

MICROARRAY ANALYSIS OF *SACCHAROMYCES CEREVISIAE* WINE STRAINS DURING SLOW FERMENTATION

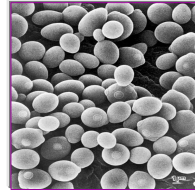


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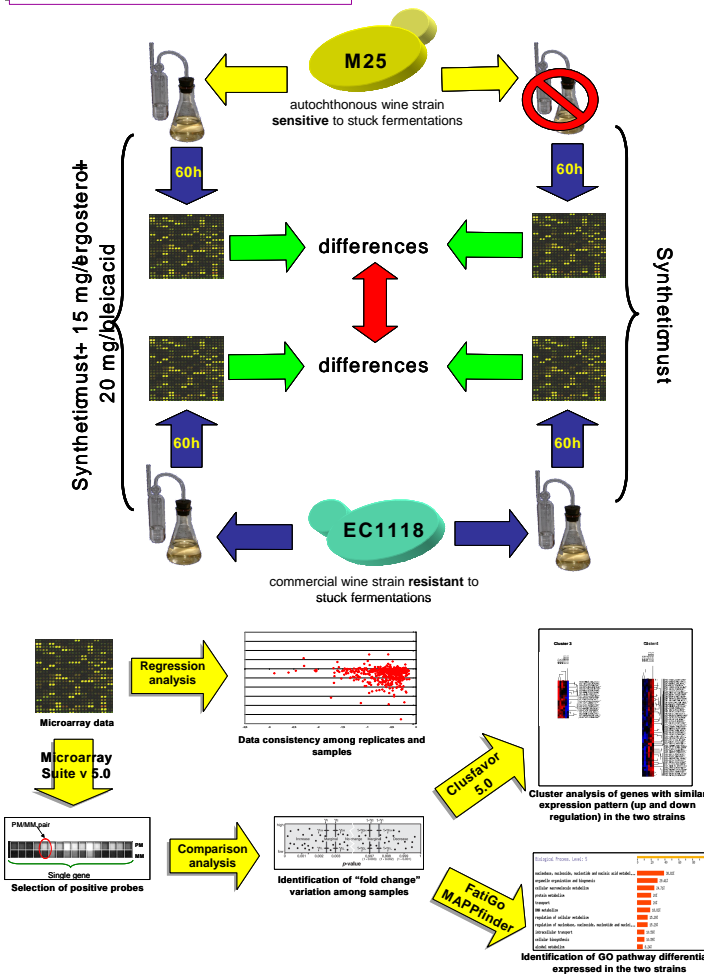
Alcoholic fermentation is a stressful process for yeast cells. The stress factors belong mainly to three different categories: (i) chemical composition of the must; (ii) wrong oenological practices; and (iii) release of some yeast metabolites which render the medium toxic for yeast cells. This stressful situation may cause decreased fermentation rates thus leading to a stuck or sluggish fermentation resulting in high residual sugars in wine (Bisson, 1999). Currently slow and incomplete fermentations are difficult to detect and problems often go unrecognized until it is too late as restarting a stuck fermentation is very hard.



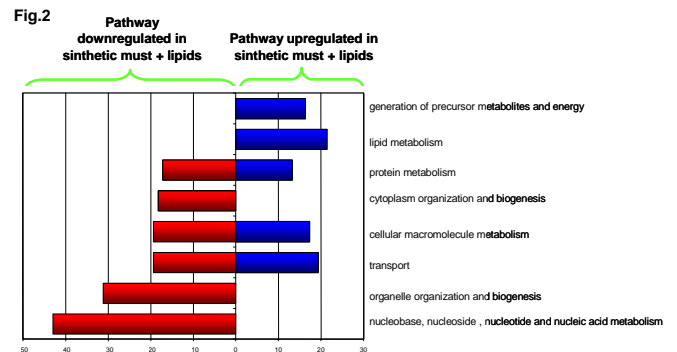
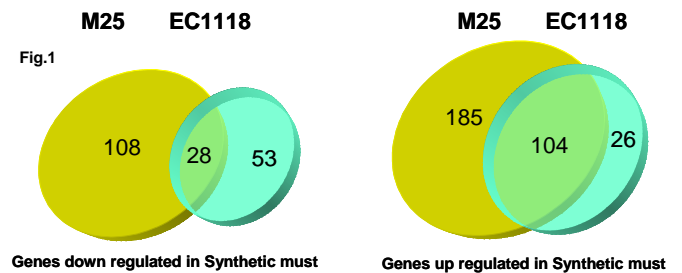
AIM

The aim of this work was to identify the genes differentially expressed in two *S. cerevisiae* strains characterized by different fermentative behavior.

EXPERIMENTAL DESIGN



RESULTS



DISCUSSION

425 genes in M25 and 211 genes in EC1118 showed differential expression (cutoff = 1,5 fold) in the two media tested.

By comparing the two strains we found that 132 genes displayed the same regulation (Fig.1). These genes were analyzed by cluster analysis and FatiGO as well as MAPPfinder to identify which pathways are commonly regulated in the two strains as a response to lack of lipids in the medium (Fig.2). We found out that the absence of ergosterol and oleic acid activates the expression of genes related to ergosterol biosynthesis and to mitochondrial activity (cytochrome biosynthesis and electron transport).

372 genes showing different regulation in the two strains were analyzed in order to find out which pathways were involved in different fermentative behavior. Analyses performed highlighted significant differences in three metabolic pathways: glucose metabolism, trehalose metabolism and mannoprotein biosynthesis. While the involvement of glucose and trehalose metabolism needs further elucidations, differences in mannoprotein biosyntheses could be implicated in the different fermentative behavior of the two strains.

REFERENCES

Bisson L. F. (1999) Am. J. Enol. Vitic. 50(1): 107-119
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