The seeds travel

Vitamin deficiencies cause health problems for astronauts, and to maintain their nutritional balance, it is necessary to search for the cultivation of some crops that provide them with their needs of different vitamins such as (A-B6-B5-D-C-K) as well as providing them with iron and calcium.

Currently, the pioneers receive regular shipments of a variety of dried, prepackaged and frozen meals to cover their nutritional needs.

But the problem is that prepackaged vitamins break down over time, which poses a problem for the health of astronauts.

So we chose the sweet potato plant because it contains vitamins, iron, antioxidants and a good proportion of calcium

The sweet potato plant takes five and a half months to grow, and it needs yellow sandy soil. As for the first irrigation, it is three weeks after its cultivation, and then the irrigation is done lightly so that the roots do not go deep.

Sweet potatoes are grown at a temperature of not less than 20 degrees Celsius

There is also the chard plant, which is rich in vitamins and minerals that the astronauts need in their healthy diet. The chard is also grown at a low temperature, not exceeding 25 degrees Celsius, and it does not need a long period to harvest it. The chard can be harvested after three weeks and used.

Agricultural soil in space

Cultivation is carried out in space on the so-called agricultural pillow, which is a black Kevlar coated with Teflon and equipped with Nomex (a synthetic fiber resistant to flame and heat) and the bottom contains growth media (calcined clay). Agricultural soil in space

How do we overcome the problem of the lack of gravity?

It is known that gravity has an important effect on root growth, but scientists have found that plants that grow in space do not need gravity to thrive.

The University of Florida research team believes that this ability is related to the plant's inherent ability to orient itself as it grows.

They found that germinated seeds behave as if their roots were on the ground, growing away from the seed in search of nutrients and water in the same pattern that would occur in the presence of gravity, indicating that plants retain an earthy instinct when they are not attracted to it.

This study shows that there is no obstacle in the growth of plants in the microgravity

It is known that plants need sunlight in the process of photosynthesis, as well as need carbon dioxide

How to overcome the problem of lack of sunlight?

In fact, a plant does not need sunlight, but it needs any light to supply the energy that it can get from photons.

Therefore, the problem of lack of sunlight can be overcome by using the LED and its lights are red and blue, as they are blue light that helps in the growth of leaves and red light helps in the growth of flowers and fruits. Since chlorophyll only absorbs red and blue light, it does not absorb green light

So the greenhouses are lit in purple

In general, plants need blue light for the growth of leaves and red light for the growth of flowers and fruits.

In terms of ideal wavelengths,

Red (610-700 nm)

and blue (500-570 nm)

These wavelengths are the most effective in promoting photosynthesis

With regard to obtaining carbon dioxide

It is obtained through an exchange process between the exhalation of astronauts, which is rich in carbon dioxide, which plants derive from them and exchange oxygen resulting from photosynthesis. With regard to obtaining carbon dioxide

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We take into account the placement of a moisture sensor in the soil to maintain the water balance and not expose it to rot as a result of the increased water percentage.

The water vapor resulting from transpiration is reused and collected to re-irrigate the plant with it again