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Bioscience Research

Print ISSN: 1811-9506 Online ISSN: 2218-3973

Journal by Innovative Scientific Information & Services Network

RESEARCH ARTICLE BIOSCIENCE RESEARCH, 2025 22(1): 43-46. OPEN ACCESS

Chemical profile and electrical conductivity of *Paulownia tomentosa* (Thunb.)Steud.

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Paulownia tomentosa is a variety that can easily adapt to the soils of Denizli region and is rich in substance content. Leaf and flower bioactive content analysis of the pawlonia tree was performed and electrical conductivity measurements were made. According to the results obtained; The least amount of chlorogenic acid was found 34.863 µg/g in the leaf extract, and 82.260 µg/g in the flower extract. As for the hormonal level in the plant content; The amount of indole-3 acetic acid in the leaf extract was 6566,33 µg/g and the amount of abscisic acid was obtained as 3491,696 µg/g in the flower extract, in organic acid analysis, the maximum formic acid in the leaf extract was 49759,63 µg/g flower µg/g, while the most common malic acid was 35296,46 µg/g in the flower extract. The highest amount of fructose sugar was found in the flower and its rate was determined as 51307 µg/g.

Keywords: *Paulownia tomentosa* (Thunb.), Sieb and Zucc. I Steud, Phytochemical content, Electrical conductivity, Denizli.

INTRODUCTION

Paulownia is cultivated in more than 40 regions of South Asia, Australia, Brazil, the United States of America, Japan, Germany, and Southern Europe, primarily in China (Abbasi 2000, Kaymakçı 2010). Today, approximately 2.4 million hectares of agricultural land in the world are cultivated with paulownia trees for various purposes (Johnson 2000, Kaplan 2008). Despite the increase in population in our country and the world, the number of people engaged in agriculture number is decreasing day by day (Serim and Öngen, 1995). World agricultural land of 2.4 million hectares is planted with Pawlonia for different needs. The use of foreign tree species in Turkey in the 1940s years, and between 1950 1 and 969 by various institutions supported studies have been carried out. P. tomentosa is a showy and fast-growing landscape species originating from East Asia. It is a species that is planted for a purpose. Some areas in the eastern USA are naturally has found growing areas (Williams, 1993). *Paulownia tomentosa* in parklands of central and southern Europe for 1830 years as an ornamental plant and after 1989 it was introduced in Italy, especially plantation studies have been carried out for its wood (Mezzalira and Colonna, 2002).

As a result of all Paulownia plantations in China as a result of scientific studies, it was determined that there are 9 different types. These are: P. tomentosa, P. elongata, P. fortunei, P. catalpifolia, P. Kawakami, P. farbesii, P. australis, P. albiphloea, P. taiwaniana (Huaxin 1986, Ching 1983). This one P. elongata is the species with the most study area and cultivated species, P. tomentosa and P. fortunei (Kays et al. 1992). Leaves broadly lobed, ovate and heart-shaped (15-30 cm long, 12-22 cm wide).

This study aimed to determine the phytochemical contents and electrical conductivity of the leaves and flowers of *Paulownia tomentosa*. This study allowed us to determine the rich content of this tree that grows and adapts to our region by analyzing its content. In particular, the growth hormones, sugar content, and organic acid content in its leaves and flowers were determined. In the light of this data, the electrical content of the plant was measured.

MATERIALS AND METHODS

Preparation of *Paulownia tomentosa* leaf and flower extract

Paulownia tomentosa leaves and flowers were collected from the campus garden of Pamukkale University in March-April. After drying in the shade, leaves and flowers were pulverized. 1/10 of solvent and ground samples were extracted. 10 grams of milled specimen (leaf and flower) was prepared using 100 milliliters of methanol solvent. It was then extracted with methanol solvent at 55 ^{o}C in a water bath for 5-6 hours. The mixture obtained as a result of the extraction was filtered through filter paper (Whatman No: 1) and the solvents were removed from the rotary evaporator (IKA RV -10 USA). The extract was

completely dried in the lyophilizer and the water was removed (Labconco Freezone 6 USA). The remaining extracts were stored at 4 ºC for use in subsequent studies. A fully organized survey of the chemical composition of the plant laboratory and analyses were performed in four replicates. Plant both aqueous and dry forms in electrical conductivity measurement processes were used and their images were taken under the cryostat device and electrical measurement devices were measured. As a result of our investigations extraction processes using methanol solvent in previous studies

