Kemampuan Adsorbsi dan Slow Release Matriks Berbasis Zeolite-A Terhadap Minyak Atsiri Mawar = Studies on Adsorption and Slow Release of Zeolite-A Based Matrix for Rose Essential Oil

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Abstrak

Pada penelitian ini zeolite-A digunakan sebagai matriks pembawa aroma yang menahan laju pelepasan minyak atsiri mawar (Rosa damacena Mill.) yang dapat diregenerasi. Zeolite-A disintesis dari kaolin Bangka Belitung menggunakan metode hidrotermal yang terdiri dari proses metakaolinisasi dan zeolitisasi. Zeolite-A dengan 20 wt% bentonite dicampur untuk membentuk matriks ZAB. Bentonite berfungsi sebagai bahan pengikat yang memiliki kemampuan adsorpsi minyak atsiri sebesar 1,497 g/g bentonite. Zeolite-A dan matriks ZAB dikarakterisasi menggunakan X-Ray Difraction, Brunauer–Emmett–Teller, Fourier-transform infrared spectroscopy, Scanning Electron Microscopy- Energy Dispersive X-Ray Spectroscopy. Pengaruh aktivasi kimia zeolite-A terhadap kinerja adsorpsi matriks ZAB diamati dengan penggunaan zat aktivator berbeda, yaitu HCl 0,1 M dan NaOH 0,1 M. Pengamatan siklus regenerasi dilakukan sebanyak 10 kali. Jumlah minyak atsiri teradsorpsi per berat matriks diamati dengan analisis gravimetrik. Tanpa aktivasi kimia, matriks ZAB dengan diameter 0,4; 0,7; 1 cm dapat mengadsorpsi minyak atsiri masing-masing sebesar 1,807; 1,624; 1,411 g/g matriks. Matriks ZAB diameter 0,4 cm teraktivasi HCl 0,1 M dan NaOH 0,1 M berturut-urut mampu mengadsorpsi minyak atsiri mawar sebanyak 1,95 dan 1,807 g/g matriks. Hasil tersebut mengindikasikan aktivasi dengan HCl 0,1 M mampu memperbesar pori sehingga minyak atsiri semakin banyak teradsorbsi. Hingga minggu ke-5 matriks ZAB masih mengandung geraniol, feniletil alkohol, linalool, sitral, sitronellol dan eugenol dengan laju pelepasan masing-masing senyawa adalah 0,04; 0,07; 0,037; 0,021; 0,026; dan 0,011 g/minggu. Hasil ini menunjukkan pelet matriks berbasis zeolite-A mampu menahan pelepasan aroma pada minyak atsiri mawar lebih dari satu bulan.....In this study zeolite-A used as a fragrance carrier matrix which retained the rate of release of rose essential oil (Rose damacena Mill.) which can be regenerated. Zeolite-A was synthesized from Bangka Belitung kaolin using hydrothermal method which consists metakaolinization and zeolitization processes. Zeolite-A and 20 wt% bentonite are mixed to form ZAB matrix. Bentonite functiona as matrix binder which can adsorb rose essential oil 1,497 g/g bentonite. Zeolite-A and ZAB matrix was characterized using X-Ray Difraction, Brunauer–Emmett–Teller, Fourier-transform infrared spectroscopy, Scanning Electron Microscopy-Energy Dispersive X-Ray Spectroscopy. Observation of chemical activation effect on zeolite-A was carried out by using different activator substances, HCl 0.1 M and NaOH 0.1 M. Observation of regeneration cycle was carried out 10 times. The amount of essential oil adsorbed per matrix weight was observed by gravimetric analysis. Without chemical activation, ZAB matrix with a diameter of 0.4; 0.7; 1 cm each has the ability to adsorb essential oils 1.807; 1.624; 1.411 g/g matrix. The 0,4 mm ZAB matrix activated with HCL o.1 M and NaOH 0.1 M each has the ability to adsorb rose essential oil 1,95 and 1,807 g/g matrix, respectively. These results indicate that activation using HCl 0.1 M enlarge pores and allow matrix to adsorb more rose essential oil. Slow release of rose essential oil observed using Gas Matrix pellet still contained geraniol, phenylethyl alcohol, linalool, citral, citronellol and eugenol on the fifth week with release rate of 0.04; 0.07; 0.037; 0.021; 0.026; and 0.011 g/week, respectively. This result shows that zeolite-A-based matrix pellets

are able to withstand the release of aroma in rose essential oil up to more than a month.