

**Title** Production of *Metschnikowia pulcherrima* by fermentation: effect of nitrogen and carbon sources on biomass

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**Citation** Journal of Plant Pathology Volume 90 (2, Supplement) August 2008, Book of Abstract, 9<sup>th</sup> International Congress of Plant Pathology, August 24-29, 2008 Torino, Italy,. 507 pages.

**Keywords** biocontrol; apple; *Metschnikowia pulcherrima*

#### **Abstract**

Microbial antagonists have been developed as alternatives to chemicals, to reduce the amounts of fungicides and their residues on fruits. One strain of the yeast *Metschnikowia pulcherrima* showed effective biocontrol properties against the main postharvest pathogens on apple and kiwi fruits. Mass production of biocontrol agents is a focus of research and industrial development to obtain a product of high quality and low cost on a large scale. The aim of this work was to find the nitrogen and carbon sources producing, through fermentation technology, maximum biomass of *M. pulcherrima* with optimal antagonistic activity. Different nitrogen and carbon substrates were tested under different conditions of temperature and pH. A microbial concentration of  $10^9$  cfu/ml after 48 h of fermentation was obtained in a substrate containing one organic nitrogen source (yeast extract) and two organic carbon sources (sugars). The pH values during the fermentation gave the trend of the process: a neutral pH was typical of the initial inoculation step, whereas a basic pH suggested the end of the growth process, with an available growth range between pH 4 and 8. The best biocontrol on apples against *Penicillium expansum* and *Botrytis cinerea* was obtained when the yeast was grown in a sugar-enriched substrate.