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# Fun with Fomites

**Purpose**

The purpose of this exercise is to test a chosen fomite for the presence of microbes and the effects of a disinfectant by growing colonies of bacteria in a medium on petri plates.

**Background**

“Fomites? What are fomites? This is a term for any inanimate object that can carry disease-causing organisms. Your cutting board, kitchen sink, the change in your pocket and even that pen you keep putting in your mouth are all fomites. Very few things we encounter in our everyday activities are sterile, or microbe-free, including us. At birth, microbes immediately begin colonizing our bodies as they do most every object in the world. They float around until they come in contact with a surface that offers food and shelter. You are most likely to find microbes in and on dark, moist objects that frequently come into contact with food, dirt or vegetation. Bathroom surfaces, hairbrushes, refrigerators, kitchen sinks and cutting boards often have lots of microbes on them. But doorknobs and walls have fewer because they are nutrient-poor and dry.

Most of the microbes on our bodies and other surfaces are harmless, but some are pathogenic or disease-causing. For this reason, we want to control the number of microbes around us. The odds of becoming infected increase with the number of microbes on surrounding objects. But what can we do to affect the number of microbes on surfaces around us?

In this activity, you will test a chosen fomite for the presence of microbes and the effects of a disinfectant by growing colonies of bacteria in a medium on petri plates. A medium has food, vitamins and salts that help microbes grow. You usually don’t see bacterial colonies like those that form on petri plates on everyday surfaces. That’s because there is rarely such a perfect concentration of nutrients on fomites in nature.”[[1]](#endnote-1)

**Procedure:**

 **Materials**

1. 3 sterile petri plates prepared with nutrient agar (can be ordered from Carolina Biological Supply Co. by calling 800-334-5551)
2. unopened box of sterile cotton swabs
3. paper towels
4. cellophane tape
5. permanent marker or grease pencil
6. a disinfectant such as 70% alcohol solution (mix 7 parts alcohol to 3 parts water), 10% bleach solution (mix 1 part bleach to 9 parts water), liquid soap, Lysol® or other household cleanser

**Sequence of Steps**

1. Clean your work area by dabbing, not pouring, disinfectant solution onto a paper towel and swabbing your area. Set out your petri plates but DO NOT OPEN THE PLATES UNTIL YOU'RE TOLD.

2. Choose an object in the room (doorknob, picture frame, toy, kitchen counter, TV remote control, coin, etc.). Take one unopened petri plate and using your grease pencil or marker, divide the bottom of the plate into four equal sections. Write the object’s name across the top and label the sections 1 through 4. Open the box of cotton swabs and select one being careful not to touch the tip. Swab your chosen object with all sides of the swab tip by turning and twisting the swab as you move it across the object’s surface.

3. Now open the lid of the plate and GENTLY make four streaks on the plate’s surface as shown in the illustration, starting in the section labeled "1" and continuing streaking in order of the sections, making your last streak in section 4. Use firm, but GENTLE pressure and do not retrace your previous streaks. Your streaks should make only very slight impressions in the agar—don’t gouge. Close the plate and seal it shut with two pieces of tape placed along the side—don’t cover over the top with tape or you won’t be able to see the inside of it well.

4. Divide a second unopened petri plate into 4 sections numbered 1 through 4 and label it "Control." Clean half of the object you swabbed with a paper towel dampened with plain water—just wipe a couple of times; don’t scrub. Using a new cotton swab, swab the cleaned area for microbes. Open the lid of the second plate and GENTLY make 4 streaks on the plate’s surface, following the order of the numbered sections as you did previously. Close the plate and seal it.

5. Divide your third petri plate into 4 numbered sections and label it with the name of the disinfectant you’ve chosen (e.g. "Bleach"). Use your chosen disinfectant to clean the other half of the object you swabbed. Using another new cotton swab, swab the area for microbes. Repeat the process of streaking the plate. Close and seal the plate.

6. Soak the used cotton swabs in disinfectant and throw them away. Place your plates in an out of the way spot and let them incubate at room temperature for two days. Clean your work area with disinfectant solution. Wash your hands.

![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()7. After two days have passed, look at your initial petri plate. Do not open it. Examine your other petri plates in turn without opening them. Create a table that compares the plates made before and after cleaning the object. Be sure to indicate whether microbes grew in each streak.

![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()8. Very carefully open the petri plates in a sink and flood them with undiluted bleach or alcohol. Let stand for an hour and then rinse them out thoroughly, tie them in a plastic bag and throw them away. Be sure not to touch the plate surfaces when you open them and wash your hands thoroughly after handling the plates. Clean your work area with disinfectant solution.

9. Answer the questions under “observations”.

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 **Observations**

Table 1

*Place an “x” in the growth row under each streak number that showed growth.*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Plate 1 | Plate 2 | Plate 3 |
| Streak | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Growth |  |  |  |  |  |  |  |  |  |  |  |  |

1. Which plate grew the most and biggest colonies? Why do you think that is?
2. Do you see a pattern in the size and amount of colonies in each plate?
3. How can we control microbial contamination?
4. If you tested more than one fomite, which one grew more microbes? Why is that?

5. Agriculture application: Complete the table below, identifying fomites which can carry disease causing organisms in a production environment.

|  |
| --- |
| Scenario: Hog production facility |
|  | Fomites | Ways to control or sanitize |
| Housing Facilities |  |  |
| General Sanitation |  |  |
| Other |  |  |

1. (2006). Fun with Fomites. Retrieved January 19, 2009, from American Society for Microbiology Web site: http://www.microbeworld.org/resources/experiment/experiment\_%20fun\_with\_fomites.aspx [↑](#endnote-ref-1)