

Evaluación de la capacidad inhibitoria de aceites esenciales en *Staphylococcus aureus* y *Escherichia coli*

Evaluation of the inability capacity of essential oils in *Staphylococcus aureus* and *Escherichia coli*

Capacidade de avaliação inibitório de óleos essenciais em *Staphylococcus aureus* e *Escherichia coli*

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Recibido para evaluación: 14 de Marzo de 2017.

Aprobado para publicación: 29 de Agosto de 2017.

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RESUMEN

El interés por los aceites esenciales ha aumentado notablemente por sus propiedades bactericidas, fungicidas y antioxidantes. El objetivo de este estudio fue evaluar la capacidad antibacteriana de aceites esenciales de eucalipto, limón y mandarina frente a bacterias ATCC *Staphylococcus aureus* y *Escherichia coli*. La actividad antibacteriana se determinó con la concentración mínima inhibitoria CMI y bactericida CMB, mediante el método de microdilución, con una emulsión estable cuyo diámetro promedio de gota estuvo entre 40 y 63 micras. La composición se determinó por cromatografía de gases acoplado a masas, también se midió la densidad, índice de refracción y acidez. Como resultados, se encontró para los aceites, valores de densidad entre $0,858 \pm 0,002$ y $0,920 \pm 0,003$ g/cm³, índice de refracción de $1,469 \pm 0,01$ y $1,4595 \pm 0,0025$, índice de acidez entre $5,32 \pm 0,02$ y $8,08 \pm 0,074$; la composición de limón y mandarina presentaron compuestos comunes como limoneno, terpineno, octanal y mircenol; en eucalipto se destacaron eucalyptol (1,8 cineol) y pineno. En conclusión, los mejores resultados de inhibición fueron para eucalipto y mandarina frente a la bacteria Gram positiva con una CMI y CMB de $6,8 \mu\text{L/mL}$ y para la Gram negativa el aceite esencial de cascara de mandarina y eucalipto con una CMI y CMB de $13,2 \mu\text{L/mL}$.

ABSTRACT

The study of essential oils has increased markedly for its bactericidal, fungicidal and antioxidant properties. The objective was to evaluate the antibacterial capacity of essential oils of eucalyptus, lemon and mandarin against bacteria ATCC *Staphylococcus aureus* and *Escherichia coli*. The antibacterial activity was determined with the minimal inhibitory concentration MIC and bactericidal MBC by the microdilution method, with a stable emulsion whose average droplet diameter was between 40 and 63 microns. The composition was determined by gas chromatography coupled to mass, the density, refractive index and acidity were also measured. The results were found for the oils density values between $0,858 \pm 0,002$ and $0,920 \pm 0,003$ g/cm³, refractive index of $1,469 \pm 0,01$ and $1,4595 \pm 0,0025$, acid value between $5,32 \pm 0,02$ and $8,08 \pm 0,74$; the composition of lemon and mandarin presented common compounds such as limonene, terpinene, octanal and myrcene, eucalyptol (1,8 cineole) and pinene were prominent in eucalyptus. The best inhibition results were for eucalyptus and mandarin versus Gram positive bacteria with a MIC and MBC of $6,8 \mu\text{L/mL}$ and for Gram negative the essential oil of mandarin and eucalyptus peel with a MIC and MBC of $13,2 \mu\text{L/mL}$.

RESUMO

O estudo de óleos essenciais aumentou significativamente devido às suas propriedades antibacterianas e antioxidantes, fungicidas. O objetivo foi avaliar a capacidade antibacteriana de óleos essenciais de eucalipto, limão e tangerina contra bactérias *Staphylococcus aureus* ATCC e *Escherichia coli*. A atividade antibacteriana foi determinada pela CIM a concentração mínima inibitória e CMB bactericida pelo método da microdiluição com uma

PALABRAS CLAVES:

Bactericida, Emulsión, Inhibición, Microdilución, Quimiotipo

KEYWORDS:

Bactericide, Emulsion, Inhibition, Microdilution, Chemotype

PALAVRAS-CHAVE:

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Por último, el estudio señala el interés acerca del aprovechamiento de los productos de desecho de la industria de jugos y frutas, maximizando el uso de los recursos existentes y minimizar los efectos adversos de los subproductos en el medio ambiente.

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