

ADENIN FROM THE LEAVES OF BINAHONG (*Anredera cordifolia* (Ten) Steenis)

Ratna Djamil¹, Wahyudi PS², Wahono S³, M.Hanafi⁴

Faculty of Pharmacy Pancasila University, Jakarta 12640, Indonesia

Abstract

Binahong (Anredera cordifolia (Ten.) Steenis) is one of the plant which is use generally for treatment of illness but no more research that explain about it's chemical compound and efficacy. In this research had been done isolation and identification of adenin in ethylacetate phase from methanol extract of that binahong's leaves. Isolation doing by thin layer chromatography (TLC), was fractionated by vaccum liquid chromatography (VLC) using CH₂CL₂, isopropanol and methanol of increasing polarity as eluents , and column chromatography (CC). Isolate was purified by HPLC preparative.

The chemical structure of isolate was identified by UV-Vis spectrophotometre, IR spectrophotometer, GC-MS, 1H NMR and 13C NMR. The result of data's analyses from UV-Vis, IR, GC-MS and NMR spectrum showed that isolate which had been identified adenin..

Key words : *Anredera cordifolia, adenin*

²Department of Chemistry, Faculty of Mathematics and Science,
University of Indonesia, Depok 1624 Indonesia

³Agency for the Assessment and Application of Technology, Indonesia

⁴Research Centre for Chemistry, Indonesian Institute of Sciences
ratnadj_ffup@yahoo.co.id

INTRODUCTION

Anredera is one species of the Basellaceae which empirically has many benefits in health, especially for treating various diseases. Familia Basellaceae have a variety of species such as Anredera baselloides (Kunth) Baill, Anredera cordifolia (Ten.) Steenis, Anredera diffusa (Moq.), Anredera leptostachys (Moq.) Steenis, Anredera spicata, Anredera vesicaria, Anredera cumingii, and others. Potential as a medicinal plant because of the bioactive compounds from these plants. Screening of phytochemicals known to contain flavonoids, saponins, steroids / triterpenoids and coumarins. Flavonoid class of compounds known to have diverse biological activities such as antioxidant, antimicrobial, cytotoxic and efficacious for degenerative diseases. One species that is widely used by people in Indonesia are Anredera cordifolia locally known as "binahong". In this paper will be delivered the discovery of adenin compound of ethyl acetate extract of leaves binahong. The molecular structure of compounds was determined based on spectroscopic data UV, IR, ¹H NMR, ¹³C NMR

METHODS

General Experimental Procedure

Binahong leaves obtained from the plantation of medicinal plants BALITTRO, Lembang-Bandung. Then the leaves are dried mashed. Binahong dried leaf powder was extracted with methanol by maceration until extracted perfectly. Maserat obtained were collected, concentrated with a rotary vacuum evaporator (Rotavapor), to obtain crude methanol extract (crude extract). Furthermore, crude methanol extract obtained successively partitioned with n-hexane, ethyl acetate and n-butanol. Ethyl acetate to extract the results of tests conducted partition thin-layer chromatography (TLC) to find a suitable eluent for the separation process further. Extracts the partition separated (fractionated) by column chromatography (KK) repeatedly, if necessary preparative thin layer chromatography (KLTP)

or preparative high performance liquid chromatography (KCKTP) to obtain pure isolates. Pure isolates were identified using data obtained spectra Ultra-violet (UV-VIS), Fourier Transform Infra Red (FTIR), Gas chromatography-mass spectrophotometry (GC-MS), Nuclear magnetic resonance (NMR).

Extraction and Isolation

The plant material were dried under shade and ground to a coarse powder(4kg) was extracted exhaustively with methanol at room temperature. The combined extract was evaporated to dryness on a rotary evaporator. The dried methanolic extract further successively partitioned with n-hexane, ethyl acetate and finally with n- buthanol. The filtrates were concentrated dried under vacuum

The ethyl acetate extracts was fractionated by VLC (Vacuum Liquid Chromatography) using gradient elution with dichlormetane -isopropanol-methanol. The subfractions, were combined to give 9 fractions.

