HETEROLOGOUS EXPRESSION OF MUCOR ROUXII Δ^{12}-DESATURASE GENE IN SACCHAROMYCES CEREVISIAE

In this study we present the cloning and functional characterization of a gene whose product is responsible for Δ^{12}-desaturase activity and is involved in the metabolic pathway of γ-linolenic acid (GLA) synthesis of Mucor rouxii. A cDNA encoding for Δ^{12}-desaturase of M. rouxii was obtained using the combination of reverse transcription–polymerase chain reaction (RT-PCR) and rapid amplification of cDNA ends (RACE) techniques. The 1191 bp code for an open reading frame of 396 amino acid residues. The deduced amino acid sequence of the cloned cDNA comprises three conserved histidine regions and two hydrophobic domains and showed similarity with microsomal ω-3 and ω-6 desaturases of plants. Expression of this open reading frame in Saccharomyces cerevisiae resulted in the accumulation of linoleic acid (C18:2), suggesting that this gene encodes for a membrane-bound desaturase, Δ^{12}-desaturase, of M. rouxii that is functional in yeast.