

Title Effect of protective agents on the viability of the freeze-dried biocontrol agent *Metschnikowia pulcherrima*

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Abstract

Biological control of postharvest diseases of fruit has improved recently as an alternative to fungicide treatment, to protect human safety and limit environmental impact. Among the most studied microorganisms used as biocontrol agents, we have focused on *Metschnikowia pulcherrima*, a yeast that has antagonistic effects on *Penicillium expansum*, *Botrytis cinerea* and *Monilia* spp., agents of blue, grey and brown mould on apple and kiwi fruit. To be commercially available, microbial agents should be formulated to optimize the efficacy and stability of the final product. This work aimed to evaluate the best agents to be added to *M. pulcherrima* to protect it against the effects of freeze-drying. Several kinds of sugar in solutions of different concentration were added to a centrifuged yeast cell suspension, to give a final concentration of 10^9 cfu/ml. We then determined which sugar solution gave the best protection against freeze-drying. Viability was evaluated periodically by calculating the cfu concentration on NYDA after rehydration of the freeze-dried cells with Ringer solution. We obtained the highest percentage viability using a 25% v/v maltose solution as protective agent. No significant loss of viability of the formulated freeze-dried cells was recorded after storage of 3 months at 4°C.