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Antibacterial Activities of Ethanol Extract of Karamunting (*Melastoma malabathricum* L.) Leaf and Flowers on *Salmonella typhi*, *Escherichia coli*, *Staphylococcus aureus*

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Keywords: *Melastoma malabathricum* L, Karamunting, *Salmonella typhi*, *Escherichia coli*, *Staphylococcus aureus*

Abstract: Karamunting (*Melastoma malabathricum* Linn) is native species from Borneo. This plant is easily found in Borneo as shrub. *M. malabathricum* L has not been used optimally, only considered a pest. *M. malabathricum* L contains flavonoid, saponin, tannin and alkaloid, which serve as antibacterial agents. In this study we tested the antibacterial activity of *M. malabathricum* L leaves and flowers against bacteria *Salmonella typhi* ATCC 14028, *Escherichia coli* ATCC 25922 and *Staphylococcus aureus* ATCC 25923. Testing of antibacterial activity using diffusion method by measuring the inhibition zone formed around the paper disk. The results of phytochemical scheming of ethanol extract of the leaves indicates *M. malabathricum* L to contain flavonoid, saponin, tannin, and alkaloid, and flowers to emit flavonoid, saponin and tannin. Profoundly, its ethanolic extract of the leaves have the antibacterial agents respectively lead to the most effective inhibitory effect 28.2 mm in diameter on *Salmonella typhi*, and that of its flowers of 27.2 mm on *Escherichia coli*.

1 INTRODUCTION

Melastoma malabathricum L (karamunting) is a native species from South Borneo. This plant is easily found in Borneo as shrub. *M. malabathricum* L has not been used optimally, only considered a pest. Based on the study, *M. malabathricum* L flowers contain flavonoid, saponin, and tannin components (Isnaini *et al.*, 2010). Flavonoid have activity as antioxidant (Unoufin *et al.*, 2017), anticancer (Raffa *et al.*, 2017), antibacterial (Unoufin *et al.*, 2017).

Flavonoid contained in the flower of *M. malabathricum* L, namely quercetin, kaempferol, and antosianin (Janna *et al.*, 2006; Isnaini *et al.*, 2017). Quercetin, kaempferol and anthocyanin are antibacterial (Borrás-Linares *et al.*, 2015; Valle *et al.*, 2016; Yang *et al.*, 2017).

Each part of the plant has a different activity because of the different content. Antibacterial activity of *Melastoma malabathricum* L. leaves and

flowers is unknown in bacterial *Salmonella typhi* ATCC 14028, *Escherichia coli* ATCC 25922 and *Staphylococcus aureus* ATCC 25923.

2 MATERIAL AND METHODS

2.1 Materials

The research materials used were flower and leaves *M. malabathricum*, isolate *Salmonella typhi* ATCC 14028, *Escherichia coli* ATCC 25922 and *Staphylococcus aureus* ATCC 25923, which was cultured in Microbiology Laboratory of Medical Faculty UNLAM, ethanol 70%, so that Mc conkey, Mueller Hinton (MH), CMC-Na, sterile aquades, blank disc paper, Brain Heart Infusion (BHI), standard solution of Mc farland I of 3.108 cfu / ml, standard ampicillin disk, standard chloramphenicol disk.

2.2 Extraction

Leaves and flowers of *M. malabathricum* L obtained in Kelurahan Guntung Manggis, Banjarbaru, South Kalimantan. Identification of plant species to be studied was done by Basic Laboratory of Faculty of Biology MIPA UNLAM with sample no. 095/TS-02/011. Extraction was done by maceration method using 70% ethanol solvent with a ratio of 1: 5 and soaked for 24 hours with 3 repetitions. The ethanolic extract will be evaporated using a rotary evaporator at a low pressure with a temperature of 60 ° C until a thick ethanolic extract is obtained.

2.3 Phytochemical Screening

The phytochemical screening used ethanol extract. The identification of alkaloids using Dragendorff reagent. The flavonoids were identified using magnesium. The identification of tannins were used 1% FeCl and identification of saponin used olive oil, if the extract have saponin will have stable emulsion (Moreira, 1979; Buveniswari et al., 2011).

