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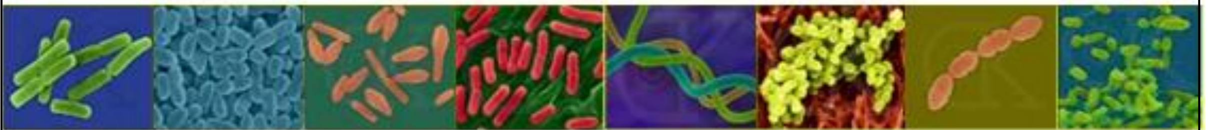

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that needs to be controlled. Finally, the inducible sporulation will probably reduce the dissemination of the biocontrol agent towards other sympatric ants after its application in the field.

BB-P15

DETERMINATION OF THE INCIDENCE OF GREY MOULD ON GRAPES OF SAN JUAN, ARGENTINA AFTER APPLYING DIFFERENT CONCENTRATIONS OF NATURALLY OCCURRING ANTAGONIST YEASTS

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Introduction: *Botrytis cinerea* is a major pathogen of grape. At present, control in conventional agriculture is mainly achieved through chemical strategies, which can also have many disadvantages, such as the public's growing concern for the human health conditions and the environmental pollution. One promising alternative to pesticides is the biological control, numerous studies indicated that some yeast species are ideal biocontrol agents, as they are natural plant epiphytic colonizers, nonpathogenic to plants and human beings in most cases and can rapidly proliferate. It has been reported that biological control was only effective when high concentrations of antagonist yeasts were applied. Objective: The aim of the present work was to study the efficacy of different concentrations of antagonistic yeasts in reducing the development of *B.cinerea*. Materials and Methods: A- Microorganisms: The pathogen *B.cinerea* was isolated from infected grapes. All yeast antagonists (15 strains of *Saccharomyces cerevisiae* and 1 of *Schizosaccharomyces pombe*) were originally isolated from grape surfaces and fermenting musts. They were selected because of their ability to control *B.cinerea* on grapes, screening them *in vitro* and *in vivo*. B- Tests on fruit: Biocontrol effectiveness was assessed on Red Globe grapes. The fruits were artificially wounded and inoculated with yeasts (10^5, 10^6 and 10^7 UFC/ml) and conidial suspension of *B.cinerea* (10^4 conidia/ml). Each sample, constituted by 9 berries and reproduced with three replicates for each yeast isolate, was incubated for 5 days at 25°C in a plastic box under high relative humidity (100%). After storage, the incidence of disease was analyzed in percentage and these were arcsin-transformed to angular data prior to ANOVA. Results: There were significant negative relationships between concentration of the antagonists and disease incidence (R^2: range on 0.75 to 0.99). The efficacy was higher when a concentration 10^7 CFU/ml of antagonist was used. When yeast cell suspensions of 8 strains of *S.cerevisiae* (BSc5, BSc49, BSc81, BSc92, BSc121, BSc140, BSc175 and BSc203) and *S.pombe* BSc167 reached a concentration of 10^7 CFU/ml, no infection by *B.cinerea* was found in fruits treated. Two strains of *S.cerevisiae*: BSc49 and BSc140 were able to inhibit mycelial growth of grey mould when a concentration of 10^6 CFU/ml of yeasts was inoculated. Conclusions: The concentrations of antagonist had significant effects on biocontrol effectiveness: the higher the concentration of yeast the better biocontrol activity of the antagonist had. When yeast was at 10^7 CFU/ml, the best control was obtained and this concentration was lower than those reported by other investigators.

BB-P16

BIOCONTROL OF FUNGI FROM SOUR ROT BY VOLATILES PRODUCED BY YEASTS IN TABLE GRAPES

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Introduction: Sour rot is an important disease of grapes that affects both crop yield and wine quality. It is caused by a number of undesirable yeasts and bacteria, in association with fungi like *Aspergillus*, *Penicillium* and *Rhizopus*. Biocontrol of plant diseases with microbial antagonist has been developed as an alternative to fungicides. Objective: To evaluate the action of volatiles produced by wild enological yeast in biocontrol of fungi associated to sour rot disease of grapes. Material and Methods:a- Antagonist isolation: Yeasts were isolated from different sources such as healthy grapes, fermenting musts and enological environments.b-Fungi isolation: The pathogens were isolated from grapes berries with sour rot symptoms. c- Screening of antagonistic yeasts: *In vitro*, antagonism between fungi and yeasts was observed by placing both on the same Czapeck Agar plate and incubating at 25°C, for 5 days. Then, antagonist yeasts were evaluated *in vivo*: a wound at the equator of grapes berries was made. Aliquots (10 µl) of 10^6 CFU/ml yeast concentration followed by 10µl of fungal conidial suspension (10^4 CFU/ml) were seeded in the hole. d- Production of antifungal volatiles: Interaction tests consisted of the bottom part of a Petri- dish with the seeded yeast inverted on top of another bottom part containing a fungus, were sealed with Parafilm®, and incubated at 25°C. Fungal growth inhibition was determined when the diameter of the fungi decreased in comparison to the negative control. All experiments were repeated three times. Results: *Aspergillus caelatus*, *A.carbonarius*, *A.versicolor*, *A.terreus*, *Penicillium comune*, *Rhizopus stolonifer* and *Ulocladium* sp. were isolated. The screening *in vitro* of 234 isolated

