IFU

Instructions for Use

BIO-KID™ MICROBIOLOGY EXPERIMENT KIT

BIOKID1	Bio-Kid™ Microbiology Experiment Kit	10 tests/kit
Each kit contains:		
G60	Tryptic Soy Agar, 15x100mm plate, 18ml	10 plates
R47	Saline, 0.85%, 13x100mm tube, 4ml	1 tube
HD258061WC	Swab, Cotton, Sterile, Wooden Shaft, Individually Wrapped	10 swabs

INTENDED USE

Hardy Diagnostics Bio-Kid™ Microbiology Experiment Kit is designed for use in performing various microbiology science fair projects at the middle and high school level, or for educators interested in developing lesson plans or activities related to science, technology, engineering, or mathematics (STEM).

This product is not intended to be used for the diagnosis of human disease.

SUMMARY

Microorganisms are ubiquitous, present everywhere and on everything. Microorganisms can cause disease, keep us healthy, and even contribute to recycling key elements in the ecosystem; yet, some can survive even the most hostile conditions, including space! Though microorganisms can be scary at times, without microbes, almost every living thing on Earth would not be able to survive.

Just like humans, microorganisms need nutrients (i.e. food) and other conditions, such as an optimal temperature, or atmosphere, in order to grow. Therefore, this kit outlines three experiments that explore various methods to evaluate microorganisms. The first two experiments illustrate techniques on how to evaluate microbes in the general environment or those living on human skin. The third experiment helps demonstrate the efficacy of cleaning methods and their relevance to health and hygiene. While there are only three experiments outlined here, this kit includes a general growth medium that can be used to perform a multitude of experiments.

Tryptic Soy Agar (TSA) is a safe and effective general growth medium, and is nutritious enough to grow a variety of bacteria and fungi. The medium contains digests of soybean meal and casein (a milk protein), which provide amino acids, vitamins, and other nitrogenous compounds to promote microbial growth: microbes need their vitamins, too! Sodium chloride (i.e. salt) is added to help cells maintain osmotic equilibrium, so they don't explode or shrivel up. Dextrose (a carbohydrate) is added as an energy source to help cells perform work. Agar is a jelly-like substance derived from marine algae, and is used to make the medium firm. It has a higher solidifying temperature than gelatin

used in Jell-O, but is still soft and spongy to the touch. It provides a surface area for microorganisms to grow and spread out.

Bio-Kid™ Microbiology Experiment Kit is designed to help children and students understand the world around them by learning how microorganisms contribute to the surrounding environment. Although most of us never have an opportunity to see microbes, these experiments and variables will provide students with an opportunity to see just how different microorganisms can be. This kit will also provide valuable lessons on the basics of critical thinking and the fundamentals of the scientific method, and can also be used to stimulate ideas, promote teamwork, and exploration. We hope the experiments inspire you, too!

FORMULA

Ingredients per liter of deionized water:*

Cat. no. G60 contains:	
Pancreatic Digest of Casein	15.0g
Peptic Digest of Soybean Meal	5.0g
Sodium Chloride	5.0g
Agar	15.0g

Final pH 7.3 +/- 0.2 at 25ºC.

Cat. no. R47 contains:	
Sodium Chloride, (saline) 0.85%, 13x100 screw cap tube	8.5gm

Final pH 6.5 +/- 1.0 at 25ºC.

* Adjusted and/or supplemented as required to meet performance criteria.

STORAGE AND SHELF LIFE

Storage: Upon receipt, store at 2-8ºC in the refrigerator or away from direct light. Media should not be used if there are any signs of deterioration (shrinking, cracking, or discoloration), contamination, or if the expiration date has passed. Product is light and temperature sensitive; protect from light, excessive heat, moisture, and freezing. Brief light exposure during testing is expected.

The expiration date on the product label applies to the product in its intact packaging when stored as directed. The product may be used and tested up to the expiration date on the product label and incubated for the recommended incubation times as stated below.

Refer to the document "Storage" for more information.

PRECAUTIONS

This product is for laboratory use only.

Normal microbial safety practices should be followed, such as wearing gloves to protect the skin, and washing hands thoroughly after performing experiments.

Used and unused plates may be discarded in the normal trash, since they contain no hazardous chemicals and the microorganisms obtained represent those commonly found in the environment.

Ensure that all testing and incubation of the plates is done away from foods and other items used for consumption. Tape the lids closed after incubation to prevent removing lids on plates with active cultures.