Hormone analyses of extracts

Hormone analyses were performed to reveal the results of the inhibitory or inhibitory effects of the extracts of *Paulownia tomentosa* leaf and flower parts, which constitute the material of our study, on the germination of plants. 2 g of the sample was taken and 10 ml of 98% ethanol was added. 2 minutes It was mixed in a homogenizer and kept in a water bath at 40 C for 1 night. This period centrifuge at 4000 rpm for 5 minutes at the end. The organic phase was removed and stored at 40 ºC was evaporated in a rotary evaporator until completely dry. Then 2 ml of the extract dissolved in the mobile phase and these extracts were obtained for the HPLC system ready for injection. For the HPLC system; Shimadzu Prominence Brand HPLC was used. CBM: 20ACBM, Detector: DAD (SPD-M20A), Column Oven: CTO-10ASVp, Pump: LC20 AT, Autosampler: SIL 20ACHT, Computer Programme: Mobile Phase using LC Solution system: A: 3% Formic acid B: Methanol HPLC system was obtained using the standards of gibberellic acid and abscisic acid (Kiselev et al. 2007).

Organic acid analysis of extracts

HPLC Method: System Used: Shimadzu Prominence Brand HPLC (Tokyo, Japan) CBM: 20ACBM. Detector: DAD (SPD-M20A). Column Furnace: CTO-10ASVp, Pump: LC20 AT, Autosampler: SIL 20ACHT, Computer Programme: LC Solution. Column: ODS 4 (250 mm 4.6 mm, 5 µm) (GP Sciences, Inertsil ODS-4, Japan), Mobile phase: ultrapure water with pH adjusted to 3 with orthophosphoric acid (Haghi et al. 2005).

Sugar analysis of extracts

Carbohydrates are natural essential nutrients synthesized by plants. There are 4 types of carbohydrates produced by plants; glucose, sucrose, maltose, and fructose. *Paulownia tomentosa* leaf and flower extract 5 g of sample were weighed and extracted in 40 ml distilled water in an ultrasonic bath. 25 After adding mL methanol and transferring to a balloon jar, a 100 mL balloon jar was also used. completed. The sample was filtered and injected into the system. Mobile phase methanol: water (80:20), column temp: 30 C; flow rate: 1.3 mL/min at room temperature. Sugar determination analysis was performed according to the method applied by Turkish Standard TSE 13359 utilized in this study. Standard Honey Fructose, Glucose, Sucrose, Turanose, and Maltose Determination of Content-HPLC using High-Performance Liquid Chromatography calibrated in the system.

Electrical Conductivity of Leaf and Flower Parts of *Paulownia tomentosa* Measurement Method

Aqueous and dry extracts of leaves and flowers of *Paulownia tomentosa* extract 13 mm tableted under pressure under 5 tonnes in diameter. The sample was pressurised with silver paste 4 contacts were taken over the cryostat system. Cryostat device using the device from room temperature to 20 K without waiting quickly. cooled. Reduced to 10-6 by turbo molecular pump. 20 K temperature was cooled by a helium-closed circuit cooling system. 20 K for 30 minutes temperature and then increased by 1 ºC and heated to 300 K.

RESULTS

Through this research, the medicinal and aromatic potential of the Paulownia tomentosa tree thanks to the emergence of an alternative drug source, can be studied in the direction of the analyses' results. According to the analyses, Paulownia tomentosa phenolic and antioxidant content of extracts of leaves and flower parts of the tree that their ingredients have at least as much potency as synthetic antioxidants were determined. The results of this study show that the natural antioxidants found in our plant compounds are provided by chemically derived synthetic antioxidants It has shown that it can meet the antioxidant activity at the same or higher rate. Organic acids show antimicrobial properties. Paulownia's collected When the plant parts are analyzed, it is rich in organic acids, and accordingly antimicrobial properties were determined. Paulownia tomentosa tree formic acid (49759.63 µg/g) and citric acid (42318.71 µg/g) in the leaf extract are more abundant. The data determined most common in plant parts organic acid type was formic acid. In light of this information, Paulownia leaves can be used in animal feed, preservatives in beverages, and flavoring in dietary products. Related to this *Paulownia tomentosa* plant parts as pharmacological and medicinal-aromatic. It is possible to say that it has a rich content. When the results of sugar analyses were examined, fructose sugar (14789 µg/g) and glucose sugar (13334 µg/g) were found in small amounts in the leaf extract.

