

## 太空中生产的食物 Food made in space

Hello. This is 6 Minute English from BBC Learning English. I'm Neil.

大家好。这里是 BBC 学习英语栏目的六分钟英语。我是内尔。

And I'm Georgina.

我是乔治娜。

Last November Nasa launched a very unusual home delivery service—a rocket carrying four tonnes of supplies to the ISS—the International Space Station.

去年十一月，美国航空航天局开始了一项非常与众不同的送货上门服务——一艘载有四吨供给品的火箭飞往 ISS——国际空间站。

Among the scientific equipment were twelve bottles of red wine from the famous Bordeaux region of France.

在这些科学设备中有12瓶来自法国有名的波尔多地区的红酒。

The astronauts might have wanted a glass of wine with dinner, but the real purpose of the bottles was to explore the possibility of producing food and drink in space—not for astronauts but for people back on Earth.

也许是宇航员们想在晚餐的时候来杯葡萄酒，但是这些酒的真正目的是为了探索在太空生产食物和饮品的可能性——不是为宇航员们，而是地球上的人。

In today's programme we'll be finding out how growing plants in space can develop crops which are more productive and more resistant to climate change here on Earth.

在今天的节目里，我们将了解在太空中种植植物能如何研发产量更高并且能够更好地抵抗地球上气候变化的作物。

And we'll hear how plants can grow in environments with little or no natural light.

而且我们还会听到有关植物如何在极少的自然光或没有自然光的环境中生长的内容。

But first, today's quiz question: what was the first food grown in space?

但是首先是今天的问题：第一个在太空中被种植的食物是什么？

Was it: a) potatoes, b) lettuce, or c) tomatoes?

是 A. 土豆，B. 生菜，还是 C. 番茄？

Well, in the film, The Martian, a stranded astronaut grows potatoes on Mars.

嗯，在电影《火星救援》中，一位被滞留的宇航员在火星上种土豆。

I know it's only a film but I'll say a) potatoes!

我知道那只是电影，但是我要选 A. 土豆。

OK. We'll find out the answer later.

好的。我们稍后会揭晓答案。

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Now, you might be wondering how it's possible to grow plants without natural light.

你可能在想在没有自然光的情况下怎么可能种植植物。

British company Vertical Future has been working on this problem by developing indoor farming methods in partnership with Nasa.

英国公司纵向未来一直通过与美国航空航天局合作开发室内的农耕方法来解决这个问题。

Here's their Head of Research, Jen Bromley, explaining the process to BBC World Service programme, The Food Chain.

以下是他们的研究领队詹·布罗姆利对 BBC 世界服务节目《食物链》解释这一过程。

Basically we use LED lighting and we use LED lights that are tuned to a specific wavelength.

基本上我们使用的是 LED 光照，而且我们使用的 LED 灯被调整到了特定的波长。

So, if you image what the rainbow looks like, the reason a plant looks green is because it's not using all the green light-it actually reflects a lot of that back.

所以，如果你想象一下彩虹的样子，植物看上去是绿色的原因是它没有使用所有的绿光——事实上它把大部分绿光反射回去了。

So the reason why it looks pink in here is because we're actually only using red light and blue light to grow the plants, and that essentially tailors the light diet so that the plants look kind of black when you look at them because they're not reflecting any light-they're being super-efficient, they're using up every photon that hits them.

所以它在这里看上去是粉色的原因是我们其实只使用了红光和蓝光来种植植物，而这基本上定制了常规光照，所以那些植物看上去是黑色的，因为它们没有反射任何光——它们超级高效，它们用尽了每一个打到它们身上的光子。

The lack of natural light in space means that plants are grown using LED lights-LED is an abbreviation of 'light emitting diode'-an electronic device that lights up when electricity is passed through it.

太空中缺乏自然光意味着利用 LED 灯种植植物——LED 是“发光二极管”的缩写——当有电通过时会发光的电子元件。

On Earth plants look green because they reflect back any light travelling at a certain wavelength-the distance between two waves of light, which make things appear to us in the various colours of the rainbow.

在地球上，植物看上去是绿色的是因为它们会将以某种特定波长——两个光波之间的距离——运动的光全部反射回去，这使得物体在我们看来像彩虹一样五颜六色。

But when scientists control the wavelengths being fed, plants are able to absorb every photon-particle of light energy, making them appear black.

但是当科学家们控制喂养植物的波长时，植物们就能够把每个光子——光能粒子——都吸收进去，使得它们呈黑色。。

Each particle of light that hits the leaves is absorbed and through photosynthesis is converted into plant food.

每个打在树叶上的光粒子都被吸收了，然后通过光合作用被转化成植物的养分。

Nasa found that different colour combinations, or light recipes, can change a plant's shape, size and even flavour.

