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CD^{+2} resistance mechanism in *Candida tropicalis* 3Aer isolated from industrial effluents

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Present investigation is elucidating the bioremediation potential and cadmium-induced cellular response with its molecular basis in *Candida tropicalis* 3Aer. Spectroscopic analysis clearly illustrated the involvement of yeast cell wall components in biosorption whereas bioaccumulation was confirmed by TEM, SEM and EDX scrutiny. TEM images divulged extracellular as well as cytoplasmic and vacuolar cadmium nanoparticle formation, further validated by presence of *ycf1* gene and increased biosynthesis of GSH under cadmium stress. Transcriptomic and proteomic approaches have rarely been applied to study change in cell architecture under environmental stress conditions, but this study is unveiling the altered expression of proteins and genes in *C. tropicalis* 3Aer under cadmium stress in concentration and time dependent manner, respectively. Fourteen proteins exhibited differential expression and found involve in cellular redox homeostasis, nitrogen metabolism, nucleotide biosynthesis and carbohydrate catabolism. Interestingly, C. *tropicalis* 3Aer is additionally equipped with nitrile hydratase enzyme, rarely been reported in yeast and thus have potential to remove nitriles (extremely toxic compounds) from environment. Cd^{+2} toxicity not only caused growth stasis but also upregulated the cysteine biosynthesis, protein folding and cytoplasmic detoxification response elements.

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