Asian Journal of Chemistry

External Cites per Doc vs Cites per Doc

% International Collaboration

Citable documents vs Non-citable documents

Cited documents vs Uncited documents

Asian Journal of Chemistry

Q4 Chemistry (miscellaneous)

SJR 2017

0.14

powered by scimagojr.com

Show this widget in your own website

Just copy the code below and paste within your HTML code:

<a href='https://www.scimagojr.com'>

Follow us on @ScimagoJR

Scimago Lab, Copyright 2007-2018. Data Source: Scopus®
Asian Journal of Chemistry

Asian Journal of Chemistry, a Multidisciplinary Chemistry Journal is a Peer Reviewed International Journal publishes from India.

ISSN: 0975-427X (Online)
ISSN: 0970-7077 (Print)
CODEN: AJCHEW

Prof. (Dr.) R. K. AGARWAL
Editor-in-Chief

Dr. HIMANSHU AGARWAL
Executive Editor

Dr. Bimal K. Banik
Associate Editor

AJC Indexing

AJC is indexed by SCOPUS, PROQUEST, EBSCO host, CNKI and many others indexing and abstracting bodies.

UGC Approved Journals
Journal Number 8774

8/31/2018, 4:42 PM
Contact Us

Prof. (Dr.) R. K. Agarwal (Chief Editor)
Asian Journal of Chemistry
11/100, Rajendra Nagar
Sector - 3, Sahibabad - 201005,
(Ghaziabad) India
Tel: +91-120-4102551

Emails:

For Paper Submission: editorajc@asiangpubs.org
For Office Enquiries: infoajc@asiangpubs.org

Asian Publication Corporation
Send Us A Message

Message *

Your/Institution Information

Name of the institution

Name *

Address 1 *

Address 2

City *

State

PIN

Country *

Select One

Phone *

Mobile

Fax

Website

E-mail *

What about us do you want to comment on

Website

Other
Asian Journal of Chemistry

Chemistry (miscellaneous)

best quartile

SJR 2017
0.14

powered by scimagojr.com

Vol. 30, No. 8, PP. 1681-1924
Search

(Enter Author Names/Keywords)

Volume : 30  Issue : 8  Page : "Select"

Quick Search | Reset

Page 1 of 2  Prev  Next  Last >>

Search Result

**Stopped-Flow Injection and Spectrophotometric Methods of Quercetin Dihydrate Determination by Using Two Reagents (2,4-Dichloroaniline and p-Aminoacetophenone)**

Hinda Ali Mahmood and Sadeem Subhi Abed*

Under a Creative Commons License


**Synthesis and Characterization of Pure and Triethanolamine Capped Hydroxyapatite Nanoparticles and Its Antimicrobial and Cytotoxic Activities**

V. Kalaiselvi² and R. Mathammal¹

Under a Creative Commons License


**Determination of Diazinon and Carbofuran Residue Levels in Apples Kept in Cold Storage Depots in Karaman Province, Tur**
Synthesis of New Oxadiazole, Triazole and Oxazepine Derivatives of Quinazoline Moiety
Fadhel Omran Essa and Kadhum J.K. Al-Hamdani
Under a Creative Commons License

Study on Poly(vinyl alcohol) Coated Superparamagnetic Nanoparticles via RAFT Polymerization Methodology for Drug Delivery System Loaded Anti-Inflammatory
Trinh Duy Nguyen, Sang Thanh Vo, Van Thi Thanh Ho, Xuan Tien Le, and Long Giang Bach
Under a Creative Commons License

Synthesis and Herbicidal Activity of 4-Benzylidene-2-phenyl oxazol-5(4H)-one Derivatives using L-Proline as Catalyst
S. Bhandari and V. Kasana
Under a Creative Commons License

Highly Porous MOF Adsorbent for Wastewater Treatment
Naoko David Shudoo and Ezekiel Dixon Diko
Under a Creative Commons License

Gold Nanoparticles Supported on Carbon Derived from Solid Olive Waste for Epoxidation of Cyclooctene
Department of Chemistry, College of Science, Jouf University, PO Box 2014, Sakaka, Kingdom of Saudi Arabia
Corresponding author: E-mail: mosaed@ju.edu.sa
Under a Creative Commons License

Thermally Stable and Processable Organic-Inorganic Hybrid Material
Geethy P. Gopalan and Raju Francis
Under a Creative Commons License

