# Chemical Characterization and Physical and Biological Activities of Rhamnolipids Produced by *Pseudomonas aeruginosa* BN10

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*Pseudomonas aeruginosa* BN10 isolated from hydrocarbon-polluted soil was found to produce rhamnolipids when cultivated on 2% glycerol, glucose, *n*-hexadecane, and *n*-alkanes. The rhamnolipids were partially purified on silica gel columns and their chemical structures elucidated by combination of one- and two-dimensional $^{1}H$ and $^{13}C$ NMR techniques and ESI-MS analysis. Eight structural rhamnolipid homologues were identified: Rha-$C_{10}$-$C_8$, Rha-$C_{10}$-$C_{10}$, Rha-$C_{10}$-$C_{12:1}$, Rha-$C_{10}$-$C_{12}$, $Rha_2$-$C_{10}$-$C_8$, $Rha_2$-$C_{10}$-$C_{10}$, $Rha_2$-$C_{10}$-$C_{12:1}$, and $Rha_2$-$C_{10}$-$C_{12}$. The chemical composition of the rhamnolipid mixtures produced on different carbon sources did not vary with the type of carbon source used. The rhamnolipid mixture produced by *Pseudomonas aeruginosa* BN10 on glycerol reduced the surface tension of pure water from 72 to 29 mN $m^{-1}$ at a critical micellar concentration of 40 mg $l^{-1}$, and the interfacial tension was 0.9 mN $m^{-1}$. The new surfactant product formed stable emulsions with hydrocarbons and showed high antimicrobial activity against Gram-positive bacteria. The present study shows that the new strain *Pseudomonas aeruginosa* BN10 demonstrates enhanced production of the di-rhamnolipid $Rha_2$-$C_{10}$-$C_{10}$ on all carbon sources used. Due to its excellent surface and good antimicrobial activities the rhamnolipid homologue mixture from *Pseudomonas aeruginosa* BN10 can be exploited for use in bioremediation, petroleum and pharmaceutical industries.

*Key words: Pseudomonas*, Rhamnolipids, Emulsification, Antimicrobial Activity