Rpe1p is a D-ribulose-5-phosphate 3-epimerasein the non-oxidative part of the pentose phosphate pathway. It is located in the cytosol. rpe1 null mutants are viable, but display no D-ribulose-5-phosphate 3-epimerase activity, and display increased sensitivity to hydrogen peroxide, reduced growth on yeast minimal medium, and no growth on media containing D-xylulose as the sole carbon source. The reduced fitness of rpe1 null mutants may be due to insufficient NADPH reserves for biosynthesis, since the pentose phosphate pathway is important for maintaining NADPH levels in the cell. Rpe1p is of industrial interest because deletion of RPE1 in a recombinant S. cerevisiae strain engineered to ferment xyloseto ethanol results in the complete loss of ethanol production, and rpe1 null mutants display increased sensitivity to the fermentation inhibitor furfural, which is a byproduct of the fermentation of xylose to ethanol.Rpe1p has similarity to the D-ribulose-5-phosphate 3-epimerases of Escherichia coli, Rhodospirillum rubrum, Alcaligenes eutrophus, and Solanum tuberosum, and has similarity to human RPE.