

## Mangosteens could be the cure to TB, say NUS researchers



Xanthones, a compound in mangosteens could be a useful tool in the fight against TB.  
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**SINGAPORE** — A natural compound found in mangosteens could be the answer to provide a new drug in the fight against tuberculosis (TB), according to a study by researchers from National University of Singapore's Yong Loo Lin School of Medicine (NUS Medicine).

Researchers found that xanthones, with its anti-oxidant and anti-bacterial properties, could be effective at inhibiting and killing *Mycobacterium tuberculosis* (Mtb), the bacterium responsible for causing TB.

Furthermore, xanthones had a low propensity for developing drug resistance, making it a promising candidate in developing anti-TB drugs, the study added.

The study, which began three years ago and was published in the *European Journal of Medicinal Chemistry*, was carried out under the Singapore Programme of Research Investigating New Approaches to Treatment of Tuberculosis (SPRINT-TB), a multi-party programme based in Singapore.

Earlier studies in Singapore using mangosteen fruit extracts had found that xanthones were effective against bacterial infections such as *Staphylococcus*. This prompted the researchers to investigate the potential for this class of compounds in tackling multi-drug resistant TB bacteria.

"We discovered that xanthones are effective in killing off persistent strains of bacteria, a property that could result in treatment-shortening therapies," said head of SPRINT-TB Professor Nicholas Paton, Division of Infectious Diseases, NUS Medicine.

Common strains of TB have developed multi-drug resistance, rendering some existing drugs ineffective against the disease. Also, there is also a low number of potential new chemical entities in the TB drug pipeline at present.

With patients facing a treatment regimen that can last six months or more, xanthones could prove an attractive option in tackling multi-drug resistant TB, the researchers suggested.

"The discovery of this new potential TB drug candidate is significant: Aside from two new drugs approved in recent years for multi-drug-resistant TB, the disease had not seen new drug developments in over 40 years. Using a proven anti-bacterial compound like xanthones means we do not have to re-invent the wheel by searching for and testing totally new compounds," said Prof Paton.

TB is an infectious disease affecting an estimated 8.6 million people globally and is responsible for some 1.3 million deaths annually, according to the World Health Organisation's Global Tuberculosis Report 2016. The emergence of multi-drug-resistant TB (MDR-TB) remains a serious public health challenge.

In Singapore, there are 41.1 cases per 100,000 people in 2016, with Asia accounting for 59 per cent of the world's TB case.

The Ministry of Health (MOH) said in a statement on Friday (March 24), which is World Tuberculosis Day, that it was notified of 1,617 new cases of TB among Singapore residents in 2016, which is higher than the 1,498 cases in 2015.

The MOH said a majority of the new cases were made up of older age groups (68.8 per cent were aged 50 years old and above) and males (65.9 per cent).

"The average TB patient currently expects to undergo six to 24 months of tedious treatment. Xanthenes offer a realistic avenue towards developing new and more effective drugs for TB with potentially shortened treatment times," said Associate Professor Thomas Dick, the study's principal investigator.

"All these factors can help in reducing the disease burden faced by Singapore's ageing population, as well as treatment costs incurred by patients and their families."

The next step, he added, was to "improve properties of the xanthenes and test them in pre-clinical studies".

But you shouldn't rush out to gorge on mangosteens, Prof Dick said. "(Xanthenes) are chemicals which are similar to the chemicals found in the fruit ... but we need to see the pre-clinical testing results. Based on the in-vitro data and their mechanism of action, we think the new compounds should delay the development of resistance and shorten treatment time as they are active against persistent bacteria."

While laboratory and pre-clinical testing on xanthenes will take at least several more years, the discovery of its efficacy against the disease is a step in the right direction, researchers said.