Proceeding

CreTech 2017

International Conference on Creative Technology

19 - 21 JULY 2017

http://utkcretech.rmutk.ac.th

5th International Conference on Creative Technology

UTK
RAJAMANGALA
KRUNGTHEP

For More Information
Rajamangala University of Technology Krungthep
Tel. +(66) 2287 9600 ext 1177
Fax +(66) 2287 9684

Antioxidant activity and secondary metabolites of *Abutilon indicum* (Linn.) Sweet from the central region of Thailand

Niramon Worasith[1]*, Bernard A Goodman[2], Pranudda Pimsee[1], Kannika Rotliang[1] and Orada Jengcharoen[1]

[1]Chemistry, Faculty of Science and Technology, Rajamangala University of Technology Krungthep, Bangkok 10120,Thailand. E-mail: *niramon.w@rmutk.ac.th, +66 2879600 ext.7338
[2] School of Physical Sciences and Technology, Guangxi University, Nanning, 530004, Guangxi, China. E-mail:bernard_a_goodman@yahoo.com, +86 18977114325
[1]Chemistry, Faculty of Science and Technology, Rajamangala University of Technology Krungthep, Bangkok 10120,Thailand. E-mail: pranudda.p@rmutk.ac.th, +66 2879600 ext.7338
[1]Chemistry, Faculty of Science and Technology, Rajamangala University of Technology Krungthep, Bangkok 10120,Thailand. E-mail: 575020300043@mail.rmutk.ac.th , +66 2879600 ext.7338
[1]Chemistry, Faculty of Science and Technology, Rajamangala University of Technology Krungthep, Bangkok 10120,Thailand. E-mail: 575020300025@mail.rmutk.ac.th , +66 2879600 ext.7338

ABSTRACT

The antioxidant activity is considered to be an important property of medicinal plants, and much of this is associated with secondary metabolites, such as polyphenols and alkaloids. This paper describes determinations of the antioxidant, polyphenol and alkaloid contents of leaves of the medicinal plant *Abutilon indicum* (Linn.) Sweet from Ratchaburi Province in central Thailand. Fresh leaves were extracted by maceration and sonication using 70%, and 95% aqueous ethanol. Antioxidant activities, total phenolics and alkaloids were then determined in the crude extracts by the DPPH, Folin-Ciocalteau and Bromocresol Green methods, respectively. 70% aqueous ethanol extracts obtained by sonication showed the strongest antioxidant activities, and the highest total contents of phenolic compounds, whereas the alkaloid content was highest in the 95% ethanol extract obtained by sonication. The results from this study demonstrate that the sonication method is the most suitable for extraction of secondary metabolites from *Abutilon indicum* (Linn.) Sweet leaves, but different solvent systems favour the extraction of different components.

Key Words: Antioxidant, total phenolic compounds, sonication, alkaloid, *Abutilon indicum* (Linn.)Sweet

1. INTRODUCTION

Abutilon indicum (Linn.) Sweet is a shrub in the *Mavaceae* family and grows abundantly in Asia. It has been used in various traditional medicines and has been reported to possess chemical components that are associated with a variety of beneficial properties, such as for example, anti-inflammatory [1], and anti-arthritic [2] activities. Recently, our research has found that 70% aqueous ethanol extracts obtained by sonication of *A. indicum* leaves have good antiviral activity [3].In the present study, we have investigated the antioxidant activity of 70% and 95% aqueous ethanol extracts of *A. indicum* leaves, along with their total contents of phenolic compounds and alkaloids.

2. MATERIALS AND METHODS

1. Source of materials

Abutilon indicum (Linn.) Sweet leaves were collected in Ratchaburi Province, central Thailand. Fresh leaves were washed and dried in air at room temperature, then ground and extracted using both maceration and sonication.

