

ORIGINAL ARTICLE

***Weissella halotolerans* W22 combines arginine deiminase and ornithine decarboxylation pathways and converts arginine to putrescine**

C.I. Pereira¹, M.V. San Romão², J.S. Lolkema³ and M.T. Barreto Crespo¹

¹ Instituto de Biologia Experimental e Tecnológica (IBET) and Instituto de Tecnologia Química e Biológica (ITQB), Universidade Nova de Lisboa, Oeiras, Portugal

² Instituto Nacional dos Recursos Biológicos – Instituto Nacional de Investigação Agrária (Ex Estação Vitivinícola Nacional), Dois Portos, Portugal

³ Molecular Microbiology, Groningen Biomolecular Sciences and Biotechnology Institute, University of Groningen, Haren, the Netherlands

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Correspondence

Cristina Isabel Pereira, Instituto de Biologia Experimental e Tecnológica (IBET), Apartado 12, 2781-901 Oeiras, Portugal.
E-mail: cpereira@itqb.unl.pt

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Abstract

Aims: To demonstrate that the meat food strain *Weissella halotolerans* combines an ornithine decarboxylation pathway and an arginine deiminase (ADI) pathway and is able to produce putrescine, a biogenic amine. Evidence is shown that these two pathways produce a proton motive force (PMF).

Methods and Results: Internal pH in *W. halotolerans* was measured with the sensitive probe 2',7'-bis-(2-carboxyethyl)-5-(and-6)-carboxyfluorescein. Membrane potential was measured with the fluorescent probe 3,3'-dipropylthiocarbocyanine iodine. Arginine and ornithine transport studies were made under several conditions, using cells loaded or not loaded with the biogenic amine putrescine. ADI pathway caused an increase in ΔpH dependent on the activity of $F_0F_1\text{ATPase}$. Ornithine decarboxylation pathway generates both a ΔpH and a $\Delta\Psi$. Both these pathways lead to the generation of a PMF.

Conclusions: *Weissella halotolerans* W22 combines an ADI pathway and an ornithine decarboxylation pathway, conducting to the production of the biogenic amine putrescine and of a PMF. Transport studies suggest the existence of a unique antiporter arginine/putrescine in this lactic acid bacteria strain.

Significance and Impact of the Study: The coexistence of two different types of amino acid catabolic pathways, leading to the formation of a PMF, is shown for a *Weissella* strain for the first time. Moreover, a unique antiport arginine/putrescine is hypothesized to be present in this food strain.