2.4 Preparation of Bacteria

The bacteria used in this study was grown on a medium for *Mc conkey*. After that it was incubated in the incubator for 24 hours at 37°C. The colonies have good colonies are selected, which form round colonies rather convex, clear and slippery then grown on BHI seedling for 6 hours at 37°C. Further dilute the suspension with sterile aquades until the turbidity is proportional to the standard of Mc Farland I (3.108 cfu / ml).

2.5 Antibacterial Test

Microorganism standardized with Mc Farland I, smeared with sterile cotton swabs on MH agar medium, then blank paper disks immersed in leaves and flowered ethanol extract of *M. malabathricum* L for 3 hours were placed on MH medium then incubated at 37° C for 24 hours . How to measure antibacterial power by measuring the diameter of a radical zone using a ruler in millimeters. Replication is done 3 times.

3 RESULT AND DISCUSSION

Results of phytochemical screening of ethanolic extract from leaves and flowers of *M. malabathricum* L showed in table 1. In the extract ethanolic from leaves of *M. malabathricum* L content flavonoid, alkaloid, saponin and tannin, but in the flowers there is not have alkaloid.

Table 1: The content of phytochemical compounds on *M. malabathricum* L

Compds	Leaves	Flowers
Flavonoid	+	+
Alkaloid	+	-
Saponin	+	+
Tannin	+	+

Results of activities antibacterial from ethanolic extract from leaves and flowers of *M. malabathricum* L showed in figure 1 and figure 2.

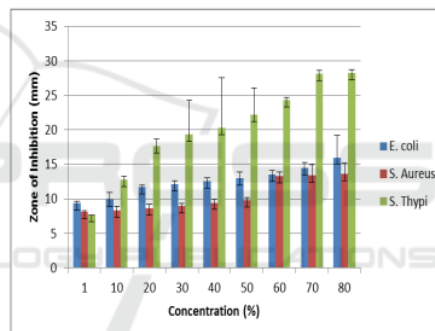


Figure 1: Zone of Growth Inhibition caused ethanolic extract of *M. malabathricum* L leaves

Extract ethanolic from leaves *M. malabathricum* L has the greatest activity in bacterial *S. Typhi*, but extract ethanolic from flowers *M. malabathricum* L has the greatest activity in bacterial *E. coli*. Differences in phytochemical content of extract ethanolic from leaves and flowers cause different activities. The extract ethanolic from flower does not contain alkaloid compounds, so the activity antibacterial is more effective for *E. coli*.

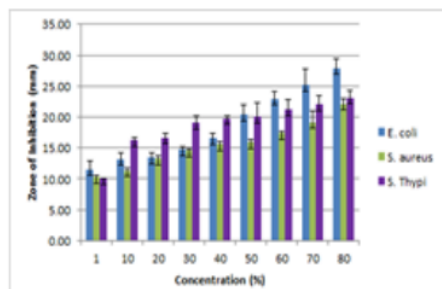


Figure 2. Zone of Growth Inhibition caused ethanolic extract of *M. malabathricum* L flowers

Flavonoids are polyphenolic compounds. The flavonoid derivative in the hydroxyl group in the β ring is more active against microorganisms than in the 2-OH group (Maftuch *et al.*, 2016). This suggests that the target of this component is a lipophilic compound through a bacterial membrane. Flavonoids have the ability to form complexes with soluble extracellular proteins and bacterial cells (Bilal *et al.*, 2017). There are three mechanisms of flavonoids, which inhibit nucleic acid synthesis, inhibit cytoplasmic membrane function and inhibit energy metabolism (Maftuch *et al.*, 2016).

Alkaloids form intercellate with double helix DNA and uncouple respiration (Bilal *et al.*, 2017). Tanin is a phenolic polymeric compound. The antimicrobial metabolism of tannins is associated with microbial adhesion inactivation, enzyme cell envelope transport protein, causing toxicity in bacterial filaments, and tannins also bind to protein walls to inhibit bacterial growth (Pandey and Kumar, 2013).

4 CONCLUSION

The differences in phytochemical content of leaves and flowers of *M. malabathricum* L cause differences in antibacterial activity

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