From the preliminary activity test with BSLT fraction 7 gives the value of LC50 of 39,47 ppm. Furthermore, fraction 7 was isolated further using sephadex column chromatography eluted with methanol, obtained 350 fraction. Fractions which gave the same chromatographic pattern obtained five fractions combined. Then performed HPLC analysis on each fraction.

Fraction of 7.5 further isolated by preparative HPLC, white isolates obtained

RESULTS AND DISCUSSIONS

From the extracted binahong leaves (Anredera cordifolia (Ten.) Steenis) with ethyl acetate adenin found in a compound. This compound is obtained through several stages of isolation include partitioning, fractionation and various chromatographic techniques.

Adenin obtained as a white powder. Spectrum showed UV absorption at λ_{max} 264 nm, indicating the presence of aromatic compounds.(figure 1),while the IR spectrum

showed absorption bands (peaks) are typical for the aromatic ring 1660 cm⁻¹, amine 3640 cm⁻¹ (figure 2). LC-MS data from m/z 135.04. (figure 3)

CONCLUSION

In a study of leaf binahong (*Anredera cordifolia*) have successfully isolated a adenin compound. The molecular structure was

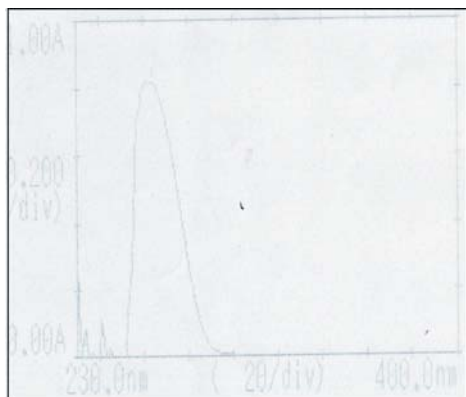


Figure 1

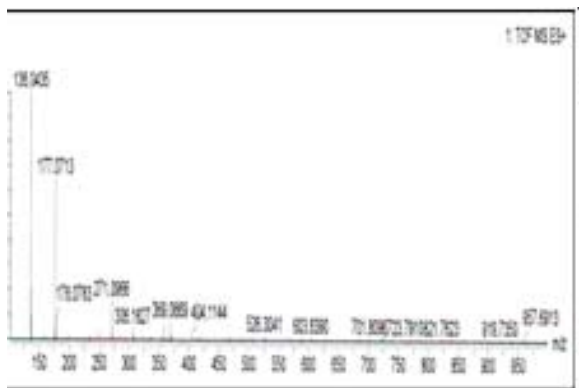


Figure 2

Proton NMR data indicate the presence of aromatic protons at δ H 8,05 and 8,08 ppm and a NH₂ at δ H 7,01 ppm. Carbon NMR data and DEPT analysis showed there were 5 carbon consisting of 2 metin, and 3 carbon quartener (figure 4 and 5). From these data, this compound was regarded as a nucleic acid compound is adenin.

Based on the long-range correlation between H-6 (δ H 7,01) and δ C119 ; H-8 (δ H 8,08) and δ C 119 (C-5), δ C 155,71 (C-4); H-2 (δ H 8,05) and δ C 155,71 (C-4). In its HMBC spectrum (Figure 6, Table 1). Therefore determined as adenine.

