

# Studies on the volatile components of the essential oil and the antioxidative and antibacterial acti

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## ABSTRACT

In this study, several methods (distillation, supersonic and supercritical fluid extraction methods) are used to extract essential oil and other extracts (methyl alcohol is used as the solvent) from the leaves of the two types (glandular hair and non-glandular hair) of eucalyptus lemon-scented trees (*Eucalyptus citriodora*) for comparing their antioxidative and anti-bacterial. For volatile components analysis, GC and GC-MS were used and we found that essential oils from the leaves of the glandular hair type mainly comprised of citronellal (69.51%) and citronellol (16.00%) and that of the leaves of the non-glandular hair type of eucalyptus lemon-scented trees comprised of 1,8-cineole (62.70%),  $\alpha$ -pinene (13.44%). The radical removal capability (to remove the radicals (DPPH (1,1-diphenyl-2-picrylhydrazyl)), the chelating strength of ferrous ions, the total equivalent antioxidative capability (TEAC) and the superoxide anion. For the radical removing activities, the essential dew extracted from the leaves of glandular hair type and the essential oil obtained from the leaves of glandular hair type have higher activities. For chelating strength of ferrous ions, the essential dew obtained from the leaves of glandular hair type and the essential oil obtained from the leaves of non-glandular hair type exhibited a higher activities. The essential oil and dew both obtained from the leaves of glandular hair type have removing. For removing TEAC, the essential oil and dew obtained from the leaves of non-glandular hair type exhibited a higher activities. For anti-bacterial activities, the paper ingots diffusion method (in three levels of concentration) were used against *Bacillus cereus* (BCRC10603), *Listeria monocytogenes* (BCRC14848), *Staphylococcus aureus* (BCRC15211), *Salmonella choleraesuis* (BCRC12948) and *Escherichia coli* (BCRC10675). We find that the essential oil obtained from the leaves of non-glandular hair type show the highest level of bacterial suppressive capability against *Bacillus cereus* (at concentration level: 1 mg/mL; range of bacterial suppression:  $19 \pm 0.5$ mm), *Listeria monocytogenes* (concentration level: 1 mg/mL; range of bacterial suppression:  $18 \pm 0.75$ mm), *Salmonella choleraesuis* (concentration level: 1 mg/mL; range of bacterial suppression:  $13.5 \pm 0.5$ mm). We also find that the extract of the type of glandular hair obtained by the supercritical fluid extraction method shows the highest level of bacterial suppressive capability against *Staphylococcus aureus* (concentration level: 1 mg/mL; range of bacterial suppression:  $20.5 \pm 0.75$ mm). In addition, we find that the essential oil of the type of glandular hair obtained exhibits the highest level of bacterial suppressive capability against *Escherichia coli* (concentration level: 1 mg/mL; range of bacterial suppression:  $12.5 \pm 0.5$ mm).

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Keywords : Eucalyptus citriodora、essential oil、GC/MS、anti-bacterial

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