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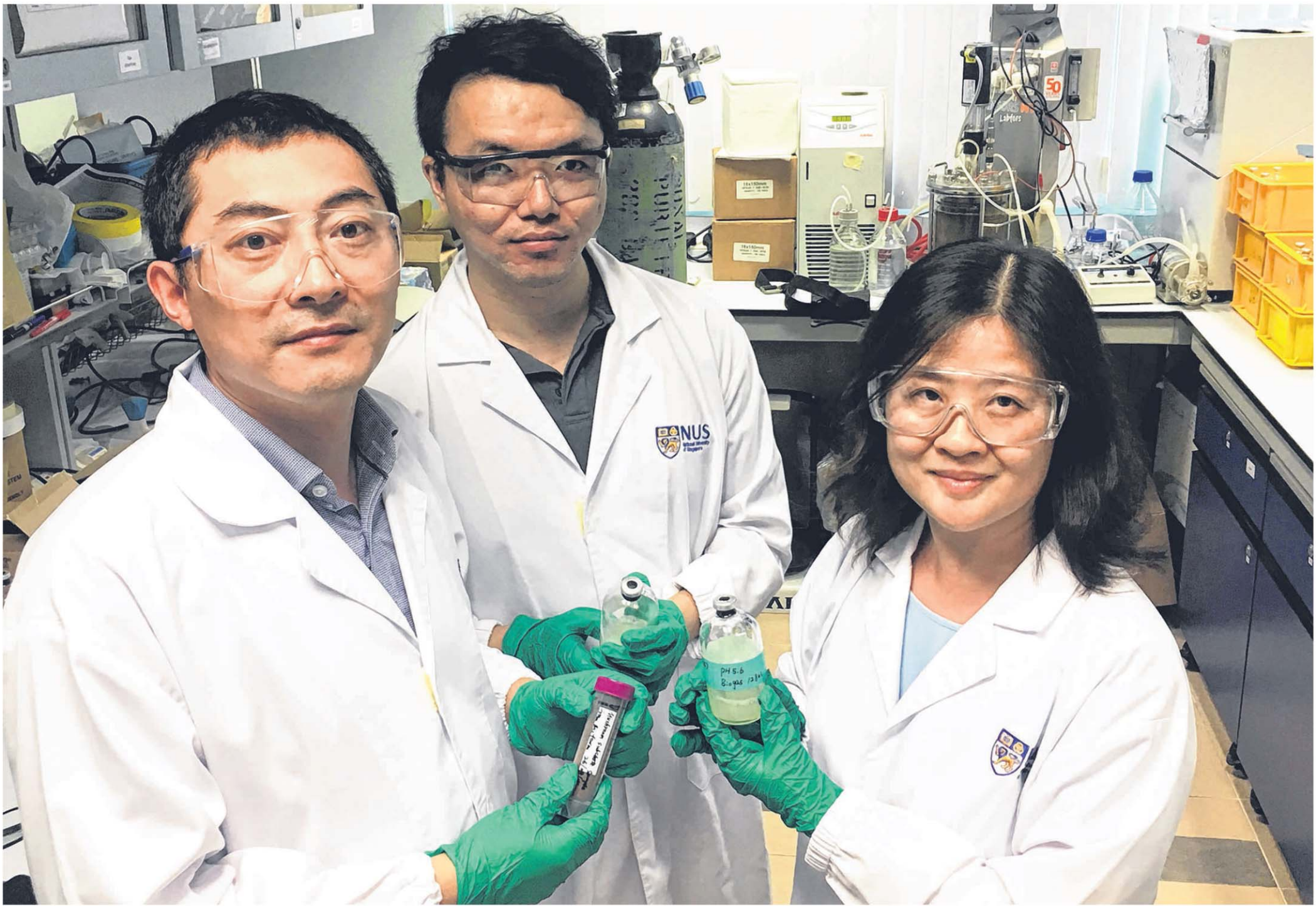

(From left): Dr Li Tinggang, research fellow; Mr Zhang Chen, a PhD student; and Associate Professor He Jianzhong from the Department of Civil and Environmental Engineering at NUS are part of a team that has found that a natural bacterium isolated from mushroom crop residue can directly convert cellulose to biobutanol, a biofuel. PHOTO: NATIONAL UNIVERSITY OF SINGAPORE

A game-changer for biofuel production

Jasia Shamdasani

Scientists here are turning trash to treasure by transforming unwanted farming byproducts into fuel.

The National University of Singapore researchers have discovered how to isolate and harness a naturally occurring bacterium from mushroom crop residue. This is then used to convert cellulose, a plant-based material, to biobutanol, which can replace petrol in car engines.

Micro organisms in the waste generated after harvesting mushrooms are left to evolve naturally for over two years to get the bacterium, said the scientists. When cellulose is added, the bacterium digests it to produce biobutanol.

The bacterium – *named Thermoanaerobacterium thermosaccharolyticum TG57* – was first discovered and cultured in 2015 by the team led by Associate Professor He Jianzhong of the university's Department of Civil and Environmental Engineering.

Traditional biofuels produced from food crops are costly and compete with food crops in the use of land, water, energy and other environmental resources, said Prof He.

However, those produced from unprocessed cellulosic materials like plant biomass such as tree leaves are in great abundance, environmentally friendly and economically sustainable.

Professor William Chen, director of Nanyang Technological University's Food Science and Technology Programme, said the new technique is interesting, and potentially significant if it could increase the yield of biobutanol production from microbial fermentation, or reduce or even remove the production of by-products, among other improvements.

Commercial production of biobutanol is hindered by the lack of potent microbes capable of converting cellulosic biomass into biofuels.

So over the next one to two years, the team says it will optimise the performance of the TG57 strain so that it will be able to produce more biobutanol.

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