Microbial Cell Factories

Poster Presentation



# *Kluyveromyces lactis SSO1* and *SEB1* genes are functional in *Saccharomyces cerevisiae* and enhance production of secreted proteins when overexpressed

Jaana H Toikkanen*, Lena Sundqvist and Sirkka Keränen

Address: VTT, Industrial Biotechnology, P. O. Box 1000, FI-02044 VTT, Finland
* Corresponding author

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## Background

The *SEB1*/*SBH1* and the *SSO* genes encode components of the protein secretory machinery functioning at the opposite ends, ER translocation and exocytosis, respectively, of the secretory pathway of *Saccharomyces cerevisiae*. Overexpression of these genes can rescue temperature-sensitive (ts) growth defect of many *sec* mutants impaired in protein secretion. Their overexpression in wild-type yeast enhances production of secreted proteins in *S. cerevisiae*, which suggests that may be rate-limiting factors in this process.

## Results

*Kluyveromyces lactis* homologs of *S. cerevisiae SEB* and *SSO* genes were isolated by multicopy suppression of *Saccharomyces* mutations [1]. *KlSSO1* and *KlSEB1* are up to 70 % identical with the *S. cerevisiae* homologs at the amino acid level and can functionally replace them. These single copy genes were able to complement the ts growth defect of *sso2-1* and *seb1*Δ *seb2*Δ *sem1*Δ strains, respectively. In addition, *KlSSO1* multicopy suppressed both sporulation defects of *S. cerevisiae* mutants *sso1*Δ/*sso1*Δ or *mso1*Δ/*mso1*Δ and ts growth defect of exocyst mutant *sec15-1*. Furthermore, *KlSSO1* and *KlSEB1* enhanced production of a secreted protein (Fig.1) similarly to *SSO* and *SEB1* genes of *S. cerevisiae* [2,3] when overexpressed.

## Conclusion

The single copy genes *KlSSO1* and *KlSEB1* are both structurally and functionally conserved in evolution with their duplicated *S. cerevisiae* homologs.

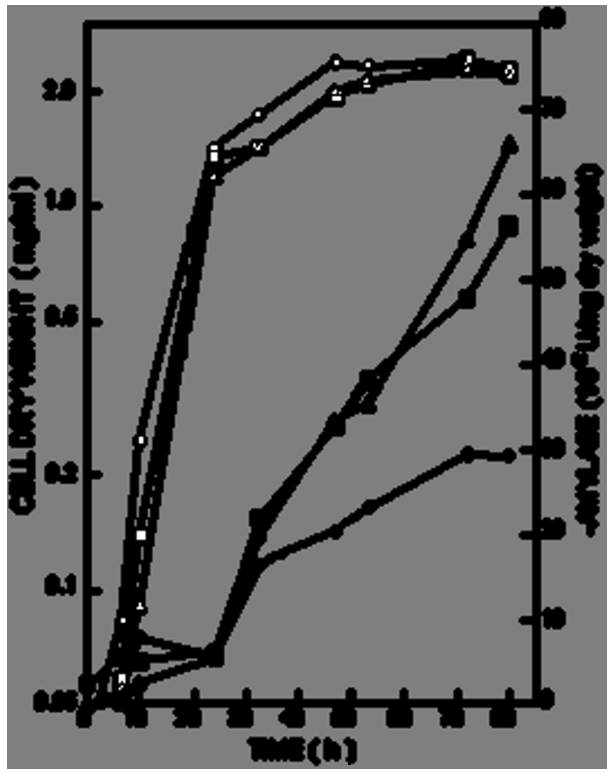


**Figure 1**
Increased production of secreted α-amylase by overexpression of *KlSSO1* (▲) and *KlSEB1* (■) in comparison to the control strain carrying empty vector (●). The cell growth is presented with open symbols.

## References

1. Toikkanen JH, Sundqvist L, Keränen S: ***Kluyveromyces lactis SSO1* and *SEB1* genes are functional in *Saccharomyces cerevisiae* and enhance production of secreted proteins when overexpressed.** *Yeast* 2004, **21:**1045-1055.
2. Ruohonen L, Toikkanen J, Tieaho V, Outola M, Söderlund H, Keränen S: **Enhancement of protein secretion in *Saccharomycescerevisiae* by overproduction of Sso protein, a late-acting component of the secretory machinery.** *Yeast* 1997, **13:**337-351.
3. Toikkanen JH, Miller KJ, Söderlund H, Jäntti J, Keränen S: **The β subunit of the Sec61p endoplasmic reticulum translocon interacts with the exocyst complex in Saccharomyces cerevisiae.** *J Biol Chem* 2003, **278:**20946-20953.