Comparison of Chemical Composition, Antimicrobial and Antioxidant Activities of Essential Oils Extracted from Different Parts of Bambangan (Mangifera pajang) Fruit
Lam Nyee Fann, Mohd Fadzelly Abu Bakar, Noor Atiekah Md Nor, Azlen Che Rahimi, Fazleen Izzany Abu Bakar, and Mohd Aspolah Md Sukari
Under a Creative Commons License

Effect of Ferric Nanoparticles on Monoaminoxidase and Acetylcholinesterase in Healthy Human Sera
Fatheela M. Huseein, Shaemaa H. Abdulsada, Wessal M. Khamis, Salma Abduledha and Bayader F. Abbas
Under a Creative Commons License
Enzymatic Synthesis of Epoxidized Fatty Hydrazides from Epoxidized Palm Oil Using Native Mucor miehei Lipase in n-Hexane Solvent
Z. Jamingsan, W.M.Z.W. Yunus, O.K. Khim and N. Abdullah

Thermodynamic Properties of Binary Mixtures of Methyl Benzoate with Chlorobenzene and Benzaldehyde at 308.15 and 318.15 K
P. Prabhu and A. Rose Venis

Synthesis, in vitro and Molecular Docking Studies of 1-(3,4-Dimethoxy-phenyl)-5-(4-hydroxy-3-methoxy-phenyl)-penta-1,4-dien-3-one as New Potential Anti-inflammatory
M. Ro. Rowan Sohilait, Harno Dwi Pranowo and Winarto Haryadi

Evaluation of Suitability of Alumino-Silicate Precursor for Geopolymerization through Advance Analytical Techniques
M. Sivasakthi, R. Jeyakshmi, N.P. Rajamani, J. Baskara Sundaranaj and Rinu Jose

Synthesis, Characterization and Biological Activities of Mercury(I) Ternary Complexes of 2-Substituted Benzothiazoles Derivatives
Mannohan Singh Chauhan, Mittesh Kumar Yadav, Aruna Sharma, Shradha Binani and Narendra Pal Lamba

Microwave Assisted Synthesis, Characterization, Molecular Docking and Antiinflammatory Activity of p-Methoxy Cinnamic Acid Derivatives
M. Soujanya, A.V.L.S. Ramakrishna, Ch. Pushya Ragini and V. Jyothsna

Preparation and Characterization of Indonesian Natural Zeolite-Supported PbO Photocatalyst
M.P. Utomo, Athouerochman, L.P. Sari and A.K. Prodjosantoso

GC-HS Method for Organic Volatile Impurities Determination and Quantification in Sertraline HCl API and Its Pharmaceutical Dosage Forms
Isolation of Steroid Compounds from Suruhan (Peperomia pellucida L. Kunth) and Their Antimalarial Activity

Nurhayati Bialangi1, Adam Mustapa2, Yusda Salimi3, Ari Widiantoro3 and Boima Situmeang4,*

1Department of Chemistry, Faculty of Mathematic and Natural Sains, State University of Gorontalo, Gorontalo 96128, Indonesia
2Department of Pharmacy, Faculty of Sport and Healthy, State University of Gorontalo, Gorontalo 96128, Indonesia
3Department of Chemistry, Faculty of Mathematics and Natural Sains, Tanjungpura University, Kota Pontianak, Kalimantan Barat 78115, Indonesia
4Department of Chemistry, Sekolah Tinggi Analis Kimia Cilegon, Banten 42411, Indonesia
*Corresponding author: E-mail: boimatumeang@gmail.com

Abstract

Suruhan (Peperomia pellucida) is easily found in Indonesia and has the potential of being a herb medicine. General phytochemical screening revealed the presence of flavonoid, steroid, triterpenoid, alkaloid and tannin compounds. Two steroid compounds were isolated from ethyl acetate fraction of the Peperomia pellucida. The compounds were isolated with chromatography method and antimalarial activity test with Desjardin method. Based on the spectral evidence IR, 1H NMR, 13C NMR, 2D NMR and MS spectroscopies, structures were determined to be stigmasterol (1) and fucosterol (2). The results of antimalarial activity test showed IC50 value of stigmasterol is 5.24 ppm and fucosterol is 0.85 ppm. This is the first report so far of isolation of steroid compounds from Peperomia pellucida plant from Gorontalo, Indonesia and their antimalarial activity test.

Keywords

Suruhan, Steroid, Antimalarial, Peperomia pellucida.

