BRAZILIAN JOURNAL OF MICROBIOLOGY xxx (2016) xxx–xxx

BRAZILIAN JOURNAL OF MICROBIOLOGY

http://www.bjmicrobiol.com.br/

Industrial Microbiology

An original method for producing acetaldehyde and diacetyl by yeast fermentation

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ARTICLE INFO

Article history:
Received 2 June 2015
Accepted 29 February 2016
Available online xxx
Associate Editor: Jorge Gonzalo Farias Avendano

Keywords:
Acetaldehyde
Diacetyl
YAD culture medium
Yeast fermentation

ABSTRACT

In this study a natural culture medium that mimics the synthetic yeast peptone glucose medium used for yeast fermentations was designed to screen and select yeasts capable of producing high levels of diacetyl and acetaldehyde. The presence of whey powder and sodium citrate in the medium along with manganese and magnesium sulfate enhanced both biomass and aroma development. A total of 52 yeasts strains were cultivated in two different culture media, namely, yeast peptone glucose medium and yeast acetaldehyde-diacetyl medium. The initial screening of the strains was based on the qualitative reaction of the acetaldehyde with Schiff's reagent (violet color) and diacetyl with Brady's reagent (yellow precipitate). The fermented culture media of 10 yeast strains were subsequently analyzed by gas chromatography to quantify the concentration of acetaldehyde and diacetyl synthesized. Total titratable acidity values indicated that a total titratable acidity of 5.5 °SH, implying culture medium at basic pH, was more favorable for the acetaldehyde biosynthesis using strain D15 (*Candida lipolytica*; 96.05 mg L^{-1} acetaldehyde) while a total titratable acidity value of 7 °SH facilitated diacetyl flavor synthesis by strain D38 (*Candida globosa*; 3.58 mg L^{-1} diacetyl). Importantly, the results presented here suggest that this can be potentially used in the baking industry.

Introduction

Yeasts are commonly used as starter cultures for increasing product-specific aroma production during various fermentation processes (cheese, kefir, sourdough, wine, beer, etc.), as they are capable of synthesizing natural flavors like acetaldehyde (ethanal) or diacetyl (2,3-butanedione) which in turn serve to enhance the quality of the food.[1] Acetaldehyde is the most important carbonyl compound produced during alcoholic fermentation with final concentrations typically varying between 10 and 200 mg L^{-1} depending on technological factors

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http://dx.doi.org/10.1016/j.bjm.2016.07.005

Please cite this article in press as: Rosca I, et al. An original method for producing acetaldehyde and diacetyl by yeast fermentation. *Braz J Microbiol.* (2016), http://dx.doi.org/10.1016/j.bjm.2016.07.005