

Studies on Extraction of Kaempferol Flavonoid from *Bougainvillea spectabilis* by using Liquid – Liquid Extraction

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Received: Feb 7, 2023 Accepted:

Feb 13, 2023 Published: Mar 14, 2023

How to cite this article:

Aggarwal A, Agrawal M, Sirohi S, Prakash DVS. Studies on Qualitative and Quantitative analysis of Phytochemicals from *Spinacia oleracea* leaves. Journal of Microbiology & Biotechnology 2023; 1(1): 5-7.

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ABSTRACT

Bougainvillea spectabilis is commonly known as paper flower and belongs to Nyctaginaceae family. It contains a high content level of Phytochemicals and acts as medicinal properties. The phytochemical analysis revealed the presence of alkaloid, furanoids, flavonoids, glycosides, phenols, quinones, steroids, saponins, terpenoids, and tannins which shows various medicinal properties anti-microbial, anti-oxidant, anti-fertility, anti-diabetic, anti-inflammatory, anti-ulcer activities, etc. In this research work, we studied on Kaempferol flavonoid extraction from methanolic extract leaf by using liquid-liquid extraction. In this extraction, kaempferol moved from the lower phase (raffinate phase) to the upper phase (extract phase). 10 µg/ml of kaempferol concentration was found to be in the extract phase and 5 µg/ml of kaempferol concentration was found to be in the raffinate phase. Then finally found about distribution coefficient or partition coefficient of kaempferol. Its value was two.

KEYWORD: *Bougainvillea spectabilis*, Kaempferol, Flavonoid, Extraction, Partition

Introduction

Bougainvillea spectabilis is commonly known as a paper flower and belongs to the Nyctaginaceae family. Huge climber *Bougainvillea spectabilis* Willd.^[1] has recognizable thorns and hairs on stems, as well as large ovate leaves. The bracts, which are crimson, dark pink, or purple and grow up and down the branches, are smaller than the blooms, which are cream in color and have enormous, curled thorns.^[2] As *Bougainvillea spectabilis* does not produce seeds, traditional multiplication of this plant is exceedingly challenging. The phytochemical analysis revealed the presence of alkaloids, furanoids, flavonoids^[3,4], glycosides, phenols, quinones, steroids, saponins, terpenoids and tannins which showed various medicinal properties anti-microbial, anti-oxidant, anti-fertility, anti-diabetic, anti-inflammatory, anti-ulcer activities etc. The World Health Organization asserts that medicinal plants are the finest source for a number of more recent herbal medications^[5] People from underdeveloped nations employ traditional medicine, which includes com-

ponents made from medicinal plants, in about 80% of cases. In order to comprehend their characteristics, safety, and effectiveness, such plants should be researched. Many plants have been found to possess antibacterial and chemotherapeutic properties [6]. The development of secondary metabolites, such as alkaloids, flavonoids, tannins, terpenoids, etc., which are naturally present in the plant for self-defense against various forms of attack, is the cause of medicinal plants' antibacterial properties. Since ancient times, numerous diseases have been treated using plant extracts, and in the late 19th century, the first scientific studies of plant antibacterial activity were published. In this research work [7], we studied the extraction of kaempferol flavonoid from *Bougainvillea spectabilis* by using liquid-liquid extraction.

Materials and Methods

Chemicals

Methanol, Hexane, and Distilled water

Collection of Plant Material

Bougainvillea spectabilis leaves are collected from MIET garden, Meerut city, Uttar Pradesh state. Leaves are cleaned with tap water, dry under sunlight, and converted into powder form.

Liquid-Liquid Extraction

Two grams of leaf powder were taken into a 100 ml conical flask and soaked with 50 ml of methanol solvent. After 24hrs the sample was filtered by using Whatman filter paper.^[8] The green-colored filter sample was considered a raffinate phase sample. This sample was poured in a separatory funnel up to 40 ml. Then hexane sample (40 ml) was added to the raffinate phase sample. Here hexane sample was considered as an extract phase sample.^[9] Both are showed in 1:1 ratio in this funnel. It was shown in Fig.1.



FIGURE 1. Liquid-Liquid Extraction

Estimation of Kaempferol

Each 1 ml of extract sample (Extract phase sample and Raffinate phase sample) was taken in each test tube and add 1 ml methanol solvent to each one. After 30 min incubation period, the test samples were estimated at 265 nm by using a colorimeter.^[10,11]

Results and Discussion

In this liquid-liquid extraction phase, the upper phase is the extract phase (hexane sample) and the lower phase is the raffinate phase (green color filter sample). Here kaempferol flavonoid was moved from the lower phase to the upper phase.^[12] Kaempferol concentration was estimated in both phases with different time periods. Finally, we are studied about distribution coefficient or partition coefficient of kaempferol.

TABLE 1: Kaempferol concentration of various phases.

S.No	Time (hr)	Kaempferol Concentration in Extract Phase ($\mu\text{g/ml}$)	Kaempferol Concentration in Raffinate Phase ($\mu\text{g/ml}$)
1	One	2.5	16.0
2	Two	7.0	12.0
3	Three	9.5	8.0
4	Four	10.0	5.0
5	Five	10.0	5.0

Distribution coefficient (Partition coefficient) of Kaempferol = Kaempferol Concentration in Extract Phase ($\mu\text{g/ml}$) / Kaempferol Concentration in Raffinate Phase ($\mu\text{g/ml}$) = $10(\mu\text{g/ml})/5(\mu\text{g/ml})=2$

Conclusion

Bougainvillea spectabilis is commonly known as a paper flower and belongs to the Nyctaginaceae family. It contains a high content level of Phytochemicals and acts as medicinal properties. In this research work, we have studied Kaempferol flavonoid extraction from methanolic extract leaf by using liquid-liquid extraction. In this extraction, kaempferol moved from the lower phase (raffinate phase) to the upper phase (extract phase). $10 \mu\text{g/ml}$ of kaempferol concentration was found to be in the extract phase and $5 \mu\text{g/ml}$ of kaempferol concentration was found to be in the raffinate phase. Then finally found about distribution coefficient or partition coefficient of kaempferol. Its value was two.

Source of Funding

None

Conflict of Interest

None

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