美国航空航天局发现不同的颜色组合，或者说光线食谱能够改变植物的形状、大小，甚至味道。

But the lack of natural light isn't the biggest obstacle to growing food in space.

但是缺乏自然光并不是在太空中种植食物的最大障碍。

Here's Gioia Massa, chief plant scientist at the Kennedy Space Centre in Florida, to explain.

以下是佛罗里达肯尼迪太空中心的主要植物科学家乔娅·马萨的解释。

Microgravity is really challenging but plants are amazing!

微重力真的很具有挑战性，但是植物太棒了。

They can adapt to so many different environments—we call this plasticity because they can turn on or off their genes to really adapt to all sorts of conditions and that's why you see plants growing in different areas on Earth—the same type of plant may look very different because it's adapting to the environment in that specific location.

它们能够适应非常多的环境——我们把这个叫做可塑性，因为它们能够开启或关闭它们的基因来适应各种条件，而这就是为什么你能够在地球上的各种地区看到植物生长——同类型的植物可能看上去非常不同，因为它正在适应那个特定地点的环境。

On Earth, plants use gravity to position themselves—shoots grow up, roots grow down.

在地球上，植物利用重力来摆放自己的位置——嫩芽往上生长，而根部往下生长。

But this doesn't apply in space because of microgravity—the weaker pull of gravity making things float and seem weightless.

但是这并不适用于太空，因为有微重力——更弱的重力使得物体漂浮起来，并且看起来没有重量。

Plants can only survive in these conditions due to their plasticity—the ability of living organisms to adapt and cope with changes in the environment by changing their biological structure.

植物能够在这些条件下存活就是因为它们的可塑性——生命体通过改变其生物结构来适应并应对环境变化的能力。

Plants adapt themselves to being in space by manipulating their genes—chemicals and DNA in the cells of plants and animals which control their development and behaviour.

植物通过操纵它们的基因——植物和动物细胞中控制它们发展和行为的化学物质和 DNA——来适应太空中的环境。

In the low-gravity atmosphere of space, plants become stressed but they adapt genetically.

在太空中的低重力环境下，植物面临压力，但是它们从基因上做出改变。

And as a result they're stronger and more resilient to other, less stressful events when they return home to Earth.

因此，它们变得比其它同类更强壮，更有抗性，当它们回到地球上时面对的压力会更小。

Like those bottles of red wine orbiting Earth as we speak.

就像我们所说的那些绕着地球运行的红酒。

The effects of microgravity on the wine's organic composition will be studied and could hopefully offer solutions for growing food in Earth's changing climate.

人们将会研究微重力对酒的有机成分的影响，并且很有可能找出在地球不断变化的气候中种植粮食的解决方案。

So, Neil, if it wasn't red grapes, what was the first food grown in space?

那么内尔，如果不红葡萄的话，那第一个在太空中被种植的食物是什么呢？

Ah yes, in today's quiz question I asked what the first plant grown in space was.

啊，是的，在今天的问中，我问你第一个在太空中被种植的食物是什么。

I said, a) potatoes.

我说的是 A. 土豆。

But in fact it was...b) lettuce, grown over fifteen months on the ISS, then eaten in fifteen minutes in the first ever space salad.

但其实是.....B. 生菜，在 ISS 上种植了超过15个月，然后被做成太空中第一个沙拉 15分钟内被吃完。

Today we've been discussing the possibilities of growing plants in space using LED lights-devices that use electricity to produce light.

今天我们一直在讨论使用 LED 灯——用电发光的设备——在太空中种植植物的可能性。

The energy needed for plants to grow is contained in photons, or light particles, travelling at different wavelengths-distances between light waves which make things look different colours.

植物生长所需的能量包含于光子中——或者说光粒子，它们以特定的波长——光波之间的距离，使得事物看上去有不同颜色——运动。

Plants have evolved over millennia using the strong gravity on Earth.

植物利用地球上的强重力进化了上千年。

But this changes in space because of microgravity-the weaker gravitational pull making things in space float and seem weightless.

但是由于微重力——更弱的万有引力使得太空中的物体漂浮着，并且似乎没有重量——这发生了变化。

Luckily, plants use their genes-the chemicals in DNA responsible for growth-to adapt to new environments by changing their biological structure-a process known as plasticity.

幸运的是，植物利用它们的基因——负责生长的 DNA 中的化学物质——通过改变它们的生物结构来适应新环境——这个过程被叫做可塑性。

All of which makes it possible for astronauts to enjoy a glass of wine and green salad in space.

这一切使得宇航员们能够在太空中享用葡萄酒和蔬菜沙拉。

And genetically stronger plants specimens to study back on Earth.

还有基因更强大的植物标本可以带回地球研究。

That's all for today but join us again soon at 6 Minute English.

这就是今天的所有内容，请收听下期六分钟英语。

Bye for now!

再见！

Bye!

再见！