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## Fish scales may be used for wound healing

By TOH EE MING



NTU Singapore scientists found that collagen (in right petri dish) processed from snakehead fish scales has potential for biomedical applications. Photo: NTU

Published 12 MARCH, 2018 UPDATED 12 MARCH, 2018



SINGAPORE — Fish scales and bullfrog skins containing collagen could be used to make wound dressings for burn victims or diabetic patients with chronic, slow-healing wounds in the not-too-distant future.

A study led by Nanyang Technological University (NTU) scientists found that the scales and skins — which contain collagen but are often thrown away — can be converted into useful materials.

Using chemical modification, the water-soluble collagen can be made into wound dressings in the form of gels, pastes, powders or pads that could be applied directly onto the skin, said NTU associate professor Andrew Tan, who is part of the team behind the study.

This could potentially treat wounds by promoting the growth of blood and lymphatic vessels, which improves the potential of tissue repair and regeneration.

Collagen dressings are typically suitable for different wound types, such as bed sores, minor burns, foot ulcers, chronic wounds and large open cuts.

Fish scales can offer a potentially useful alternative source of collagen.

While collagen is already “widely used for various biomedical applications”, most of the products that are commercially available come from animal sources like pigs, cows and sheep, said assistant professor Cleo Choong from the NTU School of Materials Science and Engineering.

They have limited clinical application due to “cultural and religious restrictions” associated with these mammal sources, she added. Greater checks and processing also have to be in place due to the risk of diseases that can be transmitted from mammals to humans.

Compared to cattle-based sources, collagen from fish scales has also been found to trigger human umbilical vein endothelial cells to produce 2.5 times more of a type of collagen that can boost blood vessel formation, according to a previous study by the same team of NTU scientists that was published in 2016.

Already, the team’s findings have drawn interest from some biomedical product manufacturing companies that are keen to turn to other non-mammal sources.

For the project, KhaiSeng Trading and Fish Farm supplied the researchers with fish scales from sea bass, snakehead and tilapia. Compared to cowhide, fish scales are cheaper and are usually removed from the fish before cooking.

About 200 milligrams of collagen can be derived from 10 grams of fish scales – the amount that can be obtained from one or two fishes.

Excluding labour costs, it costs about S\$4 to extract about 100 mg of collagen from fish scales in the lab.

The team is currently in talks with two local fisheries, to convert aquaculture waste material into useful materials and scale-up the collagen extraction process.

A large amount of aquaculture waste is produced yearly, with aquaculture production expected to hit 102 million tonnes by 2025, according to the 2016 State of World Fisheries and Aquaculture report published by the United Nations’ Food and Agriculture Organisation.

Speaking to TODAY on Monday (March 12), research fellow Dr Wang Jun Kit said that the next step would involve tests on bigger animals and human trials – which could take five to six years – before the product can be commercially available.

“They could facilitate tissue growth and speed up the overall wound healing process, but we would need to do more research and testing in this area,” said Dr Wang, adding that the research process began since 2012.

His team is looking at other collagen sources, such as bullfrog skin, which is also commonly discarded.