EFFECT OF CULTURE MEDIUM ON BIOSURFACTANT PRODUCTION IN *Serratia marcescens* SM3

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Introduction. Biosurfactants (Bs) are a group of amphiphilic compounds that possesses high superficial activity reducing surface tension (ST), facilitating the formation of emulsions (1). The aim of this study was to evaluate the effect of culture medium for the Bs production by *Serratia marcescens* SM3.

Methods. The effect of carbon and nitrogen sources on Bs production was evaluated in *Serratia marcescens* SM3. Two carbon sources (glucose and glycerol; 12 and 30 g l^{-1}) and three nitrogen sources (0.5 and 1.5 g l^{-1}) were used. The reduction of the ST and the EI_{24} on the Bs production was assessed using a 2^4 factorial design in function of glucose, $(NH_4)_2SO_4$ yeast extract (YE) and mineral medium. A 2^3 factorial design was also used in function of glycerol, $(NH_4)_2SO_4$ and peptone. The response variables were ST and emulsification index (EI_{24}) in both experiments. The effects of each variable were statistically analyzed by variance analysis (ANOVA), α=0.05. The ST was measured with a tensiometer (2). The emulsifying activity (EI_{24}) was estimated by the method described in (3).

Results. The values of ST for all treatments showed a range of variations. The results of the 19 treatments evaluated in a 2^4 factorial design revealed that treatment 1 had the best performance by decreasing the ST to 33.7mN/m. Additionally the EI_{24} was 79.7%. Followed by treatments 2 and 5 reducing the ST to 36.6 mN/m. The optimum range was in a combined effect of glucose and $(NH_2)_4SO_4$ when YE and mineral medium were kept constant. In all the cases the glucose and ammonium variables were at low levels; see surface response fig 1. On the other hand, the results of treatment 11 in the 2^3 factorial design evaluated in the PG medium reduced the ST from 54.4 to 31.5 mN/m after 72 h. Meanwhile, the EI_{24} was 79.9% in treatment number 8, when the concentration of the carbon and nitrogen factors was at high levels. In addition to treatment 8, treatment number 6 also lowered the ST from 54.4 to 31.6 mN/m and the EI_{24} was 78.9%, when the ammonium was at the low level in the surface response, see fig 2.

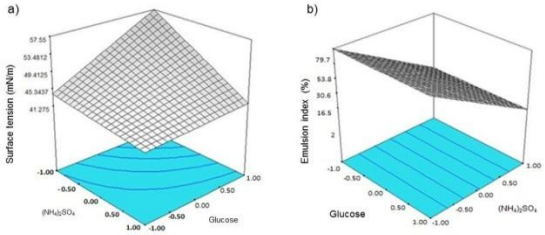

Figure 1. 2^4 factorial design. Maximum surface response and interaction of factors that affect the ST by SM3. **a** maximum of reduction de TS with respect to glucose and $(NH_4)_2SO_4$ **b**. EI24.

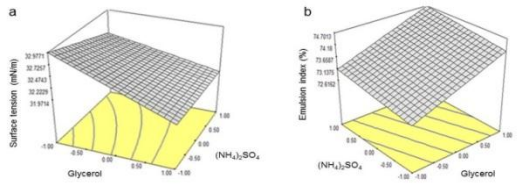

Figure 2. 2^3 factorial design. Maximum surface response and interaction of factors that affect the ST by SM3. **a** maximum reduction of TS with respect to glycerol and $(NH_4)_2SO_4$ **b**. EI_{24}.

Conclusions. The Bs production by SM3 was assessed by experimental designs that permitted the evaluation of individual interaction effects exerted by the carbon and nitrogen sources at different levels. The medium 6, in the 2^3 factorial design, had a strong positive influence on Bs production, when the carbon and nitrogen source was low.

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