

Cheaper, faster way to make amino acids

International team led by NUS don uses chemicals instead of microbes to make protein building blocks

Jose Hong

Amino acids are used in a huge range of industries but take a long time to produce. Now, they may become much easier to make with the help of scientists here.

An international team led by Assistant Professor Yan Ning from the National University of Singapore's (NUS) Department of Chemical and Biomolecular Engineering has found a way to massively shorten the manufacturing time of a product that many consumers may not know about.

His new chemical process, pub-

lished in the scientific journal *Proceedings Of The National Academy Of Sciences Of The United States Of America*, is also more stable and sustainable than current processes.

Amino acids are the building blocks of proteins, which are, in turn, crucial to make the everyday products eaten by humans and animals.

Industrial players also use amino acids to make biodegradable plastics, cosmetics and pharmaceutical products.

The amino acid leucine, for example, is essential for various metabolic processes in the body. It can stimulate muscle growth and help

prevent the deterioration of muscles with age.

However, humans cannot produce it naturally and must take it from protein-rich foods, or through manufactured sources.

Normally, they are made through fermentation, which can take up to a week, but Prof Yan's method takes just hours. He said it will be "much cheaper" simply because of its shorter production time.

Glucose is converted from plant-based agricultural waste into lactic acid in a vat.

It then turns the lactic acid into a solution rich with amino acids by exposing it to a chemical element called ruthenium at a temperature of about 220 deg C.

This solution can then be purified through membrane distillation.

"Our chemical approach is poten-

tially superior to microbial cultivation processes," Prof Yan told *The Straits Times* yesterday.

"The robust system is capable of producing amino acids that are of high quality, comparable to those produced by conventional microbial cultivation processes.

"Importantly, our system has further potential to completely convert all the glucose in the vat and achieve an amino acid yield as high as 100 per cent.

"This is not possible for microbial cultivation processes which have a yield as low as 15 per cent because a significant amount of glucose is eaten by microorganisms."

The team is now improving the system so that it can produce even more types of amino acids that are in high demand.

Eventually, Prof Yan wants to use amino acids to make artificial meat, though he is approaching the subject from the viewpoint of a chemical engineer.

He said: "Having meat from animals is a highly inefficient process, where 95 per cent of what goes into a cow comes out as waste like carbon dioxide. What I'm doing is the first step of a very long-term journey."

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POTENTIALLY SUPERIOR

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ASSISTANT PROFESSOR YAN NING, who is from the NUS Department of Chemical and Biomolecular Engineering.