Under a Creative Commons License

View Article


Our other Journals
- AJMC
- AJOMC

Send Reprint Request
Isolation of Steroid Compounds from Suruhan (Peperomia pellucida L. Kunth) and Their Antimalarial Activity

NURHAYATI BIALANGI¹, ADAM MUSTAPA², YUSDJA SALIMI¹, ARI WIDIANTORO³ and BOIMA SITUMEANG⁴*

¹Department of Chemistry, Faculty of Mathematic and Natural Sains, State University of Gorontalo, Gorontalo 96128, Indonesia
²Department of Pharmacy, Faculty of Sport and Healthy, State University of Gorontalo, Gorontalo 96128, Indonesia
³Department of Chemistry, Faculty of Mathematics and Natural Sains, Tanjungpura University, Kota Pontianak, Kalimantan Barat 78115, Indonesia
⁴Department of Chemistry, Sekolah Tinggi Analis Kimia Cilegon, Banten 42411, Indonesia

*Corresponding author: E-mail: boimatumeang@gmail.com

Suruhan (Peperomia pellucida) is easily found in Indonesia and has the potential of being a herb medicine. General phytochemical screening revealed the presence of flavonoid, steroid, triterpenoid, alkaloid and tannin compounds. Two steroid compounds were isolated from ethyl acetate fraction of the Peperomia pellucida. The compounds were isolated with chromatography method and antimalarial activity test with Desjardin method. Based on the spectral evidence IR, 1H NMR, 13C NMR, 2D NMR and MS spectroscopies, structures were determined to be stigmasterol (1) and fucosterol (2). The results of antimalarial activity test showed IC₅₀ value of stigmasterol is 5.24 ppm and fucosterol is 0.85 ppm. This is the first report so far of isolation of steroid compounds from Peperomia pellucida plant from Gorontalo, Indonesia and their antimalarial activity test.

Keywords: Suruhan, Steroid, Antimalarial, Peperomia pellucida.

INTRODUCTION

Peperomia pellucida is known as Suruhan, easy found from northeast to southeast, Indonesia. Peperomia pellucida is a small tree belonging to the family Peperomia [1]. The genus Peperomia is the second largest genus in the Piperaceae family and comprises more than 600 species widely distributed in Indonesia. The plant is widely distributed in Gorontalo, Sumatera and Java Islands and also many tropical Asian and South American countries [1,2]. Traditionally the suruhan plant (Peperomia pellucida) are used as an acne pimples, skin diseases, headaches, pain relief in rheumatism and gout rheumatism drugs [3]. The results of phytochemical screening revealed the presence of flavonoids, alkaloids, steroids, saponins and tannins [4]. The results of the proximate analysis showed ash content, high crude fiber content, while carbohydrate content was observed to be the highest. Suruhan plants are usually grown in the wet rock crevices [4,5].

Infectious diseases and parasites are one of the major diseases in the world. According to World Health Organization (WHO) data in 2011, infectious diseases and parasites are the third leading cause of death in the world [6]. In Indonesia, malarial diseases is one of the major cause of death especially in north Indonesia. Malarial diseases cause by infection of Plasmodium falciparum. Natural products have been a source of medicinal agents and traditional medicine system that have been used for thousand of years in countries. The major classes of plant photochemicals include steroid, phenolic, terpenoid and essential oils, alkaloids and polypeptides. Among these, steroid compounds one of the most numerous and structurally diverse plant phitochemicals that exist in nature. World Health Organization also has been estimated that approximately 80 % of the world’s inhabitants rely mainly on traditional medicines for their primary health care [7].

As the plant is being used extensively in Indonesia as an herbal medicine, it is necessary to have knowledge of the constituents of the plant of our native species. Previous phytochemical investigation reported in the isolation of pyran compound and antipyretic, gastroprotector, antimalarial and hypotensive activity from extract P. pellucida [8-11]. In this research, the ethyl acetate fraction subjected to chromatographic separation to afford two steroid, including stigmasterol (1) and fucosterol (2) (Fig. 1). Both compound were isolated for the first time from this species and tested as antimalarial.
The experimental specimen is suruhan (Peperomia pellucida) were collected from north Gorontalo, Gorontalo province, Indonesia in June 2016. It was identified in Herbarium biology laboratorium, Faculty of mathematics and natural sciences Gorontalo State University. The chemicals used in this research were ethyl acetate, n-hexane, methanol, distilled water, silica gel G60 (70-320 mesh), thin layer chromatography (TLC) silica plate, octadeysilane (ODS) RP-18 TLC, 10 % H2SO4 in ethanol, ethanol 70 %, whole blood and erythrocyte. Spectrum measurements were performed using a various of spectroscopies tools. Infrared spectra were measured with Shimadzu FTIR, 'H and 13C NMR spectra were measured using JEOL JNMA-500 which works at 500 MHz (for 'H NMR spectrum) and at 125 MHz (for 13C NMR spectrum), 1-D and 2-D NMR with TMS as an internal standard and ES-MS spectrometry (UPLC MS/MS TQD type Waters), Laminar air flow, Memmert incubator, Hirayama HVE-50 autoclave, microscope, micro pipets and evaporator.

