**Title** Improvement of biocontrol agent viability during formulation by induction of heat tolerance

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**Abstract**

The yeast *Candida sake* CPA-1 is an effective biocontrol agent (BCA) against major postharvest diseases on pome fruits. Optimal formulation is necessary to successfully bring BCAs into commercial use. Unfortunately, most of microorganisms are very sensitive to the drying involved in formulation. The aim of this study was to induce tolerance in *C. sake* cells by mild heat treatment in order to enhance its viability during drying processes, in this specific case during spray-drying. The possible role of synthesis of heat shock proteins (HSPs) and accumulation of sugars and sugar alcohols was also determined. First, 30ºC and 33ºC were selected as temperatures optimal for inducing thermotolerance in *C. sake* cells during incubation in molasses-based liquid medium. Mild heat was applied at different growth phases. Both temperatures induced thermotolerance, tested by exposure to lethal shock at 40ºC. Cells adapted at 33ºC in early or mid stationary phases showed survival values after spray-drying significantly higher than unadapted cells. However, viabilities were not high enough to be suitable for commercial use. Furthermore, it was shown that HSPs, sugars and sugar alcohols were not directly responsible for induced thermotolerance in this yeast. In conclusion, it is possible to induce thermotolerance in biocontrol agents, and this approach can be used to improve viability of cells during formulation.