



Researchers use chicken feathers for renewable energy



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University researchers are developing a method to use chicken feathers as a potential renewable energy source.

Teams from ETH Zurich in Switzerland and Nanyang Technological University in Singapore have discovered a use for a by-product of the poultry industry.

According to the researchers, there are 40 million tonnes of chicken feathers incinerated each year.

This not only releases large amounts of carbon dioxide (CO₂), but also produces toxic gases, including sulphur dioxide (SO₂).

The researchers have been working on extracting the protein keratin from the feathers and converting it into ultra-fine fibres.

These fibres can then go on to be used in the membrane of a fuel cell which generates CO₂-free electricity from hydrogen and oxygen, releasing only heat and water.

Chicken feathers

Raffaele Mezzenga, a professor at ETH Zurich, said: "I've devoted a number of years to researching different ways we can use food waste for renewable energy systems.

"We're taking a substance that releases CO₂ and toxic gases when burned and used it in a different setting.

"With our new technology it not only replaces toxic substances, but also prevents the release of CO₂, decreasing the overall carbon footprint cycle."

In conventional fuel cells, these membranes have so far been made using highly toxic chemicals, which are expensive and do not break down in the environment.

The membrane developed by the ETH and NTU researchers, consists mainly of biological keratin, which is environmentally compatible and available in large quantities, as chicken feathers are 90% keratin.

This means the membrane manufactured in the laboratory is already up to three times cheaper than conventional membranes.

Next steps

Researchers at ETH Zurich say there are further challenges to overcome before hydrogen can become established as a sustainable energy source.

In order to produce hydrogen, researchers say the new membrane could serve well in the future, because it can be used not only in fuel cells but also in water splitting.

The researchers' next step will be to investigate how stable and durable their keratin membrane is, and to improve it if necessary.

The research team has already filed a joint patent for the membrane and is now looking for investors or companies to develop the technology further and bring it to market.

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