火龙果皮具有最高的抗氧化活性，其次是红肉火龙果，红肉火龙果茎，白肉果皮，霸王花，白肉火龙果茎，白肉火龙果。抗氧化活性以 mg 芦丁每 100 g 样品，红肉果皮含有相当于 1191.22 芦丁，红肉火龙果 1149.04，红肉火龙果茎 1091.58，白肉果皮是 1007.78，霸王花是 931.35，白肉火龙果茎是 751.31，白肉火龙果是 191.65。抗氧化作用的  $IC_{50}$  值从低到高的顺序是红肉火龙果，红肉果皮和茎（两者浓度相同），其次是白肉皮，霸王花，白肉火龙果茎，白肉火龙果。

关键词：量天尺，火龙果，抗氧化活性

## Comparative Study on Antioxidants Activity of Different Parts of *Hylocereus Undatus*

### Abstract

*Hylocereus undatus* is a tropical rain forest area's unique plants. The flower of *Hylocereus undatus* in Chinese is called "bawanghua" which means the King of flower, while the fruit is very well known as dragon fruit or red pitaya. They have the function as "fruit", "flowers", "vegetables", "health", and "medicine" in one unit, therefore has high economic value. *Hylocereus undatus* has short growth cycle scale, quick forming fruits, large quantity, simple growth conditions, and other features, so it was known as economic plants. Based on these advantages, *Hylocereus undatus* can bring us high economic efficiency. According to the current studies, there are many scholar reports about the antioxidant activity of dragon fruit and its health functions, followed by flowers and stems. Most of the reports agree that the antioxidant activity of dragon fruit is because of betalain, and polyphenol. According to some studies, purple dragon fruit and red dragon fruit have higher antioxidant activity level comparing to white pulp dragon fruit and yellow peel white pulp dragon fruit. This result tells us that although white pulp dragon fruit has higher vitamin C and vitamin E content, but those don't have much impact on antioxidant activity. In addition to antioxidant activity, dragon fruit also effective to cure heavy metal poisoning, prevents degeneration of brain cells, prevent high blood pressure, prevent alzheimer diseases, and has the function of reducing heat. On the other hand, the flower of *Hylocereus undatus*, "bawanghua", also has antioxidant activity, contains high level of polyphenol and phytosterols compounds, has function to clearing the lung, prevent from coughing, also expels phlegm. Besides of bawanghua, the stem of *Hylocereus undatus* also contains polyphenols, and phytosterols, which has potential as health care products and cosmetics. However, in term of antioxidant activity, there is no report about the comparison of antioxidant activity of different parts of *Hylocereus undatus*. Most of studies have only focused on dragon fruit. Based on antioxidant activity of different parts of *Hylocereus undatus* and also its health function, the main purpose of this study is to understand the antioxidant activity of

different parts of *Hylocereus undatus*, to provide basic evidence to develop new products from different parts of *Hylocereus undatus*.

This study collects all of the samples which are available in the market in Hong Kong. After the samples were dried and crushed, they were extracted using 70% alcohol in 33°C sonicator for 30 minutes, five times. After the samples were concentrated using rotavapor, 70% alcohol was used to redissolve the sample into 50 mg/mL, and then allowed to react with 0.06 mM DPPH in dark for 180 minutes, then the uv absorbance was read in 515 nm. This study also investigate the influence of solvent, extraction times, reaction concentration , and control to the result. This experiment shows that pulp of red flesh dragon fruit has the higher antioxidant activity, followed by its peel and stems, white flesh dragon fruit's peel, bawanghua, white flesh dragon fruit's stem, and pulp of white flesh dragon fruit. The activity was showed in mg of rutin in every 100 g sample, peel of red flesh dragon fruit is 1191.22, its pulp is 1149.04, its stems is 1091.58, peel of white flesh dragon fruit is 1007.78, bawanghua is 931.35, stems of white flesh dragon fruit is 751.31, pulp of white flesh dragon fruit is 191.65. The IC<sub>50</sub> value of antioxidant activity from the lowest concentration to the highest concentration was pulp of red flesh dragon fruit, peel of red flesh dragon fruit and its stems which have the same concentration, peel of white flesh dragon fruit, bawanghua, stems of white flesh dragon fruit, and pulp of white flesh dragon fruit.

**Keywords:** *Hylocereus undatus*, dragon fruit, antioxidant activity.

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