

Objectives

The aim of this study was the production of γ -decalactone by a psychrophilic yeast in different scales of bioreactor and the extraction of the lactone from broth culture by adsorption on Macronet resins.

Materials and methods:

The influence of substrate (olive oil, castor oil and ricinoleic acid) on the production of γ -decalactone by *R. aurantiaca* was firstly studied in a shake-flask cultures. The addition of gum tragacanth to the fermentation medium was also tested to avoid toxicity of the lactone. The production of γ -decalactone was realised in 20- and 100-L bioreactors.

The lactone was then extracted of culture broth using 3 Macronet resins (MN-100, MN-102 and MN202).

Results:

Experiment 1. Effect of substrate on the production of γ -decalactone by *R. aurantiaca*.

Preliminary experiments were done to compare the production of γ -decalactone by *R. aurantiaca* using pure ricinoleic acid (2%), castor oil (2%) and olive oil (2%) in shake-flask cultures. No difference was observed in γ -decalactone production with castor oil and ricinoleic acid. The production of γ -decalactone was around 5.2 g/L after 10 days of culture. In the same conditions, no traces of lactones were detected by using olive oil as substrate of bioconversion.

Experiment 2. Effect of gum tragacanth on the production of γ -decalactone by *R. aurantiaca*

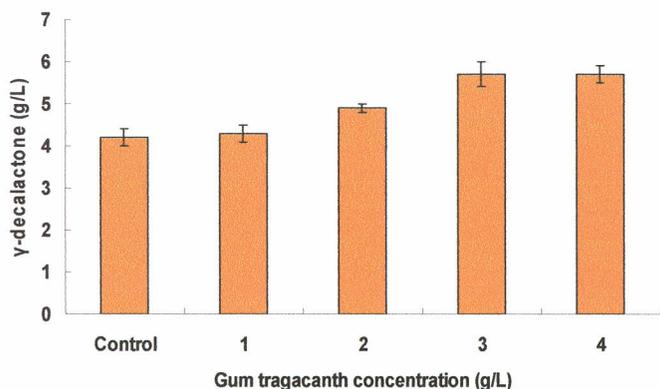


Figure 1. Effect of gum tragacanth on the production of γ -decalactone by *R. aurantiaca*

The gum tragacanth had a significant effect on the lactone production. The yield was up 30 % on the control with 3 g/L of the gum.

Experiment 3. Production of γ -decalactone by *R. aurantiaca* in 20- and 100-L bioreactors.

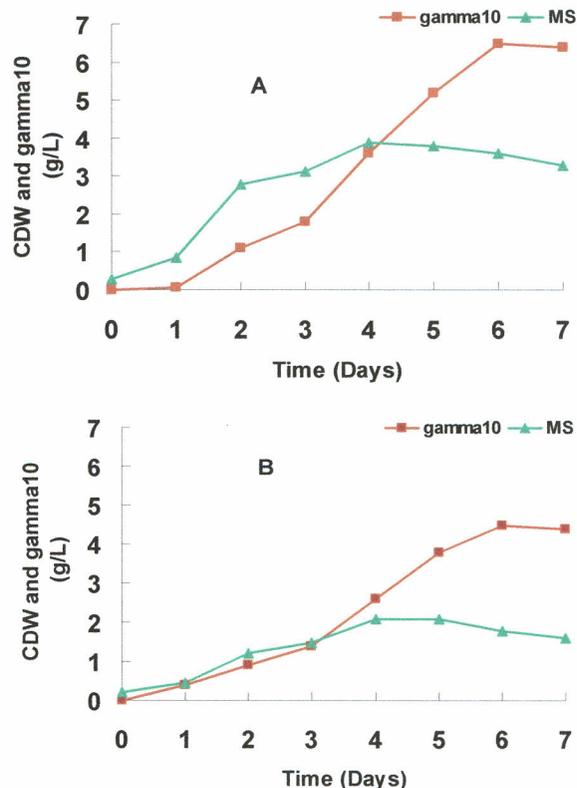


Figure 2. Production of γ -decalactone by *R. aurantiaca* in 20- and 100-L bioreactors

Experiment 4. Extraction of γ -decalactone produced by *R. aurantiaca* from culture broth.

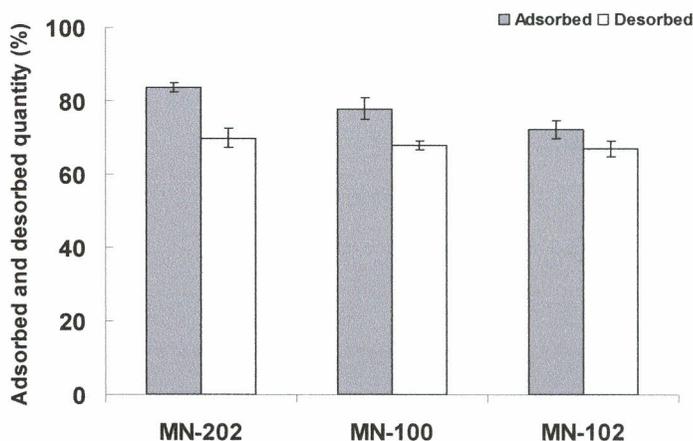


Figure 3. Extraction of γ -decalactone produced by *R. aurantiaca* by adsorption on Macronet resins

The adsorption of γ -decalactone on the resins Macronet is a good technique to extract lactone from the culture broth. The resins can be reused without loss of efficacy.