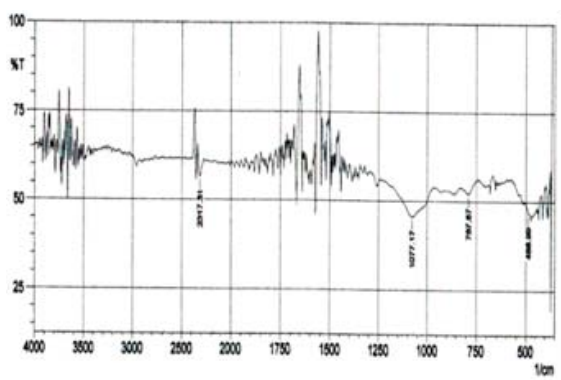


Figure 3

determined based on spectroscopic data covering

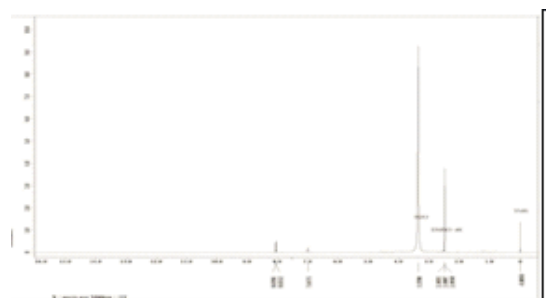


Figure 4

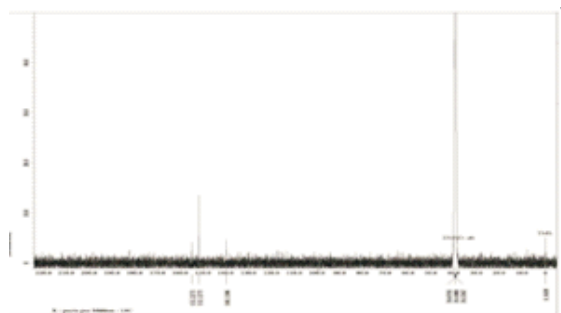


Figure 5

No.	HMQC		HMBC
	δ_H (ppm, multiplisitas)	δ_C (ppm)	
1	-		
2	8,05 (s)	140,6	155,71
3	-		
4	-	155,71	
5	-	119	
6	-	163,5	
6-NH2	7,01 (bs)	-	119
7	-		
8	8,08 (s)	152,61	155,71; 119

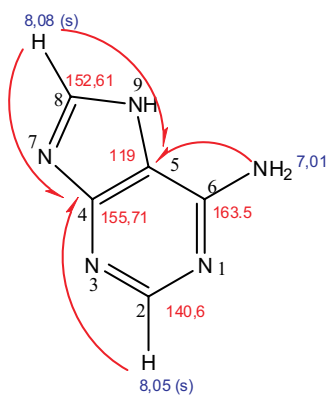


Figure 6

the spectrum of UV, IR, 1H NMR and ^{13}C NMR.

ACKNOWLEDGEMENT

This research was supported by Agency for the Assessment and Application of Technology, Indonesia (BPPT). We are grateful to Prof. Dr. Wahono S.

REFERENCES

Abou Zeid, A.H.S., Soliman, F.M., Sleem, A.A., Mitry, M.N.R. (2007). Phytochemical and bio-activity investigations of the aerial parts of *Anredera cordifolia* (Ten.) Steenis. *Bulletin of the National Research Centre Cairo*, 32,(1); 1-33.

Kochhar, S.P., J.B. Rossell. (1990). *Detection, Estimation and Evaluation of antioxidant in Food Systems*. London: Elsevier Applied Science.

Lemmens, R. H. M. J., Bunyapraphatsara, N. (2003). *Medicinal and poisonous plants Plant Resources of South-East Asia*, 12,(3), 72-73.

Moura-Letts, G., Leon, F.V., Ana, Marcollo., Abraham, J.V., Gerald, B.H., (2006). In Vivo Wound-Healing Activity of Oleanolic Acid Derived from the Acid Hydrolysis of *Anredera diffusa*, *Journal Natural Product*, 69, (6), 978-979.

Paul, S. B., Singha, S. (2012). Isolation and Identification of physiologically important Sterols and sterol glucoside from *Basella rubra* Linn, Assam University Journal of Science & Technology: Biological and Environmental Sciences, 5, (1), 120-122.

Chuang, M.T., Lin, Y., Hou, W., (2007), Ancordin, the major rhizome protein of madeira-vine, with trypsin inhibitory and stimulatory activities in nitric oxide productions. *Elsevier Inc*, 28, 1311-1316.

Murakami, T., Hirano, K., Yoshikawa, M., (2001). Structures of New Oleanane-Type Triterpene Oligoglycosides,

Basellasaponins A, B, C, and D, from the
Fresh Aerial Parts of *Basella rubra* L,
Chem.Pharm.Bull, **49**, (6), 776-779.

