

METHOD FOR THE ENZYMATIC PRODUCTION OF 2-HYDROXY-2-METHYL CARBOXYLIC ACIDS

ABSTRACT

The present invention relates to a method for the enzymatic production of 2-hydroxy-2-methyl carboxylic acids from 3-hydroxy carboxylic acids, where a 3-hydroxy carboxylic acid is produced in an aqueous reaction solution and/or is added to this reaction solution and is incubated. The aqueous reaction solution comprises a unit having 3-hydroxy-carboxylate-CoA mutase activity which has both 3-hydroxy-carbonyl-CoA ester-producing and 3-hydroxy-carbonyl-CoA ester-isomerizing activity and converts the 3-hydroxy carboxylic acid into the corresponding 2-hydroxy-2-methyl carboxylic acid which is isolated as acid or in the form of its salts. In a preferred embodiment, the unit having 3-hydroxy-carboxylate-CoA mutase activity is a unit which includes an isolated cobalamin-dependent mutase and where appropriate a 3-hydroxy-carbonyl-CoA ester-producing enzyme or enzyme system or a microorganism including them. The invention preferably relates to a biotechnological process for producing 2-hydroxy-2-methyl carboxylic acids, where microorganisms which have the desired activities are cultured in an aqueous system with the aid of simple natural products and convert intracellularly formed 3-hydroxy-carbonyl-CoA esters into the corresponding 2-hydroxy-2-methyl carboxylic acids. The invention likewise encompasses the production of unsaturated 2-methyl carboxylic acids, where the 2-hydroxy-2-methyl carboxylic acids obtained are converted by dehydration into the corresponding unsaturated 2-methyl carboxylic acids (methacrylic acid and higher homologues).