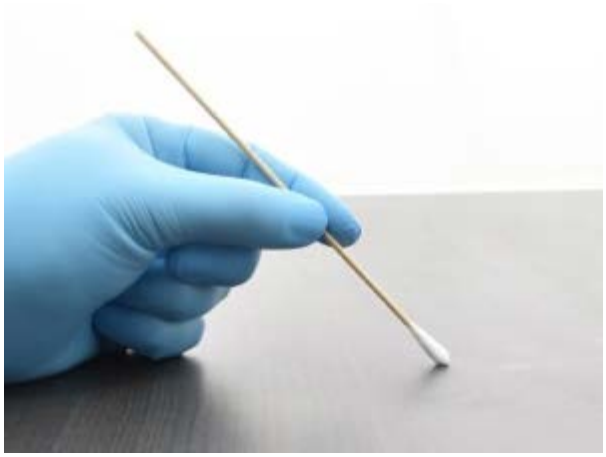
Gloves are recommended when handling microorganisms.

Supervise students/children at all times when observing results. Keep lids closed on plates after incubation to prevent direct contact with microbial colonies.

Refer to the document "Precautions When Using Media" for more information.

Refer to the document SDS Search instructions on the Hardy Diagnostics\' website for more information.

PROCEDURE



Experiment 1: Observing microorganisms in the environment

This experiment demonstrates how to sample the surrounding environment to observe for the presence of bacteria and fungi. Some recommended areas to sample are sinks/drains, computer keyboards, cell phones, door knobs, or kitchen counters. Ideally, surfaces *should not* be cleaned or disinfected prior to sampling.

1. Label the edge of the bottom of the plate (where the label is printed) with a permanent marker.
2. Swab the sample area with a cotton swab. If the surface is dry, the swab will need to be pre-moistened with sterile saline (Cat. no. R47) prior to sampling. One tube can be used to pre-moisten multiple sterile swabs, provided only unused swabs are inserted into the saline and the tube is capped between use. Do not contaminate the saline tube with dirty swabs!
3. Streak an agar plate with the swab by running the swab in a zig-zag motion across the entire surface of the medium, being careful not to puncture the agar. **NOTE**: Agar is soft like Jell-O. Take care not to puncture or tear the surface when streaking with the swab, as this will affect results.
4. Repeat steps 1-3, using a fresh plate, for all surfaces to be tested. Make sure to label the bottom of each plate separately to compare results from different surfaces.
5. Incubate the plates inverted (agar side on top, lid on the bottom) at 35°C. If an incubator is not available, the plates can be incubated inverted away from direct light at ambient room temperature. Setting the plates in a darkened cardboard or similar non-airtight box on the top of the refrigerator works well, as this area is usually slightly warmer than room temperature.
6. Colonies should be visible after 24 to 48 hours at 35°C, but may take slightly longer at cooler temperatures. Note that bacteria generally take one to two days to see visable colonies. However, fungi is slower in growth and will take three to seven days to see colonies. Observe the colonies on the plates to see and describe what types of bacteria or fungi are present in the environment. Count the number and variety of colonies to see which areas are the cleanest.

Experiment 2: Observing microorganisms on the human body

In the previous experiment, we learned about microorganisms in the environment. Microorganisms are also present all over the inside and outside of the human body. In this experiment, we will observe the various microorganisms that call the human body home. Some recommended areas to sample are teeth, tongue, armpits, between toes, behind ears, or inside the belly button. Try to avoid areas that are dry or washed more frequently.

1. Label the edge of the bottom of the plate (where the label is printed) with a permanent marker.
2. Swab the sample area with a cotton swab. If the surface is dry, the swab will need to be pre-moistened with sterile saline (Cat. no. R47) prior to sampling. One tube can be used to pre-moisten multiple sterile swabs, provided only unused swabs are inserted into the saline and the tube is capped between use. Do not contaminate the saline tube with dirty swabs!
3. Streak an agar plate with the swab by running the swab in a zig-zag motion across the entire surface of the medium, being careful not to puncture the agar. **NOTE**: Agar is soft like Jell-O. Take care not to puncture or tear the surface when streaking with the swab, as this will affect results.
4. Repeat steps 1-3, using a fresh plate, for all surfaces to be tested. Make sure to label the bottom of each plate separately to compare results from different surfaces.
5. Incubate the plates inverted (agar side on top, lid on the bottom) at 35°C. If an incubator is not available, the plates can be incubated inverted away from direct light at ambient room temperature. Setting the plates in a darkened cardboard or similar non-airtight box on the top of the refrigerator works well, as this area is usually slightly warmer than room temperature.
6. Colonies should be visible after 24 to 48 hours at 35°C, but may take slightly longer at cooler temperatures. Note that bacteria generally take one to two days to see visable colonies. Observe the colonies on the plates to see and describe what types of bacteria or fungi are present on the body. Count the number and variety of colonies to see which areas are the cleanest.

