



TO CUT DOWN ON EXCESS CARBON DIOXIDE LEVELS ON ISS USING SNAKE PLANTS

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ABSTRACT: This study deals with the Effect of hostile environments such as The International Space Station on the human body and provides a solution to cut down on excess Carbon Dioxide levels using snake plants (*Sansevieria Trifasciata*).

Key-words: ISS, International Space Station, Snake Plant, Carbon Dioxide

AIM

To cut down on excess carbon dioxide levels using snake plants (*Sansevieria Trifasciata*).

INTRODUCTION

The main objective of this research is to provide a solution to cut on excess CO₂ levels using snake plants (*Sansevieria Trifasciata*). Previously, several people have proposed several technological methods to do the same, but I have tried to provide a Natural Alternative that has several tremendous benefits rather than the usual one listed above. I decided to search online to find a way to confront this problem. I came across a post which explained a method using Snake plants (*Sansevieria Trifasciata*) and Areca Palm to create a healthy environment at your home. Shocked by the effects Astronauts face while aboard the International Space Station and the simplicity of the solution, I decided to design a module for myself and in a couple of hours I was successful in providing a useful method for this traumatic and overwhelming problem. I decided to study it further, and find what more I could do with it. This led me to fabricate a device that could help NASA's officials. In my study, I try to propose my hypotheses that introduction of oxygen producing plants to the International Space Station will improve the air quality of the hostile environments present in the international space station. This is a way to imitate the healthy lifestyle factors of longevity. This experiment will have a positive impact on the lives of astronauts and help them in a long run.

What is the need to do this?

We need to do this to prevent **drowsiness, impaired hearing, increased heart rate and blood pressure, shortness of breath, confusion, unconsciousness, muscle tremors, sweating.**

What happens to your body in space?

Space is a risky and disagreeable place. There are a few dangers about which some agencies are researching about. The dangers are assembled into five classes identified with the burdens they put on the space voyager: Gravity fields, Isolation/imprisonment, Hostile/shut situations, Space radiation, and separation from Earth. We create carbon dioxide in our bodies when our cells break down food and we release it when we breathe out. The carbon dioxide concentration in our atmosphere is approximately 0.04 percent. In the closed cabins of a spacecraft the carbon dioxide concentration is much higher, which poses a problem to the astronauts. All cells in our body uses oxygen as a fuel. The function of

the brain drops down if it is not supplied with appropriate amount of oxygen. If it falls too low, a stroke can occur. Cancers and many pathogenic diseases are caused by the lack of oxygen therefore hyperbaric oxygen chambers are used to provide oxygen. I hope that these facts help to illustrate the importance of introducing oxygen producing plants into the International Space Station.

A study by NASA on clean Air Study found that oxygen delivering plants can be utilized to both create oxygen and additionally expel regular unsafe chemicals from the air and separate them into innocuous natural results into the dirt, which the plants then use as sustenance. These chemicals are unsafe to human health. Some of these chemicals are found in manufactured floor coverings (discharges from aldehyde), oil based commodities (discharge benzene), toys, compound cleaners, paint, furniture with engineered segments and everything else that is engineered. As per Robert Frost, Instructor and Flight Controller at NASA, the main huge contrast between the air you are breathing, at this moment, and the air on the International Space Station is that the CO₂ concentration is higher in the International Space Station.

All air cleaning plants will obviously produce oxygen, yet here are some of the top ones that happen to have a high conversion rate of carbon dioxide to oxygen. The major benefit of adding oxygen producing plants to the ISS is that it would lead to increase of productivity due to the maintenance of healthy oxygen levels in the blood. Dr. B.C. Wolverton who was a former NASA research scientist had a belief that air purifying plants could be used onboard space missions to benefit the artificial environments onboard the spacecraft.

Some of these Plants are listed below:

- 1) Sprouts
- 2) Snake Plant also known as the Mother-In-Law's Tongue
- 3) Areca Palm which removes xylene and toluene from the air.
- 4) Madagascar Dragon Tree a.k.a. Red Edged Dracaena
- 5) Warneck Dracaena
- 6) Peace Lily

All the different oxygen producing plants listed above, Snake Plant is unique since it converts a lot of carbon dioxide to oxygen, making it ideal plant for our purpose. Snake Plants could be used for survival if there is no air flow meaning a person could live in a completely air sealed room if he had these plants and the Areca Palms present. The snake plant also removes formaldehyde from our surroundings.

