

ABSTRACT

Essential oils are secondary metabolites of plants that are widely utilized for their biological activities, including antioxidant and antibacterial properties. Nutmeg seed (*Myristica fragrans* Houtt.) essential oil contains compounds such as myristicin and safrole, which contribute to its pharmacological activities. Lemongrass (*Cymbopogon citratus*) is also known to contain citral and monoterpene compounds that have been proven effective as antibacterial and antioxidant agents. Although both plants have been extensively studied individually, no research has been found regarding the combination of nutmeg seed and lemongrass essential oils. Both nutmeg and lemongrass essential oils are known to possess antioxidant and antibacterial activities, yet their combination has the potential to enhance biological effectiveness. This study aimed to evaluate the antioxidant and antibacterial activities of nutmeg seed essential oil, lemongrass essential oil, and their combinations. The essential oils were obtained through steam distillation, characterized for their physical properties, and their chemical components were analyzed using GC-MS. Antioxidant activity was tested using the DPPH method, while antibacterial activity was determined using the well diffusion method against *Escherichia coli* and *Staphylococcus aureus*. The results showed that nutmeg essential oil contained safrole (13.34%) as the main component, with a total phenol content of 54.524 ± 0.464 mg GAE/g and moderate antioxidant activity ($IC_{50} = 139.488$ mg/L). Lemongrass essential oil was dominated by neral (36.59%), with a total phenol content of 27.010 ± 0.023 mg GAE/g and lower antioxidant activity ($IC_{50} = 263.544$ mg/L). The combination of both essential oils at various ratios exhibited moderate antioxidant activity and enhanced antibacterial effectiveness compared to single use. Nutmeg, lemongrass, and their combinations were found to be bacteriostatic against *E. coli* and *S. aureus*. Thus, the combination of nutmeg and lemongrass essential oils demonstrates synergistic potential as natural antioxidant and antibacterial agents.

Kata Kunci: Essential oils, nutmeg, lemongrass, antioxidant, antibacterial.