



In Depth Physiological Characterization Reveals a Novel Survival Strategy for the Yeast *Debaryomyces hansenii* at Very High Salinity, Confirming its Halophilic Behavior.

Navarrete Román, Clara; Frost, August T. ; Ramos-Moreno, Laura ; Martinez Ruiz, José Luis

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111 In Depth Physiological Characterization Reveals a Novel Survival Strategy for the Yeast *Debaryomyces hansenii* at Very High Salinity, Confirming its Halophilic Behavior.

Clara Navarrete, August T. Frost, Laura Ramos-Moreno and Jose L. Martinez

Technical University of Denmark, University of Cordoba

Debaryomyces hansenii is traditionally described as a halotolerant non-conventional yeast, being the model organism for the study of osmo- and salt tolerance mechanisms in eukaryotic systems, for the past 30 years (Adler et al., 1985; Prista et al., 1997, 2005). Its halotolerant nature has been confirmed by the fact that the presence of sodium in the culture media protects the yeast cells against oxidative stress and additional abiotic stresses, like extreme pH or high temperature (Almagro et al., 2000; Papouskova and Sychrova, 2007; Navarrete et al., 2009).

However, the study of *D. hansenii*'s biotechnological potential has always been difficult due to the persistent limitations in the availability of highly efficient molecular tools described for this yeast. There is also a lack of consensus and contradictory information along the recent years that limits the fully understanding of its carbon metabolism and physiological characterization in controlled and monitored environments. Moreover, there is also controversy about the diversity in the culture conditions (media composition, temperature and pH among others) used by different groups, which makes it complicated when trying to get conclusions and behavioral patterns.

In this work we present for the first time a complete physiological characterization of *D. hansenii* during batch cultivations, by using highly instrumented and controlled bioreactors at lab-scale. Our findings show a more complete picture of the central carbon metabolism, and the external pH influence on the yeast capacity to tolerate high Na⁺ and K⁺ concentrations are also presented. Finally, the controversial halophilic/halotolerant character of this yeast is further discussed and a novel survival strategy and adaptative behavior to high saline environments suggested.