# Pengembangan fragrance carrier dari serat luffa acutangula dengan Zeolit A dan Graphene Family Material untuk aplikasi extended release green tea oil = Development of fragrance carrier from luffa acutangula using Zeolite A and Graphene Family Material for extended release application of green tea oil

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Abstrak

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Polusi udara akibat penggunaan pengharum ruangan kimia merupakan salah satu ancaman bagi kesehatan. Dewasa ini, maraknya pemanfaatan minyak atsiri sebagai pengganti pengharum ruangan mendorong produsen untuk menghasilkan matriks yang mampu menahan laju pelepasan aroma. Penelitian ini mengusulkan pembuatan matriks
Luffa acutangula dengan modifikasi permukaan sebagai pembawa aroma green tea oil (Camellia sinensis). Luffa yang bersifat biodegradable dan hidrofilik secara alami dimodifikasi dengan zeolit A (ZA), grafit (G) dan graphene oxide (GO) masing-masing menjadi matriks LZA, LG dan LGO melalui coating dengan metode dip and dry. ZA disintesis dengan metode hidrotermal. Grafit diberi perlakuan asam-basa. GO disintesis dengan metode Hummers. Sodium alginat digunakan sebagai bahan pengikat matriks. Hasil karakterisasi BET menunjukkan luas permukaan LZA, LG dan LGO masingmasing sebesar 323,601; 151,429 dan 538,021 m2/g. Hasil karakterisasi FTIR membuktikan interaksi matriks LZA, LG, dan LGO dengan green tea oil (GTO). Efisiensi adsorpsi matriks dianalisis dengan variasi massa porous material (ZA, G, dan GO). Perbandingan massa L:SA:PM sebesar 4:1:3, efisiensi adsorpsi yang terjadi adalah LZA3 6,067 g GTO/g LZA3, LG3 6,771 g GTO/g LG3 dan LGO3 10,916 g GTO/g LGO3. Karakteristik adsorpsi isoterm matriks LGO dianalisa menggunakan model Langmuir, Freundlich dan Temkin. Adsorpsi isoterm matriks LGO oleh matriks LGO terdeskripsikan paling baik oleh model adsorpsi isotherm Langmuir. Kinetika adsorpsi GTO oleh matriks LGO terdeskripsikan paling baik oleh model pseudo-second order. Analisa extended release menunjukkann LGO mampu pelepasan GTO ke udara hingga lebih dari 6 minggu dengan laju pelepasan rata-rata 5,07 g/minggu.
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ABSTRACT<br>
Pollution due to chemical air freshener is one of the massive threats to the health. Nowadays, the growing public interest of essential oils utilization as air freshener alternative pushes fragrance indistry to produce matrix that can create long lasting product by controlling the release rate. In this work, the fabrication of surface modified luffa acutangula as green tea oil (Camellia sinensis) matrix carrier is proposed. Luffa sponge which is biodegradable and hydrophilic in nature, is made hydrophobic by coating with zeolite A (ZA), graphite (G) and graphene oxide (GO) each become LZA, LG and LGO matrix using dip and dry method. Initially, ZA was synthesized using hydrothermal method. Graphite was treated with acid-base treatment. GO was stnthesized using Hummers' method. Sodium alginate was used as matrix binder agent. The results obtained by BET indicate surface area of LZA, LG and LGO are 323.601; 151.429 and 538.021 m2/g, respectively. FTIR characterization indicate interaction between LZA, LG, and LGO matrix with

green tea oil (GTO). Adsorption efficiency of the matrix was studied with mass variation of the porous material (ZA, G, dan GO). Mass ratio L:SA:PM of 4:1:3, resulted as the highest efficiency with LZA3 6.067 g GTO/g LZA3, LG3 6.771 g GTO/g LG3 and LGO3 10.916 g GTO/g LGO3. Adsorption isotherm model of Langmuir, Freundlich and Temkin of LGO was studied. The adsorption process of LGO matrix was well fitted to Langmuir equilibrium. The adsorption kinetic of LGO matrix was well fitted to Pseudo-seond order. The extended release study showed that LGO matrix was able to hold GTO release up to more that 8 weeks with the average release rate of 5.07 g/week.