**Extraction and isolation:** Dried P. pellucida plant (204 g) were soaked in 2 L. methanol 96 % for 2 days. The shole mixture was then filtered through filter paper and the filtrate was then evaporated under reduce pressure at 45 °C using a Buchi Rorary Evaporator to provide 90 g of a gummy concentrate of the crude extract. A portion of the methanol extract (70 g) was dissolve in 96 % methanol and then with n-hexane to facilitate compact packing. The ethyl acetate fraction was subjected to column chromatography. The sample was then eluted using n-hexane (150 mL) followed by mixture of n-hexane-ethyl acetate (10:0-0:10). A total of 11 fractions (A–K) were collected each in 30 mL beakers.

The column fractions EF13-15 of crude ethyl acetate fraction were bulked together as they showed similar TLC feature with different Rf value. The mixed fraction was found to yield crystal on the wall of the beaker. The crystals were washed with n-hexane carefully. As the result mother solution was obtained leaving back the needle shape crystals, which were isolate as compound 1.

The column fractions EF9 was found to yield crystal on the wall of the beaker. The crystals were washed with n-hexane carefully. As the result mother solution was obtained leaving back the colourless sharp crystal. These sharp crystal provide the compound 2. The purification results of compound were determined by TLC on silica gel and ODS with several solvent systems and showed a single spot (> 95 % pure).

**Test for steroid with Liebermann-Burchard reaction:** A few crystals of compounds 1 and 2 were dissolve in chloroform and a few drops of concentrated sulfuric acid were added to it followed by the addition of 2-3 drops of acetic anhydride. In this case both compounds 1 and 2 turned to violet blue and finally formed green colour, which indicates the presence of steroids [12].

**Antimalarial activity test:** The antimalarial activity of the compound was tested using the Desjardins method. The test was performed using P. falciparum 3D7 strain. The P. falciparum culture was blended in RPHS media containg ± 1 % parasitemia and placed in 1 mL 24 wells. The RPHS media were replaced by sample contained RPHS media with different sample concentration. Culture was then incubated for 48 h and followed by parasite harvesting. The parasite was then swapped with Giemsa coloured blood. The parasitemia percentage was calculated by comparing the number of infected erythrocytes to 500 erythrocytes [13,14]. The formula is as follows:

\[ \text{Parasitemia} = \frac{\sum \text{infected erytrosite}}{500 \text{ erytrosite}} \times 100 \]

The growth and growth inhibition percentage were calculated using the following formula:

\[ \text{Growth} = \frac{\text{Tested parasitemia}}{\text{Control parasitemia}} \times 100 \]

\[ \text{Growth inhibition} = \frac{A - B}{A} \times 100 \]

where, A = control parasitemia, B = tested parasitemia.
The growth inhibition percentage for each concentration were used in SPSS program to calculate the IC₅₀ in ppm unit.

**Characterization compounds 1 and 2:** Different spectroscopic methods were used to elucidate the structure of isolated compounds 1 and 2. Among the spectroscopic techniques IR, ¹H and ¹³C NMR, HMOC, HMBC and H-H COSY were carried out. The infrared spectrum was recorded on Shimadzu affinity-1, ¹H and ¹³C NMR spectra were recorded using CDCl₃ as solvent on JEOL NMR 500 MHz spectrometer, Lembaga Ilmu Pengetahuan (LIPI), Indonesia.

