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## Chemical structure and *in vitro* antitumor activity of trehalose lipid biosurfactant from a novel *Nocardia farcinica* strain

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Recently, some biosurfactants were proved to be suitable alternatives to synthetic medicines and may be used as effective therapeutic agents, for example, certain trehalose lipids have been shown to possess properties of biomedical importance, since they can act as anticancer and immunomodulating agents. Trehalose lipids are glycolipid biosurfactants produced by most species belonging to the mycolates group such as *Mycobacterium*, *Rhodococcus*, *Arthrobacter*, *Nocardia* and *Gordonia*. To date there are very few studies carried out on the potential use of trehalose lipid biosurfactants as anticancer agents. The aim of this study was to isolate and identify the chemical structure of a biosurfactant produced by a newly isolated *Nocardia farcinica* strain BN26, and evaluate its *in vitro* antitumor activity on a panel of human cancer cell lines. Strain BN26 was found to produce glycolipid biosurfactant on n-hexadecane as the sole carbon source. The biosurfactant was purified using medium pressure liquid chromatography and characterized as trehalose lipid tetraester (THL) by nuclear magnetic resonance (NMR) spectroscopy and mass spectrometry (MS). Subsequently, the cytotoxic effects of THL on cancer cell lines BV-173, KE-37 (SKW-3), HL-60, HL-60/DOX and JMSU-1 were evaluated by MTT assay. The results showed that THL caused concentration dependent cytotoxicity on all human tumor cell lines investigated.

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## Physico-chemical study and evaluation of the antibacterial activity of essential oils of red gum tree (*Eucalyptus camaldulensis*) on bacteria isolated from urinary tract infections

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The main objective of our work is to evaluate the antibacterial activity of the essential oil obtained from the leaves of red gum tree (*Eucalyptus camaldulensis* L.) of 15 strains of Enterobacteriaceae responsible for urinary tract infections. It is *Escherichia coli* (n=10), *Klebsiella pneumoniae* (n=2), *Proteus mirabilis* (n=2) and *Citrobacter sp.* (n=1). The extraction of essential oils was carried out by steam distillation. The rate of essential oil yield is 0.8%. The chemical analysis by GC/MS of the extract obtained identified 18 components, representing 82.58% of the oil with a dominance of monoterpene compounds represented mainly by eucalyptol, or 1,8-cineole (31.74%) and  $\alpha$ -pinene (14.34%). Moreover, in aromagramme showed antibacterial activity in four strains of *E. coli* (*E. coli*531, *E. coli*687, *E. coli*793, *E. coli*TA). Values of inhibition diameters ranged from 8±0 mm to 12.67±0.34 mm, with an inhibition area from 0.5 cm<sup>2</sup> to 1.26 cm<sup>2</sup> and an activity coefficient between 0.05 and 0.126 cm<sup>2</sup>/μl. The MIC was determined dilution 1/50 (given 0.002g/ml). This concentration reduced the bacterial load of 71.76% (*E. coli*TA) and 92% (*E. coli*687). For the other two strains of *E. coli* (793 and 531), the MIC was determined the crude extract. Finally, the comparison of the antibacterial activity between prescribed antibiotics and essential highlights. Finally, comparison of the antibacterial activity between antibiotics prescribed and essential oil highlights that the sensitive strains to the extract of the red gum are resistant to certain antibiotics.

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