

4TH EDITION

**E-EXTENDED
ABSTRACT**

**INTERNATIONAL
AGROTECHNOLOGY
INNOVATION
SYMPOSIUM (i-AIS)**



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INTERNATIONAL AGROTECHNOLOGY INNOVATION SYMPOSIUM (i-AIS)

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ABOUT FACULTY OF PLANTATION AND AGROTECHNOLOGY

The Faculty of Plantation and Agrotechnology was established in 2010 at Universiti Teknologi MARA (UiTM). The mission of the faculty is to play the vital role of producing well-trained professionals in all areas of plantation and agriculture-related industries at national and international levels.

Bachelor of Science (Hons) Plantation Technology and Management is a three-year program that strongly emphasizes the various aspects of Production Technology, Management, and Information Technology highly sought after by the agricultural and plantation sectors. Students in this program will be fully trained to serve as professionals in the plantation sector and related industries. They will have ample opportunities to fulfill important positions in the plantation industry such as plantation executives. This program provides a strong balance of technology and management courses essential for the plantation industry such as management of plantation crops, soil fertility, plantation management operation, plantation crop mechanization, and agricultural precision. As an integral part of the program, students will be required to undergo industrial attachment to gain managerial skills in the plantation industry.

The faculty is highly committed to disseminating, imparting, and fostering intellectual development and research to meet the changing needs of the plantation and agriculture sectors. With this regard, numerous undergraduate and postgraduate programs have been offered by the government's intention to produce professionals and entrepreneurs who are knowledgeable and highly skilled in the plantation, agriculture, and agrotechnology sectors.

PREFACE

International Agrotechnology Innovation Symposium (i-AIS) is a platform to be formed for students/lecturers/ staff to share creativity in applying the knowledge that is related to the world of Agrotechnology in the form of posters. This virtual poster competition takes place on the 1st of December 2022 and ends on the 8th of January 2023. This competition is an assessment of students in determining the level of understanding, creativity, and group work for the subject related to agrotechnology and being able to apply it to the field of Agrotechnology. The i-AIS 2022 program takes place from December 1, 2022, to January 8, 2023. The program was officiated by the Dean of the Faculty of Plantation and Agrotechnology, namely Prof. Madya Ts. Dr. Azma Yusuf. The program involves students from faculties of the Faculty of Plantation and Agrotechnology (FPA) and HEP participating in i-AIS 2022, namely, the Faculty of Education and Pre-Higher Education. This program involves the UiTM student and some of the non-UiTM students which come from the international university and the local university. Two categories are contested, namely UiTM and non-UiTM. To date, students from these programs have shown remarkable achievements in academic performance and participation in national as well as international competitions.

This competition is an open door for the students and lecturers to exhibit creative minds stemming from curiosity. Several e-content projects have been evaluated by esteemed judges and that has led to the birth of this E-Poster Book. Ideas and novelties are celebrated, and participants are applauded for displaying ingenious minds in their ideas.

It is hoped that such an effort continues to breed so that there is always an outlet for these creative minds to grow.

Thank you.

Dean
On behalf of the Organizing Committee
Conference Chair
Universiti Teknologi MARA
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PHYTOCHEMICAL AND BIOLOGICAL ANALYSIS OF MEDICINAL PLANT, *Apium graveolens* (CELERY): A REVIEW

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ABSTRACT - *Apium graveolens*, popularly known as celery, is a medicinal plant used in traditional medicine to treat various types of diseases due to the presence of a variety of active compounds. The stem, leaf, seed, and root of *A. graveolens* are rich in antioxidant flavonoids, including apigenin and apiin. Apigenin is known to enhance adult neurogenesis, improve blood glucose levels, and antioxidant levels. Meanwhile, apiin can increase the activity of detoxifying enzymes such as superoxide dismutase (SOD), glutathione (GSH) peroxidase, and catalase. Bioactive compounds known as phthalides can also protect against cancer, high blood pressure, and cholesterol. Hence, the presence of these various bioactive molecules in *A. graveolens* have shown antioxidants, anti-inflammatory, and other biological activities. For the past ten years, several discoveries have also been made regarding the medicinal properties of these herbs. As a result, in this review, we provide an overview of recent research on the various uses, phytochemistry, and biological activity found in all parts of *A. graveolens* species to discuss its medical value and potential application in complementary and alternative medicine. This review aims to give current knowledge and perspectives on *A. graveolens* as a therapeutic herb.

