Every cloud has a silver lining: using hydrogen-sulfide-producing yeasts to detoxify wastewaters from heavy metals

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Context

The presence of heavy metals in wastewaters is a major environmental concern as it poses a significant threat to human health and the environment. These metals react with certain chemicals, such as hydrogen sulfide (H_2S) and precipitate as insoluble salts (Figure). H_2S wastewater treatment can therefore serve as a method of detoxification [1].

H_2S is produced by *Saccharomyces cerevisiae* during alcoholic fermentation as an intermediate metabolite of the sulfur reduction pathway, in order to provide sulfur containing aminoacids cysteine and methionine that are scarce in grape juice but required for protein synthesis and a proper cellular functionality [2]. Despite the unpleasant "rotten-eggs" descriptor associated with H_2S, oenological strains of the *S. cerevisiae* species are reported to be able to produce consistent amount of it [3].

Objectives

This project proposes to evaluate the ability of oenological yeasts, that naturally produce hydrogen sulfide, to detoxify heavy metal-contaminated wastewaters. The expected outcomes of the project will contribute to the development of a sustainable bioremediation method that avoids the use of genetically modified organisms (GMOs), which may raise concerns about safety and ethical issues. The results of this study will have significant implications for environmental protection and human health.

References

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