Polyol synthesis and taxonomic characters in the genus

Moniliella

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A study of the physiological and morphological characters of the moulds of the genus Moniliella Stolk et Dakin demonstrated the existence of a new variety of Moniliella tomentosa (v. Beyma) Stolk, referred to as Moniliella tomentosa var. pollinis. The distinction is based on the green olivaceous tinge of the colonies on agar media and the production, in liquid media with either peptone, potassium nitrate, or yeast extract – maltose, of a diffusible yellow pigment.

Polyol synthesis occurs in all the strains examined of the genus Moniliella. Paper- and gas-chromatographic methods show that the polyhydric alcohols are mainly glycerol and erythritol. M. tomentosa produces higher amounts than does M. acetoabutans. Glycerol is in excess in both species. The highest yields are obtained with the variety pollinis and here erythritol predominates. This strain, which grows well in the yeast form, is technically interesting.

INTRODUCTION

In a study on erythritol biosynthesis by osmophilic yeasts (Verachtert and Dooms, 1969) we included a yeast-like fungus, originally described as strain I2A by Hajny, Smith and Garver (1964), with a high yield of the polyol erythritol. Though I2A has many characters in common with the yeast genus Trichosporon, the Centraalbureau voor Schimmelcultures (CBS), Baarn, The Netherlands, finally assigned it to the mould genus Moniliella Stolk et Dakin.

Since the physiology of Moniliella has, so far, been studied only in M. acetoabutans (Dakin and Stolk, 1968) and since the production of erythritol may become industrially interesting (Spencer, 1968; Dooms and Verachtert, 1968a), further investigations into the genus Moniliella seemed appropriate. This paper
reports on the physiological characters of *M. tomentosa* and *M. acetoabutans* and on polyol synthesis by all the Moniliella strains examined. The strain I2A represents a taxon similar to *M. tomentosa* but sufficiently distinct to warrant the creation of a new variety named *pollinis* because it was first isolated from pollen.

**MATERIALS AND METHODS**

*Organisms.* The following strains of *Moniliella* were studied:
1. Strain I2A, from pollen, received from Dr. Hajny in 1966 and preserved in Louvain as MUCL 11.525 and in Baarn as CBS 461.67.

All strains were kept on a medium containing 2% agar, 1% yeast extract, 0.1% urea and 20% glucose. Initially, inocula for polyol production and physiological tests were a loopfull of cell material taken from the stock slants, but results were irreproducible with the *M. tomentosa* strains. Later on, we used the following method: 5 ml of sterile water was added to cultures grown on potato-dextrose agar in petri dishes. The spores were brought into suspension with a sterile brush, spun down and washed with 10 ml of sterile water, then brought into suspension in enough sterile water to obtain equal spore counts/ml for all strains. Liquid media were then inoculated with equal volumes of these spore suspensions.

*Liquid culture media.* Fermentation tests were performed in Einhorn and in Durham tubes in broths containing 2% of the different carbon sources and 0.5% yeast extract (Oxoid), and carbon assimilation tests in test tubes with media consisting of Yeast Nitrogen Base (Difco) and 2% of the carbon source tested (sugars and polyalcohols). Growth on polyalcohols was also studied on agar slants containing 5% of the polyalcohol tested, 1% yeast extract, 0.1% urea and 2% agar. Nitrate assimilation tests were performed in test tubes containing Yeast Carbon Base medium (Difco) supplemented with 0.078% potassium nitrate. Other nitrogen sources were studied by adding them in equivalent amounts (based on the N content) to the same Yeast Carbon Base. Splitting of arbutin, pellicle formation on liquid malt extract, etc. were investigated as described by Lodder and Kreger-van Rij (1952). Polyalcohol production was studied after incubation for 5 days at 30°C on a reciprocal shaker (150 strokes/min) in 500 ml Erlenmeyer flasks, each containing 50 ml of a medium with glucose 10% or 20%, yeast extract 1%, urea 0.1%.