Volatile organic compounds from *Saccharomyces cerevisiae* (I02-Pan) as a biocontrol strategy against *Fusarium graminearum*: *in vitro* evaluation and volatilome analysis

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Mycotoxins are fungal secondary metabolites that pose a serious threat to food safety. In addition to causing damage to human and animal health, the presence of these toxins in food results in significant losses for agriculture. In this context, biocontrol strategies, such as the application of volatile compounds (VOCs), emerge as a promising alternative to mitigate these impacts. The present study aimed to investigate the production of VOCs by the *Saccharomyces cerevisiae* strain (I02-Pan), isolated in the Pantanal biome, and to evaluate its effects on the growth of three strains of *Fusarium graminearum* (FML-08, FM-L37, and FML-70, all chemotype 15-ADON), isolated from barley grains. The initial screening of COV production was performed using an in vitro assay with a double-sealed plate system. In this system, the fungi were inoculated in opposite directions without physical contact. The cultivars were incubated at 25 °C for seven days. The assay was performed in triplicate. The yeast volatilome was characterized by individual cultivation in headspace vials (20 mL), followed by compound extraction by solid-phase microextraction (HS/SPME-MS). Molecules were identified based on the NIST-8 library. Statistical analysis was performed using Prism GraphPad 8.0.1 software. The results revealed 34 compounds from the yeast culture, of which nine were major, including ethyl octanoate (15.63%), isoamyl acetate (15.59%), and phenylethyl alcohol (12.10%), in addition to minor constituents such as 1-octanol and methyl-*N*-hydroxybenzenecarboximidate. Several studies have already reported the bioactivity of these molecules, including their inhibitory action on the growth of various phytopathogenic fungi. This information corroborates the results obtained through in vitro antagonistic evaluation, in which the suppression of mycelial growth of the three strains was observed. This information corroborates the results obtained through in vitro antagonistic evaluation, where suppression of mycelial growth was observed for the three tested strains of *F. graminearum*, with emphasis on FML-70 and FML-08, with inhibition percentages of 54.75% and 50.27%, respectively. This preliminary information highlights the potential of native yeasts as sustainable biological control agents through the emission of VOCs applicable in biofumigation strategies, especially in the post-harvest period, and highlights the relevance of further investigations to elucidate their feasibility and effectiveness in the agricultural context, as well as their role in mitigating food contamination by toxigenic fungi.

Key-words: natural product, fumigation, biocontrol, agriculture.