SCIENCE

Zero-waste poultry processing tech may boost production of lab-grown meat

By Ben Coxworth July 05, 2022



From left, team members Eleanor Soole, Lau Joo Hwa, William Chen and Teng Ting Shien – Hwa holds a tray made from chicken feather protein, while Chen displays a dish of the pulverized feathers Nanyang Technological University

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In a typical poultry processing facility, much of the waste is simply dumped in a landfill or incinerated. Two experimental new processes, however, make use of the feathers, blood and bones – plus one of them may ironically reduce the number of chickens slaughtered.

Developed via a partnership between Singapore's Nanyang Technological University (NTU) and poultry producer Leong Hup Singapore, the two techniques are used to create two different products: meat storage trays, and a cell culture medium that could be used to produce lab-grown meat.

In one process, feathers are washed in distilled water to remove contaminants, dried at "room temperature" (27 °C/81 °F) for four days, then pulverized by a crushing machine. The resulting feather fibers – composed of a tough protein known as keratin – are then combined with an unsaturated polymer resin, forming a liquid mixture that is placed in a glass-bodied tray mold and left to cure for one day.

In lab tests, polymer trays made via this technique were found to be just as flexible as trays made of traditional petroleum-based plastics, yet they were also able to withstand almost twice as much force without breaking.



A step-by-step depiction of how chicken feathers are washed and ground into keratin powder, which is used in the production of meat trays Nanyang Technological University

The other process involves breaking down chicken blood, bone, gristle and skin, then extracting amino acids, vitamins, glucose, inorganic salts, and growth factors from the

material. These nutrients are used to create a serum which could be used as a cell-growth medium to cultivate lab-grown meat – *including* chicken. Fetal bovine serum, which is harvested from unborn fetuses obtained from slaughtered cows, is currently utilized for this purpose.

Leong Hup is currently testing both techniques in its Singapore poultry processing plant, and plans to expand use of the technology to its facilities in Malaysia and Southeast Asia next year.



A cell culture medium (left) made from a serum (right) obtained from chicken blood (middle) and other waste materials Nanyang Technological University

"The cultivation of lab-grown meat has the potential to reduce and even one day end the slaughter of farm animals and the impact rearing farm animals has on the environment. But it is expensive, partly due to the high cost of the medium that is used to grow the meat," said the lead scientist, NTU's Prof. William Chen. "Our collaboration with Leong Hup Singapore sees us applying innovations developed by NTU's Food Science and Technology Programme to address that problem, bringing down the price for the medium, while repurposing materials that would otherwise have been discarded."

Source: Nanyang Technological University

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Based out of Edmonton, Canada, Ben Coxworth has been writing for New Atlas since 2009 and is presently Managing Editor for North America. An experienced freelance writer, he previously obtained an English BA from the University of Saskatchewan, then spent over 20 years working in various markets as a television reporter, producer and news videographer.