Experiment 3: Testing disinfecting solutions and/or disinfection methods

This experiment is useful for testing the efficacy of common disinfectants and/or disinfection techniques. Some common solutions to test are soap and water, mouthwash, kitchen cleaners, disinfecting wipes or sprays, and hand sanitizers. Sample the area before and after disinfection to determine which disinfectant or method works best.

1. Label the edge of the bottom of two plates (where the label is printed) with a permanent marker.
2. Swab the sample area with a cotton swab. If the surface is dry, the swab will need to be pre-moistened with sterile saline (Cat. no. R47) prior to sampling. One tube can be used to pre-moisten multiple sterile swabs, provided only unused swabs are inserted into the saline and the tube is capped between use. Do not contaminate the saline tube with dirty swabs!
3. Streak the first agar plate with the swab by running the swab in a zig-zag motion across the entire surface of the medium, being careful not to puncture the agar. **NOTE**: Agar is soft like Jell-O. Take care not to puncture or tear the surface when streaking with the swab, as this will affect results.
4. Clean the sample area with the disinfectant of choice and allow the area to air dry.
5. Moisten a second swab with the sterile saline (Cat. no. R47) and swab the area again after disinfecting.
6. Follow step 3 to streak the second agar plate.
7. Incubate the plates inverted (agar side on top, lid on the bottom) at 35°C. If an incubator is not available, the plates can be incubated inverted away from direct light at ambient room temperature. Setting the plates in a darkened cardboard or similar non-airtight box on the top of the refrigerator works well, as this area is usually slightly warmer than room temperature.
8. Colonies should be visible after 24 to 48 hours at 35°C, but may take slightly longer at cooler temperatures. Note that bacteria generally take one to two days to see visable colonies. Observe plates to identify the efficacy of disinfection methods. Count the number and variety of colonies to see which disinfectant was most effective.

INTERPRETATION OF RESULTS

Clearly visible growth in the form of colonies indicates a positive result. Because of the inherent variability of environmental sampling methods and locations, colonies may be of many different species of microorganisms and possess different morphologies (e.g. surface appearance, color, shape, size, etc.), quantity, and variety.

In general, fungal colonies such as mold may appear fuzzy, hairy, or cottony and may vary in color and size of colony. These colonies generally take longer to grow than bacteria.

In general, bacterial colonies may appear moist or dry, smooth on top, not fuzzy, round or spreading, and may vary in color and size of colony.

LIMITATIONS

Complete identification of colonies cannot be determined solely by growth on Tryptic Soy Agar. Further testing would be needed.

Refer to the document "Limitations of Procedures and Warranty" for more information.

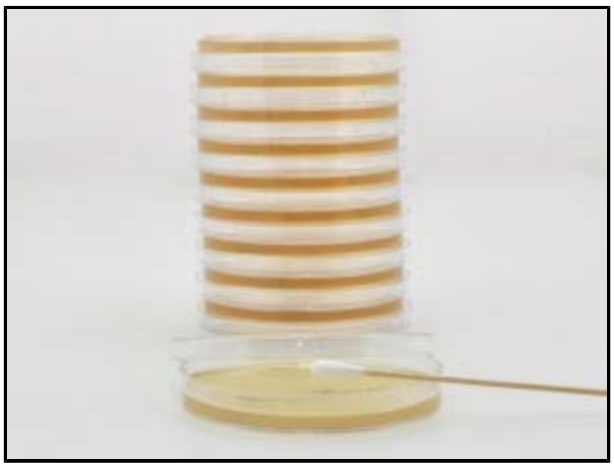
MATERIALS NOT PROVIDED

Standard microbiological supplies and equipment such as gloves, lab coats, loops, racks, applicator sticks, other culture media, incinerators, incubators, etc., as well as serological and biochemical reagents, are not provided.

PHYSICAL APPEARANCE

Bio-Kid™ Microbiology Kit contains the following:

- Tryptic Soy Agar (TSA), USP should appear translucent and light amber in color.
- Saline, 0.85%, should appear clear and colorless.
- Swab, Cotton, Sterile, Wooden Shaft, Individually Wrapped in a sealed envelope.



IFU-10071[B]

HARDY DIAGNOSTICS

1430 West McCoy Lane, Santa Maria, CA 93455, USA
Phone: (805) 346-2766 ext. 5658
Fax: (805) 346-2760
Website: HardyDiagnostics.com
Email: TechnicalServices@HardyDiagnostics.com
Ordering Information

Distribution Centers:
California · Washington · Utah · Arizona · Texas · Ohio · New York · Florida · North Carolina

The Hardy Diagnostics manufacturing facility and quality management system is certified to ISO 13485.

HDQA 2207F [D]