

SCREENING OF SOME MALAY MEDICATED OILS FOR ANTIMICROBIAL ACTIVITY

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Abstract - Oils from six Malay medicated oils, used traditionally in the treatment of infectious and septic diseases in humans, were tested for their antimicrobial property. The aim was to evaluate the antimicrobial properties of six Malay medicated oils against certain microbial isolates. Locally available Malay medicated oils were checked for their antimicrobial activities using six species of bacteria: *E. coli*, *Salmonella* spp., *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Streptococcus*, *Bacillus subtilis* and 2 fungi with 1 yeast (*Aspergillus niger*, *Penicillium* spp. and *Candida albicans*). Clove oil showed the highest antibacterial activity followed, respectively, by “bunga merah”, cajaput, nutmeg, lemon grass and “gamat” oil. Clove oil and lemon grass showed anticandidal activity. The Malay medicated oil studies did not show any antifungal activity. The study shows that Malay medicated oils, like antibiotics, have antimicrobial activities against some microorganisms.

Keywords: Gamat, Kayu putih, Nutmeg, Clove, Lemon grass, Bunga merah

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INTRODUCTION

It has long been acknowledged that some medicated oils exhibit antimicrobial properties. Medicated oils are extracted from plants or herbs and used for medicinal purposes. In many parts of the world medicated oils from plant are used for antibacterial, antifungal and antiviral activities. These oils have been used as a source of medicinal agents for skin infections. Malaysia has around 12000 species of flowering plants, of which around 1300 are said to be medicinal (Burkill, 1935) and only about a hundred have been investigated for their potential. Traditional medicated oils have been used for many years by a large proportion of Malay communities for their physical health needs. Medicated oils are also used in traditional medicine by Malay people for deep and superficial wound healing and as an anti-diarrheal. Six Malay medicated oils (Table 1) were studied and the objective of the research was to evaluate the antimicrobial property of locally available medicated oils against bacteria, fungi and yeast.

MATERIALS AND METHODS

Six Malay medicinal oils were purchased from local medical shop at the PKNS Complex, Shah Alam, Selangor, Malaysia. The medicated oils were “gamat”, cajaput, nutmeg, clove, lemon grass and “bunga merah” oil. Six bacteria, fungi and yeast were used as test organisms: *E. coli*, *Salmonella* spp., *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Streptococcus*, *Bacillus subtilis*, *Aspergillus niger*, *Penicillium* spp. and *Candida albicans*. Nutrient Agar (NA), Potato Dextrose Agar (PDA), Nutrient Broth (NB) and Potato Dextrose Broth (PDB), were purchased from MERCK, and used as microbiological media. All microbiological media were prepared according to the manufacturers' instructions, and the respective amount of agar powders were dissolved in 1 l Schott bottles containing distilled water. The suspended agars were dissolved by heating using microwave for 5 minutes. All media and antibiotic-free discs were autoclaved (TOMMY) for 15 min at 121°C. A loopful of colonies was taken from the pure culture, transferred aseptically

Table 1. Local Malay medicinal oils

No.	Oils	Medicinal Uses
1	"Gamat" (<i>Sticophus hermanii</i>) oil	Minor wounds, muscle ache, massage
2	Cajaput (<i>Melaleuca cajaputi</i>) oil	Stomach ache, vomiting, cough
3	Nutmeg (<i>Myristica fragrance</i>) oil	Stomach ache, joint ache, difficulties in breathing
4	Clove (<i>Eugenia caryophyllis</i> or <i>Syzygium aromaticum</i>) oil	Headache, flatulence, massage
5	Lemon grass (<i>Cymbopogon citratus</i>)	Wound, toothache, flu
6	"Bunga merah" oil	Dizziness, nerve problem, massage

onto NB and PDB and shaken overnight (INNOVA 2100). Two drops of Malay medicated oil were dropped onto sterilized antibiotic-free discs using sterile Pasteur pipettes, dried on sterile filter paper in a laminar airflow (HWS series) for 30 min, finally 0.1 ml of stock culture was dropped onto the agar surface. The antibiotic-free discs containing the medicated oils were placed on the surfaces of inoculated media using sterile forceps. All media which were inoculated with bacteria were incubated

aerobically (MEMMERT) at 37°C for 24 h while the media which were inoculated with fungi and yeast were incubated aerobically at room temperature for 48 h. The incubated antimicrobial assays were examined for growth-inhibition zones which served as a relative assessment of their antimicrobial activity.

RESULTS AND DISCUSSION

Table 2 shows that the effect of the oils depended on the test species of the test organism. Clove oil exhibited a broad spectrum of anti microbial activity against Gram-positive, Gram negative bacteria and *Candida albicans*. It was followed by clove oil or "bunga merah" oil which inhibited the growth of three types of bacteria - *E. coli*, *Salmonella* spp. and *Klebsiella pneumoniae*. "Gamat" oil did not show any antimicrobial activity against the tested bacteria, fungi and yeast. No oils were effective against fungi. Of the six oil samples, only cajaput, clove and "bunga merah" can inhibit the growth of *E. coli* and *Bacillus subtilis*. *Staphylococcus aureus* and *Streptococcus* spp. are the most resistant to the oil sample and are only inhibited by clove oil. Fungi showed the highest resistance compared to yeast, whereby *Candida albicans* was only sensitive to clove and lemon grass oil. All test bacteria were inhibited by Streptomycin which was used as a positive control while sterilized

Table 2. Effects of tested oils on different tested bacteria

OIL	"Gamat"	Cajaput	Nutmeg	Clove	Lemon grass	"Bunga merah"
BACTERIA						
<i>E. coli</i>	-ve	+ve	+ve	+ve	-ve	+ve
<i>Salmonella</i> spp.	-ve	+ve	-ve	+ve	-ve	+ve
<i>Klebsiella pneumoniae</i>	-ve	-ve	+ve	+ve	-ve	+ve
<i>Staphylococcus aureus</i>	-ve	-ve	-ve	+ve	-ve	-ve
<i>Streptococcus</i>	-ve	-ve	-ve	+ve	-ve	-ve
<i>Bacillus subtilis</i>	-ve	+ve	-ve	+ve	-ve	+ve

+ve: Inhibition zone can be observed

-ve: Inhibition zone cannot be observed

Positive control: Streptomycin

Negative control: Sterile distilled water

Table 3. Effect of tested oils on different fungi and yeast

	OIL	“Gamat”	Cajaput	Nutmeg	Clove	Lemon grass	“Bunga merah”
FUNGI/							
YEAST							
<i>Asperigillus niger</i>		-ve	-ve	-ve	-ve	-ve	-ve
<i>Penicillium spp.</i>		-ve	-ve	-ve	-ve	-ve	-ve
<i>Candida albicans</i>		-ve	-ve	-ve	+ve	+ve	-ve

+ve: Inhibition zone can be observed

-ve: Inhibition zone cannot be observed

distilled water was used as negative control in these studies. Clove oils contain eugenol which is a bioactive compounds. A recent study showed that clove oil has an effective antimicrobial activity (Burt et al., 2003). The essential oil of clove also shows significant anti-inflammatory and cancer chemopreventive effects (Kim et al., 2003). Eugenol is responsible for the anodyne and mild antiseptic properties which exhibit broad antimicrobial activities against Gram-positive, Gram negative and acid fast bacteria as well as *Candida* (Essawi et al., 2000; Garcia et al., 2003).

CONCLUSION

The results confirm the effectiveness of Malay medicated oils in traditional medicine for treating certain types of infections. Further research of this fertile field is recommended.

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