

CASE STUDY

FOR BIOSERVE SPACE TECHNOLOGIES



PURAFIL REMOVES
ETHYLENE GAS
FOR BIOSERVE
SPACE TECHNOLOGIES



ABOUT BIOSERVE SPACE TECHNOLOGIES

The shuttle missions conducted by the National Aeronautics and Space Administration (NASA) are critical in determining if plant and human life can be sustained in space.

BioServe Space Technologies in Boulder, Colorado is the leading research center for outer space plant experiments. Fully funded by NASA, BioServe has conducted experiments aboard more than 100 shuttle missions. Their purpose during these missions is to study those factors which affect plant growth in space.

THE PROBLEM

Ethylene is a ripening hormone emitted by growing vegetation. Though ethylene gas is colorless, it can be identified by its sweet, pungent odor. A high concentration of ethylene gas, especially in an enclosed space, can cause plants and flowers to wilt and die prematurely.

Ethylene off-gassing during space shuttle missions proved to be an impediment in BioServe's research. BioServe approached Purafil, Inc. in hopes of a solution.

PURAFIL PROVIDES THE SOLUTION

Purafil® Select media is popular in the supermarket and florist industries for preservation of fruits and cut flowers. When BioServe researchers approached Purafil, they recommended Purafil Select media to remove ethylene gas.

To date, Purafil Select media has flown shuttle missions aboard Columbia, Endeavor and Discovery. While aboard the Columbia, Purafil Select media was part of an experiment documenting plant growth in orbit. The Purafil media was used to removed some part of the ethylene that is secreted out by plant seedlings.



PLANT SEEDLINGS

PURAFIL® SELECT MEDIA

It was determined that ethylene gas was scrubbed out effectively by the Purafil Select media and was non-detectable in the canisters of seedlings. However, ethylene was present at 50ppb in the canisters not containing Purafil Select media.

Purafil Select media was also included in the Plant Module for Autonomous Space Support (P-MASS) on a 30-day, returnable satellite. In fact, BioServe plans to include Purafil Media as an important component of their dedicated shuttle-based payload for plant growth. Now, BioServe is able to grow plants under very confined circumstances aboard the space shuttles and move forward with their research.

BioServe continues to be pleased with Purafil's reliability and believes the media is a critical part of their ability to progress in their studies.

PURAFIL SELECT MEDIA

Purafil Select media is an activated alumina-based substrate impregnated with potassium permanganate ($KMnO_4$) and sodium bicarbonate. Activated alumina offers a greater surface area than other common substrates, such as zeolite or silica gel, for reaction with gaseous contaminants. With more surface area available within the media, more contaminants are removed by the active ingredient.

Purafil Select media removes gaseous contaminants through a chemical reaction process known as oxidation. The adsorbed gases are converted to non-toxic solids which remain on the media pellet without the possibility of desorption.

Among the gases removed by Purafil Select media is ethylene. Purafil media demonstrates a 2.0% removal capacity for ethylene; for every 100 lbs of Purafil media, 2 lbs of ethylene is removed.

Purafil Select media is UL Classified and defined as those that, when clean, do not contribute fuel when attacked by flame and emit only negligible amounts of smoke.