Isolation and characterization of an acrylamide-degrading yeast Rhodotorula sp. strain MBH23 KCTC 11960BP

ABSTRACT

As well as for chemical and environmental reasons, acrylamide is widely used in many industrial applications. Due to its carcinogenicity and toxicity, its discharge into the environment causes adverse effects on humans and ecology alike. In this study, a novel acrylamide-degrading yeast has been isolated. The isolate was identified as Rhodotorula sp. strain MBH23 using ITS rRNA analysis. The results showed that the best carbon source for growth was glucose at 1.0% (w/v). The optimum acrylamide concentration, being a nitrogen source for cellular growth, was at 500 mg l–1. The highest tolerable concentration of acrylamide was 1500 mg l–1 whereas growth was completely inhibited at 2000 mg l–1. At 500 mg l–1, the strain MBH completely degraded acrylamide on day 5. Acrylic acid as a metabolite was detected in the media. Strain MBH23 grew well between pH 6.0 and 8.0 and between 27 and 30 °C. Amides such as 2-chloroacetamide, methacrylamide, nicotinamide, acrylamide, acetamide, and propionamide supported growth. Toxic heavy metals such as mercury, chromium, and cadmium inhibited growth on acrylamide.

Keyword: Acrylamide; Rhodotorula sp.; Acrylic acid