

Evaluation of Methods of Production on Industrial Scale of Antagonistic Yeasts for Postharvest Biological Control of Fruit Diseases

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Abstract

Several species of yeasts characterized by antagonistic activity against fungal phytopathogens have been proposed as postharvest biological control agents of fruit diseases. However, the development of commercial products based on antagonistic microorganisms requires two basic conditions: the ability to control a broad range of pathogens under different storage conditions of the fruits; the availability of inexpensive systems of multiplication on industrial scale and application of the biocontrol agents. In this work two strains of the yeasts *Pichia guilliermondii* and *Pichia anomala*, selected for their high performances on postharvest biological control of the fungal pathogens *Penicillium digitatum* Sacc. and *Botrytis cinerea* Pers. ex Fr., were used for the development of methods of production on industrial scale of biocontrol agents, to be used for postharvest treatment on citrus fruits, grapes and strawberries. Different media and growth conditions were evaluated using fermentation systems of different size and batch cultivation. The parameters of growth evaluated on a lab incubator were tested on a fermentation system composed of two units of 75 and 500 litres. A quality control of the product during the process and at the end of the production cycle was conducted in order to verify the absence of contaminant microorganisms and evaluate the vitality of the strains. The identity of strains and colonies was evaluated using microbiological, biochemical and genomic methods (Plate count, Biolog test and 26S rDNA sequencing), while no contaminants were detected at the end of the production cycle.

Keywords: Biocontrol, Postharvest, *Pichia guilliermondii*, *Pichia anomala*