Keywords: *Apium graveolens*, biological activity, phytochemistry, uses of *Apium graveolens*

INTRODUCTION

Apium graveolens is a plant of the *Apium* genus of the Apiaceae family. This herb is an annual or perennial plant-derived from wild and wetland species found throughout Europe (mainly in Italy and France), Africa, and Asia. Due to its wide cultivation and uses, this herb can now be found in most developing countries, including African countries such as Abyssinia, Algeria, India, Iran, the Caucasus, and the United States [1]. This plant is available in three cultivars and variations, each with its own distinct colour and flavour. The most important botanical cultivars of *A. graveolens* are *A. graveolens* var. *dulce* (stalk celery or pascal celery), *A. graveolens* var. *rapaceum* (celeriac), and *A. graveolens* var. *secalinum* (golden or leaf celery) [2]. Active compounds derived from *A. graveolens* have many benefits and also can be used in various ways. Many studies have shown the importance of medicinal plants in traditional medicine and their widespread use as a raw source in the pharmaceutical industry. Medicinal plants are believed to be more effective than other synthetic medicine types in curing various diseases due to their natural properties [3]. However, many people today still believe that *A. graveolens* can only be used as a flavour enhancer for food and vegetable commodities. Most of them are unaware that this herb is actually one of the medicinal herbs that can help treating various type of diseases [4]. The objectives of this study are to review the recent study on uses, phytochemical and biological activity of *A. graveolens* and validate its potential as a new source of herbal pharmaceuticals and natural products.

MATERIAL AND METHOD

The bibliographic research was performed in the following databases: PubMed, Google Scholar, Scopus, and ScienceDirect, where these databases were searched for relevant studies which included at least one keyword from each of the following: (i) *Apium graveolens*, (ii) phytochemistry, (iii) biological activity, (iv) medicinal plants, and (v) uses of *Apium graveolens*. No limit was placed on the search time frame in order to retrieve all relevant papers, and the last search was performed on 2021. About 65 papers have been reviewed including journal articles and proceedings as well as the reference lists of articles for additional relevant studies.

RESULTS AND DISCUSSION

The stems, leaves, roots, and seeds of *A. graveolens* are reported to have medicinal properties that can be used to treat a variety of diseases. The most common herb part used medicinally are seeds, followed by roots, stems, and leaves. Each part contains different secondary metabolites that can treat different types of diseases. Table 1 summarises some of the ethnopharmacological studies conducted on *A. graveolens*.

The major bioactive components discovered in *A. graveolens* are phenolic compounds and furocoumarins. Apiin, apigenin, glucoside A and B, isoquercitrin, phytic acid, and tannins are some types of phenolic compounds. Meanwhile, the three phototoxic furocoumarins, which are bergapten, psoralen, and xanthotoxin, are the majority of the furocoumarins presence in this herb. The other furocoumarins discovered in *A. graveolens* include 8-hydroxy methoxy psoralen, apiumoside, apiumetin, celereoside, celerin, isoimperatorin, isopimpinelin, and osthonol [5,6]. This herb also includes carbohydrates, glycosides, steroids, and trace elements (calcium, iron, potassium, and sodium). *A. graveolens* is a kind of vegetable high in potassium and antioxidants. A study found that one serving of *A. graveolens* (100 g) contains at least 14 calories and various nutrients.

Traditional uses and phytochemical analysis of *A. graveolens* prompted scientists to investigate its new pharmacological properties, leading to the formation of many potent medications to prove the herb's medicinal potential. As a result, pure extracts and compounds produced by *A. graveolens* have been studied and found to have a variety of biological activities, including antioxidant, antimicrobial, anti-inflammatory, antihypertensive, and antihyperglycemic activities.

Table 1: Ethnopharmacology Studies of *A. graveolens*

Plant part	Treatment	Preparation/mode of use	References
Stem	Chronic pulmonary catarrh, gout, lose excess weight	Prepared as juice or used as decoction	[7, 8]
	Lack of appetite	Prepared as juice or used with common salt	[1]
Leaves	Colic	Wild <i>A. graveolens</i> , Ptychotis ajwain, and water were all distilled together.	[5, 8]
Root	Diuretic	Prepared as tea or used as decoction	[5]
	Treatment of liver	Not specified	[4]
Seed	Abdominal pain, irritable bowel syndrome, painful menstruation, flatulence	Herbal preparation containing <i>A. graveolens</i> , <i>Zingiber officinale</i> , and <i>Foeniculum vulgare</i> Mill. or used in decoction	[2, 7, 8]
	Asthma	Used as decoction	[3, 7]
	Hoarseness of voice	Used in powder form with honey	[1]
	Reduced blood pressure, gout	Used in combination with other drugs	[1, 7]

CONCLUSION

In conclusion, *Apium graveolens* has the potential to be a highly beneficial medicinal plant that may be used to treat a variety of diseases without causing any harmful side effects. This is because *A. graveolens* is a fragrant plant containing various compounds such as coumarins, flavonoids, furanocoumarins, isobenzofurans, phthalides, and sesquiterpenes, all of which have been shown to have antioxidant, antimicrobial, anti-inflammatory, antihypertensive, antihyperglycemic, and other biological effects. This herb can also be used to treat various diseases, including lowering blood pressure, jaundice, stomach pain, and increasing breast milk secretion. However, further study on the effectiveness of *A. graveolens* as a plant-derived treatment, which has the potential to become a new source of herbal pharmaceuticals and natural products, should be done, as it may give various health advantages to people in addition to being consumed as a vegetable or snack. Hence, the finding of this review paper can provide readers with some knowledge on the uses, phytochemistry, and biological activity of *A. graveolens* that have been studied from previous research.

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