Eight species of fungus biology essay

Science, Biology

Introduction

This practical was carried out to see if different concentrations of garlic extract affected the size of the zone of inhibition of fungal growth around the well of the agar plate. We used eight species of fungus to allow comparison between the species.

Materials and Methods

There were eight species of fungus used in this experiment. These were; Alternaria altanata Chladysporium cucumericum Penicillium italicum Penicillium hirsutum Penicillium isolate 1 Penicillium isolate 2 Penicillium isolate 3 Botrytis cinereaEach pair was given two of the eight possible species. Firstly, the garlic extract was prepared. This was done by grinding 10g of garlic in a sterilised mortar and pestle with 15ml of deionised water. The outer scales of the garlic bulbs were removed and it was chopped into small pieces on a sterilised tile to make it easier to grind. This extract was then filtered through two layers of muslin into a 15ml centrifuge tube, using an alcohol-cleaned filter funnel. The tubes were spun at 4, 000rpm for 10 minutes. The supernatant was collected- this is the garlic extract. The dilutions of this extract were prepared as follows; X = 2ml H2O + 2ml of original extract. X = 2ml H2O + 2ml of ½ dilution. X = 4. 5ml H2O + 0. 5ml of original extract X = 2ml H2O + 2ml of 1/10 Dilution X = 2ml H2O + 2ml of 1/20 Dilution X = 4. 95ml H2O +0. 05 of Original ExtractThe group were given Penicillium hirsutum and Botrytis cinerea. Spore suspension of these two fungi was carried out by adding 20ml of sterile water to the plate, scraping the surface mycelium to suspend the spores and transferring this to

a sterile universal bottle. This was then filtered through muslin to remove hyphal debris. This step had to be carried out gently to ensure no release of fungal spores into the atmosphere. Agar plates were prepared using a sterilised cork borer. After each removal of an agar plug, the implements were sterilised using alcohol and a Bunsen burner. One improvement made was to be aware of how long the implements were heated for, as this could melt the agar in the plates, making it harder to remove. The dilutions were added to each central well. A control plate with H2O and a plate of original extract was also added for comparison. The plates were then incubated for around 72 hours at 27ºC.

Data Set

The group were given Penicillium hirsutum and Botrytis cinerea. The results are as follows;

Radius of zone of inhibition (mean, mm) results for BLGY 2225 Antifungal properties of garlic practical 2013

Fungal isolate

Neat garlic extract

1/2 dilution garlic extract

1/4 dilution garlic extract

1/10 dilution garlic extract

1/20 dilution garlic extract

1/40 dilution garlic extract

1/100 dilution garlic extract

Negative control

Penicillium hirsutum53. 332. 6610000Botrytis cinerea22. 3317. 6612. 668. 664200

Class Data

Figure 1 shows fungus Allternaria altanata’s mean radius of zone of inhibition (cm) with S. E bars for different concentrations of extract. Figure 2 shows fungus Penicillium italicum mean radius of zone of inhibition (cm) with S. E bars for different concentrations of extract. Figure 3 shows fungus Penicillium hirsutum mean radius of zone of inhibition (cm) with S. E bars for different concentrations of extract. Figure 4 shows fungus Penicillium isolate 1 mean radius of zone of inhibition (cm) with S. E bars for different concentrations of extract. Figure 5 shows fungus Penicillium isolate 2 mean radius of zone of inhibition (cm) with S. E bars for different concentrations of extract. Figure 6 shows fungus Penicillium isolate 3’s change in mean radius of zone of inhibition (cm) with S. E bars for different concentrations of extract. Figure 7 shows fungus Botrytis cinerea’s change in mean radius of zone of inhibition (cm) with S. E bars for different concentrations of extract.

Statistics

Discussion

This practical was to determine whether different concentrations of garlic extract affected the size of the zone of inhibition of fungal growth around the well of the agar plate. When raw garlic is crushed, allicin is produced by a reaction with the enzyme allinase. It is deactivated below pH 3 and because of this; it is not usually produced in the body when garlic is consumed. Allicin is also unstable and can break down within 24 hours. Allicin is an organosulfur compound that can be isolated in the laboratory from garlic. It was first isolated in 1944 by Cavallito et al. Allicin exhibits certain antibacterial and anti-fungal properties and is garlic's mechanism for protection against pests and fungi.

Antibacterial activity

Allicin has been found to have numerous antimicrobial properties, and has been studied in relation to both its effects and its biochemical interactions. One potential application is in the treatment of methicillin-resistant Staphylococcus aureus (MRSA), an increasingly prevalent concern in hospitals. A screening of allicin against 30 strains of MRSA found high level of antimicrobial activitity, including against strains that are resistant to other chemical agents. Of the strains tested, 88% had minimum inhibitory concentrations for allicin liquids of 16 mg/L, and all strains were inhibited at 32 mg/L. Furthermore, 88% of clinical isolates had minimum bactericidal concentrations of 128 mg/L, and all were killed at 256 mg/L. Of these strains, 82% showed intermediate or full resistance to mupirocin. This same study examined use of an aqueous cream of allicin, and found it somewhat less

effective than allicin liquid. At 500 mg/L, however, the cream was still active against all the organisms tested—which compares well with the 20 g/L mupirocin currently used for topical application. A water-based formulation of purified allicin was found to be more chemically stable than other preparations of garlic extracts. They proposed that the stability may be due to the hydrogen bonding of water to the reactive oxygen atom in allicin and also to the absence of other components in crushed garlic that destabilize the molecule. Allicin features the thiosulfinate functional group, R-S(O)-S-R. The compound is not present in garlic unless tissue damage occurs, and is formed by the action of the enzyme alliinase on alliin.[1] Allicin is chiral but occurs naturally only as a racemate. The racemic form can also be generated by oxidation of diallyl disulfide:(SCH2CH= CH2)2 + RCO3H → CH2= CHCH2S(O)SCH2CH= CH2 + RCO2Hhere's what i wrote he wanted for the fungi lab report. short intro, materials and methods (not just writing what they give us) he wants to know if we made any improvements, our data set, reerence to the class data (do not put a table of class data in), interpret class data-graphs and stats, discussion-not what results say (he wants that in results maybe??) but how the data we obtained relates to literate on the topic. xxxx