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Space

Signs of alien life on exoplanet K2-18b may actually be nothing at all

Alex Wilkins

APPARENT signs of alien life on the exoplanet K2-18b may just be statistical noise, according to a new analysis of data from the James Webb Space Telescope.

On 17 April, Nikku Madhusudhan at the University of Cambridge and his colleagues claimed that K2-18b, a large, rocky planet 124 light years away, showed strong evidence of an atmosphere containing dimethyl sulphide, a gas that on Earth is only produced by living things.

But Jake Taylor at the University of Oxford has re-analysed the data that Madhusudhan and his team released – which was produced from an unpublished raw dataset – using a basic statistical test, and he found that it doesn't appear to show the presence of any molecules at all.

To detect molecules on alien worlds, astronomers observe the light that has passed through the planet's atmosphere, producing

what is known as a transmission spectrum. This comes in the form of a collection of data points for different frequencies of light, and astronomers then trace a line through these points to match them to known molecules.

Many of these lines will look a bit like bell-shaped curves, known

"The reflectivity of K2-18b's atmosphere could be too high to retain a liquid ocean"

as Gaussian distributions. Taylor used a statistical test to see whether the data better matched a Gaussian distribution or a flat line, which would indicate no molecules have been detected.

In six tests comparing Madhusudhan's data with different bell-shaped curves and flat lines, five of them showed a better match with a flat line (arXiv, DOI: arXiv:2504.15916). "This

indicates that the data does not have the precision, yet, to detect a spectral feature [indicating a particular molecule]," says Taylor.

Madhusudhan disagrees that tests like these say anything useful, because the simplicity of Taylor's modelled curves doesn't reflect the complexity of real data.

But Taylor argues that simple models, like Gaussian distributions, are routinely used to identify chemicals such as sodium in exoplanet atmospheres, and that most planetary models use simplified models to some extent.

Another question over the habitability of K2-18b concerns whether liquid water can exist on its surface. Oliver Shorttle at the University of Cambridge and his colleagues argue that the reflectivity of K2-18b's atmosphere, based on its transmission spectrum, is too high to retain a liquid ocean and

implies a scorchingly hot interior (arXiv, DOI: arXiv:2504.12030).

"Those spectra tell us that the atmosphere is absorbing light from the star, and that's bad news from the perspective of the planet's climate, because it wants to be reflecting to stay as cool as possible," says Shorttle.

Madhusudhan counters that Shorttle and his team can only measure the reflectivity for the part of the planet's atmosphere that light passes through on its way to us, rather than the day side of the planet, which permanently faces the star. This makes its "impractical" to infer information about the whole planet, he says.

It is possible that the day side of the planet is cooler than the point they measured, says Shorttle, but that would imply that heat can't efficiently move around the planet, which would be another problem for the likelihood of finding life, he says. ■

Health

Daily peanut doses could desensitise allergic adults

ADULTS with peanut allergy reduced their risk of reactions by eating a little peanut protein every day as part of a trial.

Peanut allergy occurs when the immune system mistakenly identifies proteins in the legume as a threat. It responds by producing more IgE antibodies, which are a vital part of the immune response but go into overdrive with allergic reactions. In extreme cases, it can lead to potentially fatal anaphylactic shock.

An intervention called oral immunotherapy was approved for children with the allergy in the US in

2020. This involves training the immune system by exposing it to gradually increasing doses of peanut proteins. However, it was unclear if this worked in adults.

To fill this knowledge gap, Stephen Till at King's College London and his colleagues recruited 21 adults with peanut allergy. At the start of the study, participants were only able to eat up to an eighth of a peanut, on average, before having an allergic reaction.

Each participant ate the protein equivalent of one 40th of a peanut every day for two weeks. This dose was slightly increased every two weeks for several months, until they could safely and consistently eat the protein equivalent of four large peanuts every day for a month (Allergy, doi.org/g9gj7c).



FABIO PAGANIALAWA

Three participants dropped out due to allergic reactions, while three others left for unrelated reasons. "This dropout number is acceptable for this kind of treatment," says Cezmi Akdis at the Swiss Institute

Some people can have extreme allergic reactions to peanuts

of Allergy and Asthma Research.

The remaining 15 took part in an allergy test where they ate increasing doses of peanut protein under supervision. All but one could eat the equivalent of five peanuts without having an allergic reaction.

Blood samples also revealed that the intervention caused participants to have higher levels of IgG antibodies, which counteract the effects of IgE antibodies.

"It is very promising," says Akdis. But larger trials are needed to verify the results, he says. ■

Speak to your doctor before seeking new treatments for medical conditions
Carissa Wong