2. Extraction by maceration

Maceration was carried out using 50 grams of ground leaves soaked in 300 ml of 70% or 95% aqueous ethanol for 72 hours at room temperature. The extracts were collected and filtered through muslin cloth following by Whatman No. 1 filter paper.

3. Sonication extraction

50 grams of ground leaves were sonicated using the same solvents and plant: solvent ratios as in the maceration method. Mixtures were placed in an ultrasonic bath at room temperature for 30 min, and the extracts collected and filtered through muslin cloth followed by Whatman No. 1 filter paper.

4. Antioxidant activity

Antioxidant ability was determined using DPPH assay, with ascorbic acid was used as standard.

5. Total phenolic content

Total phenolics were determined using the Folin-Ciocalteau reagent.

6. Alkaloid determination

Alkaloids were estimated spectrophotometrically as products of the reaction with Bromocresol Green (BCG).

3. RESULTS AND DISCUSSION

1. Antioxidant activity

The antioxidant activities expressed as IC_{50} values of the 70% and 95% aqueous ethanol extracts obtained by the sonication and maceration methods are shown in Table 1. The 70% aqueous ethanol extract obtained by sonication had the lowest IC_{50} value (0.221 mg/ml), and thus the strongest antioxidant activity.

Table 1 IC_{50} values for the crude extracts of *A. indicum* (Linn.) Sweet

Solvent	IC_{50}(mg/ml)	
	Sonication	Maceration
70% aq. ethanol	0.221	0.320
95% aq. ethanol	0.319	0.450

2. Total phenolic content

The total phenolic contents of the 70% and 95% aqueous ethanol extracts obtained by the sonication and maceration methods are shown in Table 2. The 70% aqueous ethanol extract obtained by sonication had the highest content of phenolic compounds.

Table 2 Total phenolic contents of crude extracts of *A. indicum* (Linn.) Sweet expressed as mg/g gallic acid)

Solvent	mgAE/g of extract	
	Sonication	Maceration
70% aq. ethanol	202.10	135.20
95% aq. ethanol	198.40	120.85

3. Estimation of alkaloid contents

The total alkaloid contents of the 70% and 95% aqueous ethanol extracts obtained by the sonication and maceration methods are shown in Table 3 as the products of their reaction with BCG. In these determinations, the highest alkaloid contents were obtained with the 95% aq. ethanol extract using the sonication method.

Table 3 Alkaloids contents of crude extracts of *A. indicum* (Linn.) Sweet

Solvent	mgAE/g of extract	
	Sonication	Maceration
70% aq. ethanol	7.53	5.740
95% aq. ethanol	10.19	8.51

Various techniques and solvent systems have been used for extracting important components from plants. Although maceration is often used in classical methods, sonication is more convenient to use.

4. CONCLUSIONS

The results from this project have demonstrated that sonication is more efficient than maceration for the extraction of antioxidants and secondary metabolites fromleaves of *A. indicum* (Linn.)Sweet. The highest antioxidant activity and phenolic contents were obtained with 70% aqueous ethanol extracts, whereas the highest alkaloid contents were obtained with 95% aqueous ethanol extracts.

ACKNOWLEDGEMENTS

The authors acknowledge the Rajamangala University of Technology Krungthep, Thailand for providing funding for this project.

REFERENCES

[1] Sarawathi R, Upadhyay L, Venkatakrishnam R, Meera R, Devi P. Phytochemical investigation, Analgesic and anti-inflammatory activity of Abutilon indicum. *Int J Pharm Pharm Sci.ISSN-0975-1491*. 2011; 3: suppl 2.

[2] Vallabh D, Jadhav VM, Kadam VJ. In-vitro anti-arthritic activity of *Abutilon indicum* (Linn.) sweet. J Pharm Res.2009; 2: 644-645.

[3] Worasith N, Goodman B. Antiviral properties of extracts from Abutilon indicum(Linn.) Sweet. *In proceeding: the 5th Rajamangala University of Technology Conference (5th RMUTCON) 2014.*