**Compound 1:** White crystalline needle. IR (KBr, νmax, cm⁻¹): 3373.6, 1641.7, 1457.3, 1381.6, 1247, 1038.7, 881.6. ¹H NMR (500 MHz, CDCl₃) δ: 9.01 (1H, d, J 5.1 Hz, H6), 5.17 (1H, dd, J 15.0, 8.4 Hz, H22), 5.30 (1H, dd, J 15.0, 8.4 Hz, H25), 3.17 (1H, dd, J 9.6, 4.8 Hz, H3), 1.00, 0.68 (3H, s, H19 and H18), 0.92 (3H, d, J 6.0 Hz, H21), 0.98 (3H, d, J 8.0 Hz, H29), 1.77 (1H, m, H25), 0.84 (3H, d, J 7.2 Hz, H26) and 1.17 (3H, d, J 7.2 Hz, H27). ¹³C NMR (125 MHz, CDCl₃) δ: 37.4 (CH₂, C1), 32.1 (CH₃, C2), 71.9 (CH, C3), 42.1 (CH₃, C4), 140.5 (CH, C5), 121.9 (CH, C6), 31.8 (CH₂, C7), 41.8 (CH, C8), 50.2 (CH, C9), 36.6 (Cq, C-10), 21.2 (CH₂, C11), 39.8 (CH₂, C12), 42.4 (Cq, C13), 56.9 (CH, C14), 24.4 (CH₂, C15), 29.4 (CH₂, C16), 56.0 (CH, C17), 18.4 (CH, C18), 12.4 (CH₂, C19), 19.5 (CH, C20), 20.5 (CH₂, C21), 138.7 (CH, C22), 129.4 (CH, C23), 52.9 (CH, C24), 49.1 (CH, C25), 20.4 (CH, C26), 19.3 (CH₂, C27), 25.5 (CH₃, C28), 12.9 (CH, C29).

**Compound 2:** White crystal. IR (KBr, νmax, cm⁻¹): 3430.2, 2937.4, 1625.8, 1450.6, 1366.7, 923.5. ¹H NMR (500 MHz, CDCl₃) δ: 5.30 (1H, br. d, J 15.0, 8.4 Hz, H22), 5.18 (1H, q, J 6.7 Hz, H25), 3.43 (1H, m, H-3), 1.59 (3H, s, H-19), 1.03 (3H, d, J 1.2 Hz, H-22), 0.96 (3H, d, J 1.2 Hz, H-26), 0.68 (3H, s, H-18). ¹³C NMR (125 MHz, CDCl₃) δ: 36.2 (CH₂, C1), 30.5 (C-2), 71.5 (CH, C3), 42.7 (CH₂, C4), 140.2 (CH, C5), 122.3 (CH, C6), 30.9 (CH₂, C7), 31.6 (CH, C8), 50.3 (CH, C9), 36.2 (Cq, C10), 21.0 (CH₂, C11), 39.3 (CH₂, C12), 42.1 (Cq, C13), 56.5 (CH, C14), 24.5 (CH₂, C15), 28.7 (CH₂, C16), 55.4 (CH, C17), 11.8 (CH, C18), 19.4 (CH₂, C19), 36.4 (CH, C20), 18.7 (CH, C21), 35.2 (CH₂, C22), 25.6 (CH₂, C23), 146.9 (CH, C24), 34.7 (CH, C25), 22.2 (CH₃, C26), 22.1 (CH₂, C27), 115.5 (CH, C28), 31.1 (CH₂, C29).

**RESULTS AND DISCUSSION**

**Characterization compounds:** Pure compound was isolated as a white powder. The mass spectral data of the compound 1 gave a molecular formula C₂₉H₄₈O and compound 2 C₂₉H₄₈O, which was supported by the ¹³C NMR, ¹H NMR and DEPT 135 spectral data.

The compound 1 is a white needle shapes crystal, which gave positive Lieberman-Burchard test for steroid. The IR spectrum (KBr) of isolated showed characteristic absorption frequencies at 3430.2 cm⁻¹ (O-H stretching). Absorption at 2937.4 cm⁻¹ is due to aliphatic C-H stretching. Other frequencies include 1625.8 cm⁻¹ as a result C=C stretching however this band was weak at 1450.6 cm⁻¹ was a bending frequency for cyclic (CH₂) and 1366.7 cm⁻¹ for C-H bending. The vibration at 923.5 cm⁻¹ due to C-O stretching [15-18]. Compound 2 was identified as fucosterol by comparison the ¹H NMR and ¹³C NMR spectra with those of compound 1. The NMR and MS data were very similar to those of compound 1 except the position of olefinic proton and quaternary carbon while one methylene signal were present for H28 and quaternary carbon at C24. The olefinic proton for H22 and H23 in compound 2 were absent. The ¹³C NMR spectrum showed 29 carbons including an oxymethine carbon signal at δ 71.5 and two double bonds at C5/C6 and C22/C23 with six methyl groups which was supported by the key COSY and HMBC. Thus, the structure of isolated compound was assigned as stigmasterol. The physical and spectral data are consistent to the reported literature values of stigmasterol (Fig. 1) [20-23].

