



Space Farming

Space farming requires greater understanding if humans are to survive in space without constant contact from Earth. Space farming simply refers to growing edible plants in space. At first glance this might not seem too tricky, but the properties of space and our ability to travel and live in its environment greatly complicate the situation.

Luckily, the International Space Station has a whole team of astronauts from around the world specializing in a variety of scientific and engineering fields. Astronauts conduct experiments and improve our knowledge of cultivating plants in space, as well as many other critical areas of science. Earth-bound researchers and scientists analyze the results and conduct their own experiments, thinking up new theories and possible solutions.

Before we look into the progress the experts have made in space farming, let's delve a little deeper into the obstacles they face.

Less Gravity

The experiments astronauts perform on the ISS are conducted at **microgravity** and could be helpful in the related case of farming on the surface of the moon or Mars, which have significantly lower levels of gravity than Earth. Plants use gravity as they grow, with stems growing up and roots growing down. Scientists analyze whether plants can properly grow with lower levels of gravity, and just what those levels are.

Artificial Lighting

Most plants on Earth have access to loads of natural sunlight and grow toward that light, but researchers must fool plants growing in space to follow this same behavior. It's important to use energy efficiently in space, because resources are limited.

Energy can't be wasted on light bulbs that don't produce a lot of imitation sunlight. In addition, different types of lighting create heat, and extra heat is something spacecrafts must eliminate. Additionally, astronauts don't have extra room to lug spare light bulbs through space, so they need a lighting source with staying power, like light emitting diodes (LEDs).

Limited Available Space

The confined quarters of spacecraft are very different from the massive, rolling farmlands on Earth. Researchers must develop efficient, streamlined grow boxes that can hold crops as they grow. Grow boxes must be automatic and be able to regulate plant needs: water, humidity, light, air and nutrients. They also need to integrate with the life support system to successfully exchange gases (carbon dioxide and oxygen).

So when can astronauts visit space's first salad bar? It might be a while as researchers work to understand and overcome the obstacles that space farming presents.

