

Phytochemical Compounds Found In Moringa (Moringa Oleifera) Leaves Ethanol Extract From Kupang, East Nusa Tenggara

By Kusmiyati

ORAL

**Phytochemical Compounds Found In Moringa (*Moringa Oleifera*) Leaves
 Ethanol Extract From Kupang, East Nusa Tenggara**

Author	Kusmiyati	Soedjajadi Keman	Muhammad Amin
Affiliation	Health Polytechnic of MoH of Kupang - Indonesia	Faculty of Public Health, Airlangga University Surabaya - Indonesia	Faculty of Medicine, Airlangga University Surabaya - Indonesia
Author	Suwarno		Irma Sarita Rahmawati
Affiliation	18 Faculty of Veterinary Medicine, Airlangga University Surabaya - Indonesia		Brawijaya University Malang - Indonesia

Email: kusmiyati7926@yahoo.com

Abstract

Background. *Moringa oleifera* leaves are often used to treat diseases. One of the provinces with a large number of *Moringa oleifera* plants is East Nusa Tenggara Province, Indonesia.

Objective: To identify phytochemical compounds found in *Moringa oleifera* leaves ethanol extract. **Materials and methods:** *Moringa oleifera* plant was obtained from *Moringa oleifera* plantation in Sokon Village, Kupang, East Nusa Tenggara, Indonesia. *Moringa oleifera* leaves were extracted using maceration technique with ethanol 96% as a solvent. Qualitative phytochemical screening was done using thin layer chromatography method. **Results:** The results showed that *Moringa oleifera* leaves extract consisted of many compounds such as polyphenols, flavonoids, saponins, saturated sapogenin, and unsaturated steroid. This results was different from other studies that found alkaloids and tannins. **Conclusion:** Concluded from this study results that the ethanolic extracts of *Moringa oleifera* leaf contains compounds that have potential to prevent diseases.

Keywords: Compound, ethanol, extract, *Moringa oleifera*, leaves, phytochemical

* Correspondence: kusmiyati7926@yahoo.com

Present Address: Piet A. Tallo St., Liliba- East Nusa Tenggara, Indonesia - 85111



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INTRODUCTION

Moringa oleifera is known as a miracle tree as almost every part of it is useful for humans. This plant can grow in various countries, both in Asia, Africa and other countries. Besides being used as medicine, this plant is often used as a source of food ingredients to improve nutrition. The benefits of the plant are of course due to the various components contained in the plant. *Moringa oleifera* leaves, often used as vegetables. In various countries, *Moringa oleifera* leaves are often used to treat diseases (Kasolo et al., 2010).

Various studies in experimental animals also show the potential of *Moringa oleifera* leaves as antioxidants, antibacterial, anti-inflammatory, anticancer and so on. *Moringa oleifera* leaf components have also been studied (Mansour et al., 2014; Muhammad et al., 2017; Ratshilivha., 2014). The content of the compounds contained varies influenced by many factors such as genetic, season, soil and so on.

Indonesia is also rich in various plants, including *Moringa oleifera*. One of the provinces with a large number of *Moringa oleifera* plants is East Nusa Tenggara Province. Local people often call it "marungga". This plant grows a lot in the yard and is often used as a vegetable.

MATERIALS AND METHODS

Plant Material

Moringa oleifera plant was obtained from *Moringa oleifera* plantation in Sokon Village, Kupang, East Nusa Tenggara, Indonesia. The plant was identified in laboratory of Department of Biology, Faculty of Science and Technology, Airlangga University.

Extraction

Moringa oleifera leaves were extracted using maceration technique with ethanol 96% as a solvent. Extraction was performed in Laboratory of Phytochemistry, Faculty of Pharmacy, Airlangga University. Identification of compounds contained in extract was done in Testing Service Unit Faculty of Pharmacy Airlangga University. *Moringa oleifera* leaves were dried at room temperature, then mashed into powder. *Moringa oleifera* leaf powder was then soaked with 96% ethanol solvent to taste until all the powder was submerged. Soaking was done for 3x24 hours at room temperature of 25°C then filtered with filter paper. The filter results were evaporated in a rotary vacuum evaporator at 40°C. At the end of the process, pure extract with thick and brown liquid was obtained. The use of 96% ethanol in the extraction process because the solvent can isolate bioactive compounds.

Identification of phytochemical compound RESULTS

To find out the class of compounds contained in *Moringa oleifera* leaves ethanol extract, qualitative phytochemical screening was done using Thin Layer Chromatography (TLC) method.

17 Identification of compounds in ethanol extract of *Moringa oleifera* leaves was performed using thin layer chromatography method. The results showed that *Moringa oleifera* leaves extract consisted of many compounds such as polyphenols, flavonoids, saponins, saturated sapogenin, and unsaturated steroid, whereas tannins and alkaloids were not detected (Table 1).

