

Tasting amino acids: UmamiTs as a key family in the import and export of nitrogen in *Pinus pinaster*.

Blanca-Reyes, Irene; Ávila Sáez, Concepción; Cánovas, Francisco M; Castro-Rodríguez, Vanessa.

Molecular Biology and Biotechnology, Department of Molecular Biology and Biochemistry, University of Málaga, Spain

*ireneblanca@uma.es

Abstract

Pinus pinaster is a conifer used as a model species for the study of nitrogen (N) metabolism, a limiting and fundamental element for plant growth and development due to its presence in different compounds such as nitrogenous bases, nucleic acids and amino acids (Yao *et al.* 2020). Numerous genomic and transcriptomic studies in this species have led to a better understanding of nitrogen management in forest plants.

In this context, it is essential to understand how organic nitrogen is mobilised between compartments for its assimilation, a process involving amino acid (AA) transporters. These transporters include AA permeases (AAPs), cationic transporters (CATs) and UmamiTs (Usually Multiple Acids Move In and out Transporter) (Yang *et al.* 2020, Zhao *et al.* 2021), recently identified.

Our work focuses on the study of the UmamiTs family of importers/exporters in *P. pinaster*, which will allow us to understand their role in amino acid mobilisation, fundamental in processes such as embryogenesis, N remobilisation and loading and unloading in the phloem/xylem. After the identification of 26 members of the family, a phylogenetic analysis was performed together with UmamiTs from other plant species of economic and ecological interest. Expression studies reveal that they are located in different compartments at the subcellular level and suggest that they could be involved in N transport between them, ensuring its subsequent mobilisation and storage in different tissues. Understanding the role of UmamiT transporters in pine not only sheds light on crucial processes like nitrogen assimilation and amino acid mobilization but also holds promise for enhancing forestry practices and optimizing plant growth in sustainable ecosystems.

References

Yang, G., Wei, Q., Huang, H., & Xia, J. (2020). Amino Acid Transporters in Plant Cells: A Brief Review. *Plants*, 9, 967. <https://doi.org/10.3390/plants9080967>

Yao X., Nie J., Bai R., Sui X. (2020) Amino Acid Transporters in Plants: Identification and Function. *Plants* (Basel). 9(8):972. doi: 10.3390/plants9080972.

Zhao C., Pratelli R., Yu S., Shelley B., Collakova E., Pilot G. (2021). Detailed characterization of the UMAMIT proteins provides insight into their evolution, amino acid transport properties, and role in the plant. *J Exp Bot.* 72(18):6400-6417. doi: 10.1093/jxb/erab288.

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