

Mastery Series: What Good Are Microbes?

1. What is the nitrogen cycle, and what critical roles do microbes play in it?
2. Why should each city thank its sewage treatment plants' microbes?
3. How is most of the world's oxygen produced?
4. Why is a yeast infection an indication of abnormal flora?
5. List 7 foods made with the aid of microbes.
6. Give an example of a food made with both bacteria and yeast (which is a fungus).
7. Why have some genetically modified plants become resistant to round-up?

Mastery Series ANSWERS: What Good Are Microbes?

1. What is the nitrogen cycle, and why are microbes critical to it?

The nitrogen cycle is a series of chemical reactions that different species of bacteria perform in order to provide usable forms of nitrogen to plants. N_2 in the air undergoes several reactions until it is “fixed” into nitrates (NO_3^-) that can be assimilated by plants. Plant and animal nitrogenous wastes (primarily NH_3 , ammonia) can also be converted into nitrates (NO_3^-). Many bacterial species are able to perform different aspects of these essential conversions.

2. Why should each city thank its sewage treatment plants’ microbes?

Bacteria break down sewage into less or non-toxic wastes.

3. How is most of the world’s oxygen produced?

Cyanobacteria—the blue-green photosynthetic phytoplankton in the oceans.

4. Why is a yeast infection an indication of abnormal flora?

Although we all have *Candida albicans* on our mucous membranes, this yeast generally only overgrows when there is a scarcity of normal bacteria, such as *Lactobacillus*, *Escherichia*, *Staphylococcus* and *Streptococci*. When normal bacteria decrease in number, then fungi such as *Candida* can grow TOO much.

5. List 7 foods made with the aid of microbes.

Fermented dairy: Yogurt, cheese, kefir

Fermented veggies, grains, and meats: Saurkraut, kombucha, pepperoni, bread

Alcohol: beer, wine, liquor

6. Give an example of a food made with both bacteria and yeast.

Sourdough bread (*Lactobacillus* and *Saccharomyces cerevisiae*)

Some cheeses

7. Why have some genetically modified plants become resistant to round-up?

Roundup normally blocks protein synthesis in plants. Round-up ready modified plants have been genetically engineered with a bacterial protein that is not affected by Round-up. Thus, these plants can keep making proteins even when sprayed with Round-up.