

# Anti Hepatitis C virus activity screening on Harpullia arborea extracts and isolated compound

*by* Aty Widyawaruyanti

---

**Submission date:** 16-Dec-2020 03:06PM (UTC+0800)

**Submission ID:** 1476577636

**File name:** C-45-\_fullpaper\_AntiHCV\_Harpullia-07112014.doc (63K)

**Word count:** 1059

**Character count:** 6493

# AntiHepatitis C virus activity screening on *Harpullia arborea* extracts and isolated compound

**Lidya Tumewu, Evhy Apryani**, Institute of Tropical Disease Universitas Airlangga, Campus C Unair Mulyorejo Surabaya 60115; **Mei Ria Santi**, Department of Microbiology, Faculty of Medicine, University of Indonesia, Jakarta 10430; **Tutik Sri Wahyuni**, Department of Pharmacognosy and Phytochemistry, Faculty of Pharmacy, Universitas Airlangga, Surabaya 60286; **Adita Ayu Permanasari, Myrna Adianti**, Institute of Tropical Disease Universitas Airlangga, Campus C Unair Mulyorejo Surabaya 60115; **Chie Aoki**, Division of Microbiology, Kobe University Graduate School of Medicine, Kobe 650-0017, Japan; **Aty Widyawaruyanti, Achmad Fuad Hafid**, Department of Pharmacognosy and Phytochemistry, Faculty of Pharmacy, Universitas Airlangga, Surabaya 60286; Institute of Tropical Disease Universitas Airlangga, Campus C Unair Mulyorejo Surabaya 60115, aty-w@ff.unair.ac.id; **Maria Inge Lusida, Soetjipto**, Department of Microbiology, Faculty of Medicine, Universitas Airlangga, Surabaya; Institute of Tropical Disease Universitas Airlangga, Campus C Unair Mulyorejo Surabaya 60115; **Hak Hotta**, Division of Microbiology, Kobe University Graduate School of medicine, Kobe 650-0017, Japan.

## INTRODUCTION

Hepatitis C is a major healthcare problem worldwide. Available therapy for hepatitis C treatment is very expensive and probably not be accessible for all patients. Regarding to this reason, the development of safe and inexpensive antiviral drugs is required. Natural products as a source of new drugs are potential to study. Some antiHCV substances from plants were obtained (Wahyuni, 2013; Adianti, 2014; Aoki, 2014).

*Harpullia arborea* (tulip wood tree) is a member of Sapindaceae family commonly known as kayu pacat in Indonesia (Basuni, 1997). Traditionally, watery exudates from barks and fruits is used as leech repellent, oil extracted from seeds is a source of antirheumatics (Singh, 2011). *Harborea* seeds extract also shown antibacterial activities against various strains of bacteria. *Harborea* seeds contain glycosides, steroids, saponins and resins (Gowri, 2009). A norhopane triterpenoid also isolated from the leaves of *arborea* (Poovapathanachart, 2008).

This study was conducted to determine antiHCV activity of *Harborea* extracts and isolated compound.

## MATERIALS AND METHOD

### Plant material

*Harpullia arborea* was obtained from Alas Purwo National Park at Banyuwangi, East Java. Sample was authenticated by the authority of Purwodadi Botanical Garden, Pasuruan, East Java.

### Extraction dan fractionation

*Harborea* was extracted by ultrasonic assisted extraction method using 80% ethanol as a solvent. Liquid fractionation was conducted using dichloromethane, ethyl acetate and buthanol respectively.

### AntiHCV activity test

Extract was examined for antiHCV activity against JFH1a and J6/JFH1 in a cell culture system using Huh7 cells at a multiplicity of infection (MOI) of 0.1.

## RESULTS DAN DISCUSSION

Anti-Hepatitis C Virus (anti-HCV) activity screening of *H. arborea* leaves and stem extract revealed that leaves extract exhibited anti-HCV with IC<sub>50</sub> value of 17.5 µg/ml and 12.4 µg/ml against HCV JFH1a and J6/JFH1 respectively, meanwhile stem extract was found to be not active against both HCV type.

Fractionation of leaves extract resulted in 4 fractions which were dichloromethane, ethyl acetate, buthanol and aqueous fraction. Anti-HCV activity screening at a concentration of 30 µg/ml revealed that buthanol fraction inhibited HCV JFH1a growth by 54% in which other fractions only inhibited by 15-30%. Buthanol fraction contains yellow spot on TLC profile as a major compound. Further separation of buthanol fraction using sephadex LH-20 and methanol 90% as a solvent was obtained 7 fractions (B1-B7). Fraction B5 contain yellow precipitate and by recrystallization process obtained a yellow crystal as a glycosylated flavonoid compound which identified as Kaempferitrin (3,7-di- $\alpha$ -L-rhamnopyranosyl kaempferol). Structure determination of compound was done by nuclear magnetic resonance spectroscopy and data were compared with references (Ouyang Ming-An, 2003; De Souza Menezes, 2007). Kaempferitrin was further tested against JFH1a. Anti-HCV activity test shown that kaempferitrin was not exhibited anti-HCV. It is possible to explain that anti-HCV activity of extract and buthanol fraction was produced by other compounds in the extract and buthanol fraction instead of kaempferitrin or the activity was created

by synergism effect of many compounds. Previous studies were reported some activity of kaempferitrin. Like many flavonols, it has antimicrobial, antioxidant and antiinflammatory activities. It is also mimics insulin in **2**mutulating glucose uptake in diabetic rats, but inhibits insulin-stimulated glucose uptake in 3T3-L1 cells (Jorge, 2004; Prasad, 2009). But no report about antiviral activity of kaempferitrin was found. Further study need to be done to investigate the antiHCV compounds of *Harborea*.

