

ABSTRACT

Oxidative stress can weaken the immune system, making it easier for bacterial infections to develop and cause degenerative tissue damage. Basil leaves (*Ocimum basilicum* L.) and nutmeg seeds (*Myristica fragrans* H.) are two types of spice plants known to have therapeutic potential through their essential oil content which is rich in bioactive compounds. In this study, essential oils were isolated by steam distillation and their physical properties and compound components were tested using GC-MS. The purpose of this study was to test the antioxidant and antibacterial activities of single essential oils and their combinations so that the effect of the combination of the two oils on antioxidant and antibacterial activities was known.

The results of this study showed the yield of basil leaf essential oil of 0.19% and nutmeg seed oil of 0.27%. Both oils showed the presence of flavonoid and triterpenoid compounds. In the determination of phenolics, the results of basil leaf and nutmeg essential oils were respectively 30.352 ± 0.039 mg GAE/g and 54.590 ± 0.464 mg GAE/g. The antioxidant activity of basil leaf essential oil has an IC_{50} value of 212.421 mg/L which is included in the very weak category and nutmeg seed essential oil 134.415 mg/L is included in the weak category. Both essential oils were combined with a composition of 1:1; 1:2; 2:1 and tested for antioxidant activity with an IC_{50} value of 193.229 mg/L (weak); 95.816 mg/L (strong); and 238.438 mg/L (very weak). Antioxidant activity shows that nutmeg essential oil has a stronger antioxidant effect than basil essential oil. Antibacterial tests show that basil essential oil has a better antibacterial effect against *Escherichia coli* and *Staphylococcus aureus* than nutmeg. The combination results show that the composition of 1:2 has the best antioxidant effect, while the composition of 2:1 has the best antibacterial effect of the other compositions. This indicates a synergistic effect between the two oils.

Keywords: basil leaves, nutmeg, essential oils, antibacterial, antioxidant.