

INTISARI

Minyak atsiri merupakan suatu campuran kompleks bersifat volatil yang diambil dari bagian tertentu tumbuhan dan dengan metode tertentu untuk dimanfaatkan aktivitas biologisnya. Permintaan pasar akan minyak atsiri yang tinggi dan rendemen ekstraksi yang rendah menyebabkan harganya menjadi mahal. Hal tersebut berpotensi bagi produsen untuk melakukan adulterasi. Maka dari itu, perlu untuk dilakukan autentikasi minyak atsiri untuk mendeteksi adanya pemalsuan pada minyak atsiri *C. winterianus*. Pada penelitian ini, digunakan sampel berupa minyak atsiri *C. winterianus* murni, minyak atsiri *C. citratus* murni, campuran minyak atsiri *C. winterianus* dan minyak atsiri *C. citratus* berbagai seri konsentrasi, minyak atsiri *C. winterianus* komersial, serta minyak atsiri *C. citratus* komersial. Penelitian ini dilakukan dengan menggunakan metode *Attenuated Total Reflectance Fourier Transform Infrared* (ATR-FTIR) yang dikombinasikan dengan kemometrika *supervised pattern recognition* berupa kNN (*k-nearest neighbor*) dan *unsupervised pattern recognition* berupa PCA (*principal component analysis*).

Hasil penelitian menunjukkan bahwa minyak atsiri *C. winterianus* murni mengandung senyawa khas berupa sitronelal, sitronelol, dan geraniol, sedangkan minyak atsiri *C. citratus* murni mengandung senyawa khas berupa sitral. Hal ini dibuktikan dengan hasil spektra inframerah sampel minyak atsiri yang dicocokkan dengan hasil kromatogram HS-GC-MS minyak atsiri murni. Hasil analisis menggunakan model kNN dapat mengelompokkan sampel minyak atsiri *C. winterianus* dan minyak atsiri *C. citratus*. Selain itu, hasil analisis menggunakan PCA menghasilkan *score plot* yang juga dapat mengelompokkan sampel minyak atsiri *C. winterianus*, minyak atsiri *C. citratus*, serta campuran minyak atsiri *C. winterianus* dan minyak atsiri *C. citratus* berbagai seri konsentrasi.

Kata kunci: ATR-FTIR, autentikasi, kNN, PCA, minyak atsiri, minyak atsiri *C. winterianus*

ABSTRACT

Essential oil is a complex mixture of volatiles extracted from certain parts of plants and by certain methods to utilize its biological activity. The high market demand for essential oils and low extraction yields cause them to be expensive. This could potentially lead to adulteration by producers. Therefore, it is necessary to authenticate essential oil to detect adulteration in C. winterianus essential oil. In this study, samples were used such as pure C. winterianus essential oil, pure C. citratus essential oil, mixture of C. winterianus essential oil with C. citratus essential oil of various concentration series, commercial C. winterianus essential oils, and commercial C. citratus essential oils. This research was conducted using Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) method combined with chemometrics that are supervised pattern recognition namely kNN (k-nearest neighbor) and unsupervised pattern recognition namely PCA (principal component analysis).

The results showed that pure C. winterianus essential oil contains typical compounds in the form of citronellal, citronellol, and geraniol while pure C. citratus essential oil contains typical compounds in the form of citral. This is evidenced by the essential oils infrared spectra results matched with the pure essential oils HS-GC-MS chromatogram results. The results of analysis using the kNN model can classify samples of C. winterianus essential oil and C. citratus essential oil. In addition, the results of analysis using PCA produced a score plot that can also classify samples of C. winterianus essential oil, C. citratus essential oil, and mixture of C. winterianus essential oil with C. citratus essential oil in various concentration series.

Keywords: ATR-FTIR, authentication, kNN, PCA, essential oil, C. winterianus essential oil