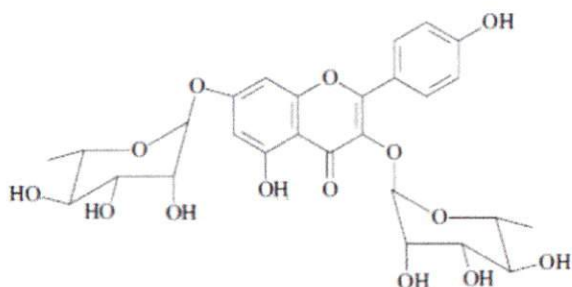


Figure 1. Kaempferitrin (3,7-di- $\alpha$ -L-rhamnopyranosyl kaempferol)

#### CONCLUSION

In this study, we concluded that *H.arborea* leaves extract and buthanol fraction were exhibited anti-HCV activity against JFH1a virus, while the isolated compound, kaempferitrin was not.

#### ACKNOWLEDGEMENT

This study was supported by Science and Technology Research Partnership for Sustainable Development (SATREPS) from Japan Science and Technology Agency (JST), Japan International Cooperation Agency (JICA) and Universitas Airlangga Indonesia.

#### REFERENCES

1. Adianti M, Aoki C, Komoto M, et al. (2014). Anti-hepatitis C virus compounds obtained from *Glycyrrhiza uralensis* and other *Glycyrrhiza* species. *Microbiol Immunol*, 58(3): 180-187.

2. Aoki C, Hartati S, Santi MR, et al. (2014). Isolation and identification of substances with anti-hepatitis C virus activities from *Kalanchoe pinnata*. *Int J Pharmaceut Sci*, Vol 6, Issue 2.
3. Basuni S, Haidir. (1997). Studi pola penyebaran, potensi dan habitat kayu pacat (*Harpullia arborea*) dalam rangka pembangunan bank plasma nutfah in situ di Taman Nasional Kerinci Seblat. *Media Konservasi* Vol V, 2: 85-88.
4. De Souza Menezes F, Minto ABM, Ruela HS, et al. (2007). Hypoglycemic activity of two Brazilian *Bauhinia* species: *Bauhinia forficata* L and *Bauhinia monandra* Kurtz. *Brazilian Journal of Pharmacognosy* 17(1): 08-13.
5. Gowri SS, Vasantha K. (2009). Solvent based effectiveness of antibacterial and phytochemical derivatized from the seeds of *Harpullia arborea* (Blanco) Radlk (Sapindaceae). *J Appl Sci Environ Manage*, Vol 13,(4):99-101.
6. Jorge AP, Horst H, de Sausa E, et al. (2004). Insulinomimetic effect of kaempferitrin on glycaemia and on 14C-glucose uptake in rat soleus muscle. *Chem Biol Interact* 149, 89-96.
7. Ouyang Ming-An. (2003). Studies on lignans and flavonoid glycosides of *Ligustrum sinense*. *Chinese Traditional and Herbal drugs* 34, 196.
8. Poovapathanachart R, Thanakijcharoenpath W. (2008). A New norhopane from *Harpullia arborea*. *Fitoterapia* vol 79, issues 7-8, 498-500.
9. Prasad CNV, Mohan SS, Banerji A, et al. (2009). Kaempferitrin inhibits GLUT4 translocation and glucose uptake in 3T3-L1 adipocytes. *Biochem Biophys Res Commun* 380, 39-43.
10. Singh B, Singh VN, Sinha BK, et al. (2011). *Harpullia arborea* (Blanco) Radlk A New record to Meghalaya. *Journal of Non-Timber Forest products*, Vol 18(3), 237-238.
11. Wahyuni TS, Tumewu L, Permanasari AA, et al. (2013). Antiviral activities of Indonesian medicinal plants in the East Java region against hepatitis C virus. *Virology Journal* 10:259.

# Anti Hepatitis C virus activity screening on Harpullia arborea extracts and isolated compound

## ORIGINALITY REPORT

5%

SIMILARITY INDEX

3%

INTERNET SOURCES

4%

PUBLICATIONS

0%

STUDENT PAPERS

## PRIMARY SOURCES

1	Noémie Calland, Jean Dubuisson, Yves Rouillé, Karin Séron. "Hepatitis C Virus and Natural Compounds: A New Antiviral Approach?", <i>Viruses</i> , 2012 Publication	1%
2	<a href="http://dadun.unav.edu">dadun.unav.edu</a> Internet Source	1%
3	<a href="http://www.scitechnol.com">www.scitechnol.com</a> Internet Source	1%
4	<a href="http://link.springer.com">link.springer.com</a> Internet Source	1%
5	"Natural Antimicrobial Agents", Springer Science and Business Media LLC, 2018 Publication	1%

Exclude quotes Off

Exclude matches Off

Exclude bibliography On

# Anti Hepatitis C virus activity screening on Harpullia arborea extracts and isolated compound

---

## GRADEMARK REPORT

---

FINAL GRADE

**/0**

GENERAL COMMENTS

**Instructor**

---

PAGE 1

---

PAGE 2

---