Title Improving low water activity and desiccation tolerance of the biocontrol agent *Pantoea agglomerans* CPA-2 by osmotic treatments

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Abstract

Aims:To study the improvement of tolerance to low water activity (a[sub]w) and desiccation during spray drying in *Pantoea agglomerans* cells subjected to mild osmotic stress during growth. Methods and Results:The micro-organism was cultured in an unmodified liquid (control) or in a[sub]w-modified media, and viability of these cells was evaluated on unstressed (0.995) and 0.96 a[sub]w stressed solid media, in order to check total viability and a[sub]w stress tolerance respectively. Significant improvements in viability on unmodified medium were observed with cells grown for 24 h in NaCl 0.98 a[sub]w, glycerol 0.98 a[sub]w and 0.97 a[sub]w and for 48 h in NaCl 0.98 a[sub]w and 0.97 a[sub]w modified media. Both yield improvements and water stress tolerance were achieved with low a[sub]w media. Cells grown for 24 h in NaCl 0.98 a[sub]w or for 48 h in NaCl 0.98 a[sub]w, 0.97 a[sub]w and 0.96 a[sub]w, glucose 0.97 a[sub]w and glycerol 0.97 a[sub]w showed improved a[sub]w stress tolerance in comparison with control cells. The best results were obtained with NaCl treatments (0.98 a[sub]w and 0.97 a[sub]w) which also exhibited better survival rates than control cells during spray-drying process and maintained their efficacy against postharvest fungal pathogens in apples and oranges. Conclusions:NaCl treatments are very appropriate for improving *P. agglomerans* low a[sub]w tolerance obtaining high production levels and maintaining biocontrol efficacy. Significance and Impact of the Study:Improving stress tolerance of biocontrol agents could be an efficient way to obtain consistency and maintain efficacy of biological control under practical conditions.