Table 1 The Results of Identification of Phytochemical Compounds in *Moringa oleifera* Leaves Ethanol Extract

Class	Indicator	Result	Interpretation
Alkaloid	Orange coloured spot	No orange coloured spot	Negative alkaloid
Terpenoid and free steroid	Purplish-res/purple coloured spot	No purplish-red coloured spot. Salkowski test showed red coloured ring.	Positive unsaturated steroid
Flavonoid	Brown to blackish brown coloured spot.	Brown coloured spot	Positive Flavonoid
Polyphenols	Brown to blackish brown coloured spot	Blackish brown coloured spot	Positive polyphenols
Tannin	Blue coloured solution	Green coloured solution	Negative
Saponin	Froth appeared	Froth appeared. Liebermann-Burchard test showed light yellow coloration	Positive saponin. Positive saturated sapogenin

DISCUSSION

5 The results showed that *Moringa oleifera* leaf extract consisted of many

compounds such as polyphenols, flavonoid, saponin, saturated sapogenin, and unsaturated steroid. This was similar to other studies which found flavonoid in

Moringa leaves (Makita *et al.*, 2016; Wang *et al.*, 2017). Goswami and Singhai (2016) found saponin, steroid, phenolic and alkaloid compounds. However, a study conducted by Yahaya *et al.* (2013) detected no flavonoid. The difference of type of compounds found in *Moringa oleifera* leaves may be caused by some factors such as, season, type of soil, nutrient content in soil, etc. Makita *et al.* (2016) stated that environmental and genetic factors caused different metabolism in plant. A study of *Moringa oleifera* leaves extracted using petroleum ether found phenolic, alkaloid, flavonoid, sugar, tannin, and saponin compounds. This shows that the type of solvent affects the identified compounds. Extraction using different solvents will show different results.

The results of the identification of compounds in *Moringa oleifera* leaf extract showed the presence of polyphenols. Various natural antioxidants have the ability to inhibit oxidative stress through various mechanisms. Phenol components found in plants can be a source of natural antioxidants (Brewer, 2011). *Moringa oleifera* leaf ethanol extract also contains flavonoids. Flavonoids from *Moringa oleifera* leaves ethanol extract have antioxidant activity (Wang *et al.*, 2017). Identification results also indicate the presence of saponins. Saponins are bioactive compounds that have the potential as antioxidants. Muhammad *et*

al. (2017) showed that triterpenoid saponin from the skin and stems of *Jaffrea xerocarpa* showed antioxidant activity in DPPH assay. Other studies have shown that the administration of one of the flavonoids, quercetin, can increase the activity of catalase enzymes in the lungs due to bleomycin (Verma *et al.*, 2013).

Flavonoids had antioxidant activity through various mechanisms as free radical scavenger, metal chelating, suppressing enzymes associated with free radical formation and stimulating internal antioxidant enzymes (Banjarnahor and Artanti, 2014; Kumar and Pandey, 2013). However, flavonoid molecules in high doses may act as pro-antioxidants (Rathee *et al.*, 2009). Identification of compounds in the *Moringa* leaf ethanol extract was also found in the presence of saponins. These results are in line with other studies that also found saponin compounds in *Moringa oleifera* leaves extracted using water, in addition to phenols, alkaloids, flavonoids, sugar and tannins. This is different from extraction using chloroform solvents which are only found in sugar (Elangovan *et al.*, 2014). Aside from being an antioxidant, saponins can be potentially anti-inflammatory (Moghimpour and Handali, 2015). Singh *et al.* (2017) reported that saponins from nuts are useful for improving health, including anti-inflammatory. Research by Wu *et al.*,

9(2017) found that triterpenoid saponin from the roots of *Ilex pubescens* showed anti-inflammatory activity. Thus saponins in *Moringa oleifera* leaves are also thought to have anti-inflammatory activities.

Moringa oleifera leaves contained compounds that were very potential in maintaining health. Research in South Africa showed that the total phenol content and total *Moringa oleifera* leaf flavonoids were higher than other vegetables, broccoli, cabbage, spinach, cauliflower, peas (Pakade *et al.*, 2013). *Moringa* that grow in Kupang, the leaves are often consumed daily by the community as vegetables.

CONCLUSION

This study showed that *Moringa oleifera* leaf extract consisted of many compounds such as polyphenols, flavonoid, saponin, saturated saponin, and unsaturated steroid. Further research is needed on the compounds in *Moringa oleifera* leaves in different seasons and different locations, and the use of *Moringa oleifera* leaves in preventing disease.

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