

EFFECT OF CADMIUM, NICKEL, COPPER AND ZINC IN YEAST GROWTH

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Abstract:

The metals in the soil originate from the weathering of the source materials and anthropogenic sources such as pesticides and fertilizers, organic and industrial waste, mining and burning of fuel, irrigation and atmospheric deposition, and undergo biociclagem processes through uptake by plants and microbial biomass or by changes in free form or chelates. Heavy metals such as Cadmium and Nickel, are toxic to most organisms when present in excessive concentrations, which is mostly caused by anthropogenic sources. Micro-organisms such as fungi and yeast, exposed to high concentrations of heavy metals can provide morphological changes and changes in the cell composition content. In this context, this study aimed to evaluate the toxicity and the macro and micro morphological changes in yeast growing in the presence of different concentrations of metals. 11 isolates previously selected were used, belonging to the species: *Cryptococcus podzolicus* (3), *Cr. laurentii* (1), *Pseudozyma* sp. (1), *Meyerozyma* sp. (2), *Debaryomyces* sp. (1), *Aureobasidium* sp. (2) and *A. leucospermi* (1). Isolates were grown in Medium metal (1% (NH₄)₂SO₄, 0.1% KH₂PO₄, 0.05% MgSO₄, 2% glucose, 0.3% yeast extract), pH 5.6, with metal solutions (Cadmium-Cd, Nickel-Ni, Copper-Cu and Zinc-Zi) at different final concentrations (1 mM, 5 mM, 10 mM and 20 mM). The medium without the metals solution was used as control. There have been changes in colony morphology and slides were prepared with lactoglycerol to verify cellular changes. Slides were observed and photographed by an optical microscope (Leica DFC 490) using the Leica Qwin program V3. Of the 11 isolates only grew 5 at the maximum concentration of 20mM to Cd, Cu and Zi, and the most toxic metal was Ni, followed by Cd, Cu and Zi. All metals induced morphological changes in colonies of 7 isolated in all concentrations tested, mainly by changing the color and appearance of the colonies. The two isolates of species *Cr. podzolicus* were the most resistant growing in 20mM concentrations for Cd, Cu and Zi, and 5mM to Ni, and for these isolates were observed changes in morphology cell like elongation, and formation of pseudohyphae.

Keywords: Cell morphology, Colonial morphology, Metals, Toxicity.

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