

[Home](#) > [SCIENCE NEWS](#) > [Biology](#) >

## NTU Invents Antimicrobial Compound Used In Reusable Face Masks Made By Ghim Li Group

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BIOLOGY



Credit: Ghim Li Group

Scientists from Nanyang Technological University, Singapore (NTU Singapore) have developed a sustainable and green way to extract high-quality antimicrobial compounds from seeds.

“With this know-how using organic sustainable argri-waste, we are able to apply this on new sustainable products using natural cotton fibres and sustainable chemicals which is in line with Ghim Li Group’s sustainable initiatives to protect the environment by reducing global waste and carbon footprint. We will continue to enhance our R&D efforts on sustainability to achieve our Ghim Li Group’s motto “????” to do our part using our products to benefit mankind by saving the environment.”

The discussion to use NTU’s antimicrobial technology started when Ms Ang heard about the sustainable waste-to-resource food research done by Prof Chen’s team.

Ms Ang, an NTU alumnus and a 2019 recipient of the Nanyang Alumni Achievement Award recognised for her outstanding contribution to her field, then contacted NTUitive, NTU’s enterprise and innovation company, to acquire the antimicrobial technology and its knowhow.

GLG is now looking to embark on a future research partnership with NTU to further research and develop innovative antimicrobial compounds and to identify future applications.

Prof Chen, who is also the Michael Fam Chair Professor in Food Science and Technology, said: “Our new antimicrobial compound assigned to Ghim Li Group was been tested in our labs to be safe for humans and can be sustainably produced in large quantities using green processes. We hope to continue this productive partnership where we can develop sustainable innovations that will keep Singapore at the forefront of a circular economy.”

One potential area of research in future, could be to further study the properties of the antimicrobial compound and its effects on different bacteria and viruses. This follows the findings of a peer-reviewed paper in 2005 by Taipei’s National Health Research Institutes.

The Taiwanese study reported that similar compounds found in black and green teas (also found commonly in seeds) demonstrated inhibitory activity against a protease that was deemed critical to the viral replication of the severe acute respiratory syndrome coronavirus (SARS-CoV).

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This new antimicrobial compound is used by global apparel and textiles manufacturer Ghim Li Group (GLG) as a fabric finishing in their reusable masks sold locally and overseas. The masks were distributed to Singaporeans and permanent residents last month as part of the Government's strategy to fight the COVID-19 pandemic.

\$149

The natural antimicrobial compound developed by NTU scientists contains powerful antioxidants found in seeds. In lab tests done at NTU, the compound killed 99 per cent of harmful bacteria by disrupting their cell walls.

Obtaining high-value ingredients from organic parts discarded during food processing, such as stems, seeds and husks, is an innovative way that can contribute towards a sustainable circular food economy and a key research focus of NTU's Food Science and Technology Programme.

Using green processes to obtain these ingredients will also be more sustainable, as typical antimicrobial solutions require the use of harsh chemicals such as solvents or use ions obtained from various metals such as silver.

In contrast, Professor William Chen, Director of NTU's Food Science and Technology Programme, and his team used ball-milling, known as solid-state synthesis, with clean water processes to extract the antimicrobial compounds from the discarded husks of seeds without the need for harsh chemicals.

\$549

As the natural compound is considered non-toxic for humans, it has huge potential to be applied in other types of products, such as personal protective equipment, sports apparel, paints, and disinfectants.

## About Nanyang Technological University, Singapore

A research-intensive public university, Nanyang Technological University, Singapore (NTU Singapore) has 33,000 undergraduate and postgraduate students in the Engineering, Business, Science, Humanities, Arts, & Social Sciences, and Graduate colleges. It also has a medical school, the Lee Kong Chian School of Medicine, established jointly with Imperial College London.

NTU is also home to world-renowned autonomous institutes – the National Institute of Education, S Rajaratnam School of International Studies, Earth Observatory of Singapore, and Singapore Centre for Environmental Life Sciences Engineering – and various leading research centres such as the Nanyang Environment & Water Research Institute (NEWRI) and Energy Research Institute @ NTU (ERI@N).

Ranked amongst the world's top universities by QS, NTU has also been named the world's top young university for the past six years. The University's main campus is frequently listed among the Top 15 most beautiful university campuses in the world and it has 57 Green Mark-certified (equivalent to LEED-certified) building projects, of which 95% are certified Green Mark Platinum. Apart from its main campus, NTU also has a campus in Singapore's healthcare district.

Under the NTU Smart Campus vision, the University harnesses the power of digital technology and tech-enabled solutions to support better learning and living experiences, the discovery of new knowledge, and the sustainability of resources.

For more information, visit <http://www.ntu.edu.sg>

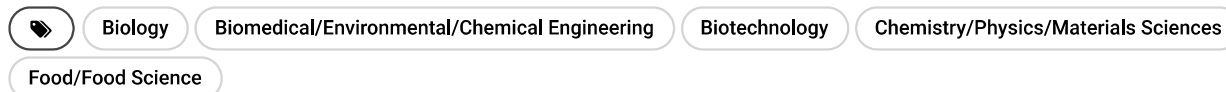
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With the new technology, GLG has plans to capture new business opportunities, expanding their product offerings to masks and even medical uniforms, beyond the traditional apparel products.

Products from GLG are distributed worldwide, to a range of USA and Europe specialty store retailers, major department stores and supermarket chains.

### Antimicrobial finish by NTU scientists

Research fellow Dr Jaslyn Lee and other researchers from Prof Chen's team conducted lab experiments using the extracted antimicrobial liquid compound, testing it on common food pathogens *Escherichia coli* and *Staphylococcus aureus*, which typically cause food poisoning when consumed.

				-15
	Orlando Queen Size Bed, Fossil	Joshua Chair, Flint Grey (Walnut Leg)	Seb Queen Size Bed	
	\$829	\$149	\$999	\$-

When in contact with bacteria, the compound binds to the bacteria wall, inactivating the protein and enzymes on the wall, thus inhibiting bacterial growth. In the tests, the compound was shown to be able to create a "zone of inhibition", where both *S. Aureus* and *E. Coli* bacteria growth were not able to penetrate this zone.

The NTU research team was initially targeting to create a new generation of sustainable anti-microbial food packaging. But following discussions with GLG, the newly discovered compound found another important application in reusable masks in this COVID-19 pandemic.

NTU Senior Vice President (Research) Professor Lam Khin Yong, said: "As a leading research-intensive university, NTU is proud that our research efforts have yielded a valuable resource for Singapore in the fight against infectious diseases. This innovation was an unexpected result of research in food science being applied in reusable masks used in the fight against COVID-19. This is a great example of how academia and industry can work together to create value for Singapore's economy and help Singapore companies become more competitive."

### Applications beyond masks by Ghim Li

Ms Estina Ang, Founder, Chairman & CEO, Ghim Li Group, said: "Ghim Li Group is thrilled to embark on our new journey with NTU on our R&D collaboration as we continue to reinvent our business model to develop new products and explore new business markets.