Snake plant is an exceptionally rich source of oxygen while having uncommon robustness and ease of maintenance. Its properties have vital implications in the fields of health.



BENEFITS OF SNAKE PLANT

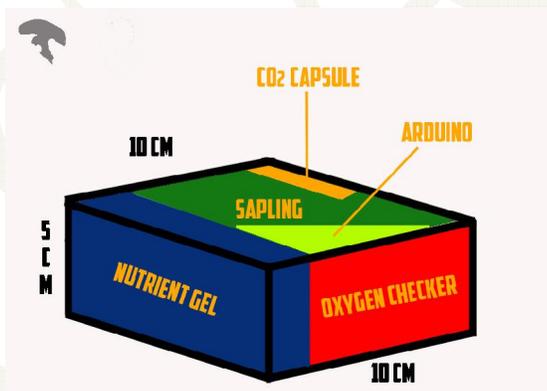
1. The colour green has a soothing and healing effect on our body. Moreover it is considered as a predominant color in nature. People have a propensity to feel the most at ease in settings that contain green colour. It is one of the best ways to deal with stress.
2. When detoxing your body, approximately 70% of it occurs through breathing, 20% through perspiration, 8% through urination and 2% through the bowels. In confined places people generally breathe improperly because the air is so toxic. When the air is vibrant and full of life-force energy, they naturally take big deep breaths all the time.
3. Another useful addition to these clean air plants is that they replace several electronic purifiers that are also negative ion generators. Electronic purifiers create a micro-climate in our surrounding which is not good for our health. Once optimal air quality is reached, we would be shocked to know how suffocating the air is.

Some other benefits are:

- 1) 52% less eye irritation
- 2) 34% fewer respiratory symptoms
- 3) 24% fewer headaches
- 4) 12% less lung impairment
- 5) 20% greater productivity

MY METHOD AND EXPERIMENT

Note: It can be propagated by cuttings or by dividing the rhizome.



The packet in the box includes nutrient gel, sapling, Arduino board (microcontroller), and carbon dioxide cartridge.

1. A sapling of a snake plant propagated by cutting or by dividing the rhizome is grown on a nutrient gel. The nutrient gel provides all the nutrients including water in adequate amount leaving the plant uncared by any human.
2. First of all, we need to remove the packet from the box.
3. Then we need to break the Carbon Dioxide cartridge.
4. At the end of the experiment check the oxygen level in the packet through the oxygen and carbon dioxide connected to an Arduino with the suitable sensor.

The exact number of oxygen producing plants needed by NASA should depend upon:

1. Volume of the habitable zone of The International Space Station
2. The number of people aboard the International Space Station

The NASA clean air study recommended 15-18 good sized oxygen producing plants and air cleaning plants for a 1,800 square foot house. Of course, that would be an average and you should take into account the various factors

mentioned above to decide whether you require more clean air plants than this. It would be best to start with just a few oxygen producing plants and increasing the number over time.

VARYING NEEDS OF THESE PLANTS

1. These plants require clean or dust free environment. The environment at the International Space Station is dust free.
2. Over watering may be harmful for the plant's survival. We don't need to care about this cause because we plan to grow the plant in a nutrient gel that has all the nutrients including water in adequate amounts.

CONCLUSION

This experiment will have a positive impact on the lives of astronauts and help them in a long run. This is a way to imitate the healthy lifestyle factors of longevity. This experiment will have a positive impact on the lives of astronauts and help them in a long run.

Also if we all try a bit harder Snake Plants could be one of the first plants species that could be grown on Mars.

FUTUREWORK POSSIBILITIES

1. I have designed a perpetual motion generator that requires no input to generate free unlimited electricity.
2. I will also try to provide other solutions to the problems that many global agencies face today and working individually on them would surely result in various vulnerabilities.

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