If consumed in excess, it may have a disease-causing effect. Although fructose seems to be a healthy type of sugar, it has more disease-causing effects than glucose sugar. Extraction of leaf parts of Paulownia tomentosa electrical conductivity measurements of the samples were made. This unique beauty and leaf extract of our tree, which has many uses after the prepared apparatus was kept at 20 K for 30 minutes, 1 ºC and heated up to 300 K.

Table 1: Chemical content analysis of *Paulownia tomentosa* flower and leaf

Numune (µg/g)	Hormone *ABA/IAA*	Organic Acid Oksalik asit	Formik asit	Malik asit	Asetik asit	Pirüvik asit	Sitrik asit	Sugar (µg/g) Fructose	Glucose
Flower	3491,696 /648,141	16380,5	30192,45	35296,46	4895,46	1246,61	24172,34	51307	49148
Leaf	**1335,151/6566,33**	**12611,5**	**49759,63**	**2014,16**	**12375,33**	**676,12**	**42318,71**	**14789**	**13334**

After the heating process, under the cryostat device conductivity measurement. The woody parts, although in small quantities have electrical conductivity (Acar et al. 2006). Measurement in leaf extracts no conductivity measurements were observed in the range. Paulownia tomentosa tree also contains sugar and carotene substances are present. The highest amount of fructose and glucose sugar is found in the flower extract and the lowest amount in the leaf extract. Attracts bees with the colors of its flowers and its high sugar content is among the tree species that are thought to make a great contribution to bee keeping with their rates. In the majority of the foods we consume, such as honey and molasses, which are useful fructose is a naturally occurring type of sugar. Naturally occurring in these products fructose is not harmful if it is not intensively ingested and the body's glucose helps in the processing phase. But taking excessive amounts of the body the capacity of the organisation to process it. This can lead to unwanted diseases may be encountered. A medicinal plant that can be used in the pharmaceutical industry as well as the amount of sugar contained in the flower extract should be kept and attention should be paid to consumption. It also has a sugar content leaves and flowers can be used as animal feed. When we consider the collection phase of the plant Paulownia tomentosa plant, abscisic acid content was found in flower extract and leaf extract. Auxin hormone was first discovered in growth is among the regulators. The hormone auxin increases the division of cells, and elongation and promotes growth. Auxin hormone is found in the leaves of the plant and is formed by meristematic cells. The indole group of auxin hormone indole 3 acetic acid (IAA) is the only one that can be synthesized naturally in plant hormones. However, many synthetic substances have a similar mechanism of action to IAA. (Kumlay and Eryiğit 2011). Indole 3 acetic acid content, in leaf extract was found to be higher than the flower extract. Indole 3 acetic acid Thanks to this, the leaf blades are large and can be used as a windscreen. The rate of organic acid present in the plant is significant. The organic acid value in our study material is formic acid in leaves > citric acid > acetic acid. Leaf of *Paulownia tomentosa* formic acid, which is highly abundant in the extract, is a one-carbon carboxylic acid. Due to its high content in the leaf, the leaf is used as a preservative in livestock feed. and its use as an antibacterial has been put forward as evidence. Beekeeping formic acid is used in spraying thanks to the formic acid contained in our plant, it is a natural source of struggle in beekeeping in the flower extract than in the leaf extract. It was found less in leaf extract malic acid < oxalic acid < pyruvic acid than in flower extract (Table I).

CONCLUSIONS

In our study, the leaf and flower content of the *Paulownia tomentosa* (Thunb.) Steud., plant was investigated and content analysis was performed. It was predicted that the effects of the contents determined in different amounts would also be different. For this reason, the electrical conductivity effect of this plant was also examined.

Supplementary materials

The supplementary material / supporting for this article can be found online and downloaded at: https://www.isisn.org/article/

Author contributions

Yeşim Kara: Conceived the idea, planned for the study and writing the article. Experimental work was done by my high degree student Özge Uğuz.

Informed Consent Statement

Not applicable.

Data Availability Statement

All of the data is included in the article/Supplementary Material.

Acknowledgments

This study was suppoted by The Scientific research Projects Coordination Department in Pamukkale University, project No: FEBE046

Conflict of interest

The authors declared that present study was Uğuz and Kara performed in absence of any conflict of interest.

Peer Review: ISISnet follows double blind peer review policy and thanks the anonymous reviewer(s) for their contribution to the peer review of this article.

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