resulted in 95% of yeast with antagonistic activity and 63 isolates showed efficacy to inhibit the 7 grapes pathogens on *in vitro* test. From 63 isolates, 8 antagonist yeasts consistently produced antifungal volatiles, and inhibited mycelial growth of *A.caelatus*, *A.carbonarius*, *A.terreus* and *P.comune*. Volatiles produced by *Kluyveromyces marxianus* BKm153, *Debaryomyces vanrijiae* BDv197, *Pichia guilliermondii* BPg190, *Saccharomyces cerevisiae* BSc44 and BSc78 produced growth inhibition of *A.terreus*, although BKm153 showed the highest inhibition (48.66% ± 2.44). *A.carbonarius* was affected by the presence of volatiles produced by *Candida sake* BCs198, *A.caelatus* by *S.cerevisiae* BSc119 and *P.comune* by *Candida versatilis* BCv223. Conclusion: These results suggest that the production of antifungal volatiles from antagonistic yeasts play a significant role in mechanisms of biocontrol of fungal pathogens of grapes.

BB-P17

USE OF *Aphanocladium* sp., *Acremonium* sp. OR *Aciditiobacilus ferrooxidans* SORBED ON A NATURAL CLAY (MONTMORILLONITE), AS AN URANIUM REMOVAL SYSTEM.

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Uranium is a radionuclide with noticeable toxicity as heavy metal. It reaches water from natural and man-made sources representing a risk for human health and environment. Generally, conventional sorption techniques for heavy metals removal from wastewaters are not useful due to the great volumes treated and the low concentration of pollutants. Biosorption is an alternative process where different types of biomass allow heavy metals concentration from diluted solutions. Among the most commonly used biosorbents is the fungal biomass, with the advantage of being easily generated at low costs. The main technological drawback in biosorption processes is getting a suitable immobilization of the biomass to obtain efficient biofilters. A methodology to increase biosorption surface and retain biomass is to generate clay biopolymers matrices. Montmorillonite clays are among the possible innocuous sorbents with this characteristic. This type of clay has optimal properties for metal sorption because it is able to complex all kind of organic as well as inorganic compounds on its surface. In this study, we use microorganisms able to grow in the presence of high concentrations of Uranium: *Aphanocladium* sp., *Acremonium* sp., and the acidophilic bacteria *Acidithiobacillus ferrooxidans*. U(VI) adsorption by microbial-natural clay matrices was studied to determine if biomass immobilization on clay could increase the montmorillonites sorption capacity. The different generated matrices were characterized by X- ray power diffraction (XRD), specific surface area and scanning electron microscopy. Uranium sorption capacity was determined by batch systems. Analyzed clays exhibited a great capacity for uranium sorption. This property was remarkably modified by interaction with different microorganisms and culture media. Fungal biofilms that grew on clay with an organic carbon source in the culture medium increased sorption capacity. Furthermore, the separation process was easier as the presence of the biofilm facilitated clay precipitation. The simple sorption of fungal and bacterial biomass on clay matrices also produced an increase in the Uranium sorption capacity. These preliminary studies conclude that these microbial biofilms-clay systems have a great potentiality for uranium biosorption processes given its high cationic exchange capacity and its ability to adapt the process to different situations.

BB-P18

EFFECT OF FUNGICIDES IN THE VIABILITY OF POTENTIAL BIOCONTROL AGENTS AGAINST *Fusarium* HEAD BLIGHT IN WHEAT

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Fusarium Head Blight (FHB) caused by *Gibberella zeae* (anamorph = *Fusarium graminearum*) is a devastating disease that causes extensive yield and quality losses to wheat in humid and semi-humid regions of the world. Different strategies have been used to reduce the impact of FHB including crop rotation, tillage practices, fungicide application and the planting of less susceptible cultivars. None of these strategies by themselves are able to substantially reduce the impact of the disease. Biological control offers an additional strategy and can be used as part of an integrated management of FHB. In previous studies three bacteria, *Bacillus subtilis* RC 218, *Brevibacillus* sp. RC 263 and *Streptomyces* sp. RC 87B were selected by their potential to control the growth and deoxynivalenol (DON) production by *F. graminearum*. These microorganisms were able to control FHB and DON production in greenhouse trials. The goal of this work was: - to test the effect of common fungicides, utilized to control *Fusarium* head blight, on the viability of the potential biocontrol agents *Bacillus subtilis* RC 218, *Brevibacillus* sp. RC 263 and *Streptomyces* sp. RC 87B. Three different fungicides were used in the bioassay (prothioconazole, tebuconazole and metconazole) at concentrations ranging from 0.5 to 80 µg/ml. A single colony of each bacterial strain was used to inoculate 100 ml of the basal medium in 250 ml Erlenmeyer flasks and incubated for 12 h (overnight culture) at 28 ºC in a rotatory shaker (150 rpm) in order to obtain mid-log phase cells (approximately 10^6 cells ml^{-1}). Cells counting was done in a