The compound 2 is a white crystal which gave positive Lieberman-Burchard test for steroid. The IR spectrum (KBr) of isolated showed characteristic absorption frequencies at 3430.2 cm⁻¹ (O-H stretching). Absorption at 2937.4 cm⁻¹ is due to aliphatic C-H stretching. Other frequencies include 1625.8 cm⁻¹ as a result C=C stretching however this band was weak at 1450.6 cm⁻¹ was a bending frequency for cyclic (CH₂) and 1366.7 cm⁻¹ for C-H bending. The vibration at 923.5 cm⁻¹ due to C-O stretching [15-18]. Compound 2 was identified as fucosterol by comparison the ¹H NMR and ¹³C NMR spectra with those of compound 1. The NMR and MS data were very similar to those of compound 1 except the position of olefinic proton and quaternary carbon while one methylene signal were present for H28 and quaternary carbon at C24. The olefinic proton for H22 and H23 in compound 2 were absent. The ¹³C NMR spectrum showed 29 carbons including an oxymethine carbon signal at δ 71.5 and two olefinic carbon at δ 122.3 and δ 115.5. The double bonded unsaturation at δ 146.9 and δ 115.5 was characteristics of fucosterol [15,16] and two methylene carbon signals were present at δ 35.2 and 25.6 for C22 and C23 confirmed by DEPT 135. If we compared with DEPT 135 for compound 2 then we confirmed that this compound was having six methyl (CH₃) groups, ten methylene (CH₂) groups, nine methane (CH) groups and four quaternary carbons (Cq) groups. These assignment are in good agreement for the structure of fucosterol [15,24,25].

**Antimalarial activity:** Paracitemia and growth inhibition percentage shown by the sample compounds 1 and 2 were calculated (Table-1). The positive control in this test was quinoline and artemisinin 10⁻³ M was used as comparison. All data of paracitemia, growth and growth inhibition percentage was used to calculate the IC₅₀ and its linear regression curve. The regression equation was used to calculate the IC₅₀. The IC₅₀ of the compound 1 is 5.24 ppm and compound 2 0.85 ppm. Compound 2 has good antimalarial activity than compound 1. This is the first time reported steroid from *Peperomia pellucida* and antimalarial activity test against *Plasmodium falcivarum*.
TABLE-1

<table>
<thead>
<tr>
<th>Concentration (µg/mL)</th>
<th>Compound 1 (Stigmasterol)</th>
<th>Compound 2 (Fucosterol)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Paracitemia (%)</td>
<td>Growth (%)</td>
</tr>
<tr>
<td>Control (quinolin)</td>
<td>2.3</td>
<td>0</td>
</tr>
<tr>
<td>Artemecyn 10-8 M</td>
<td>0.3</td>
<td>13.04</td>
</tr>
<tr>
<td>1 x 10^-6</td>
<td>2.3</td>
<td>100.00</td>
</tr>
<tr>
<td>1 x 10^-7</td>
<td>2.2</td>
<td>95.65</td>
</tr>
<tr>
<td>1 x 10^-8</td>
<td>1.7</td>
<td>73.91</td>
</tr>
<tr>
<td>1 x 10^-9</td>
<td>1.3</td>
<td>56.52</td>
</tr>
<tr>
<td>1 x 10^-10</td>
<td>1.1</td>
<td>47.82</td>
</tr>
<tr>
<td>1 x 10^-11</td>
<td>1.0</td>
<td>43.47</td>
</tr>
<tr>
<td>1 x 10^-12</td>
<td>0.7</td>
<td>30.43</td>
</tr>
<tr>
<td>1 x 10^-13</td>
<td>0.5</td>
<td>21.73</td>
</tr>
</tbody>
</table>

Conclusion

In this research we successfully isolated two steroid compounds from ethyl acetate fraction of *Peperomia pellucida*. Compound 1 was stigmasterol and compound 2 was fucosterol. The IC50 of the compound 1 is 5.24 ppm and compound 2 0.85 ppm. This is the first report of isolation steroid compounds of *Peperomia pellucida* from North Gorontalo district, Indonesia.

Acknowledgements

The authors thank The Ministry of Research and Higher Education of Indonesia Republic for funding this collaboration (RISTEKDIKTI) and Mrs. Fajriah, M.Sci. as well as Dr. Achmad, for their help in conducting the NMR measurements.

References