

A Rare Natural Bioactive Compound Produced by Actinomycetes and the licensing of its production technology

# Trehangelin

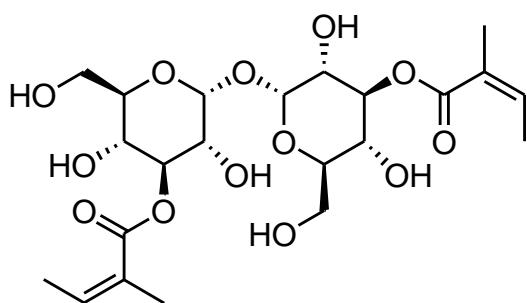


Figure 1. Trehangelin (THG)

## What is Trehangelin?

Trehangelin (hereafter referred to as THG) is a rare compound in which two molecules of angelic acid are bound to trehalose (Figure 1).

It was discovered as a novel substance produced by a rare actinomycete isolated from the roots of Kingin-sou (*Scrophularia ningpoensis*), by Dr. Satoshi Ōmura, Distinguished Honorary Professor at Kitasato University, who was awarded the Nobel Prize in Physiology or Medicine in 2015.

Interestingly, this compound is known to promote plant growth, possibly due to its origin from microorganisms that coexist with plant roots. In fact, THG has been shown to increase chlorophyll content and enhance stem strength in Komatsuna (Japanese mustard spinach, *Brassica rapa* var. *perviridis*) (Figure 2). Moreover, THG has been reported to activate “autophagy”, a cellular self-cleaning system known to play important roles in maintaining the function of skin cells (Figure 3).

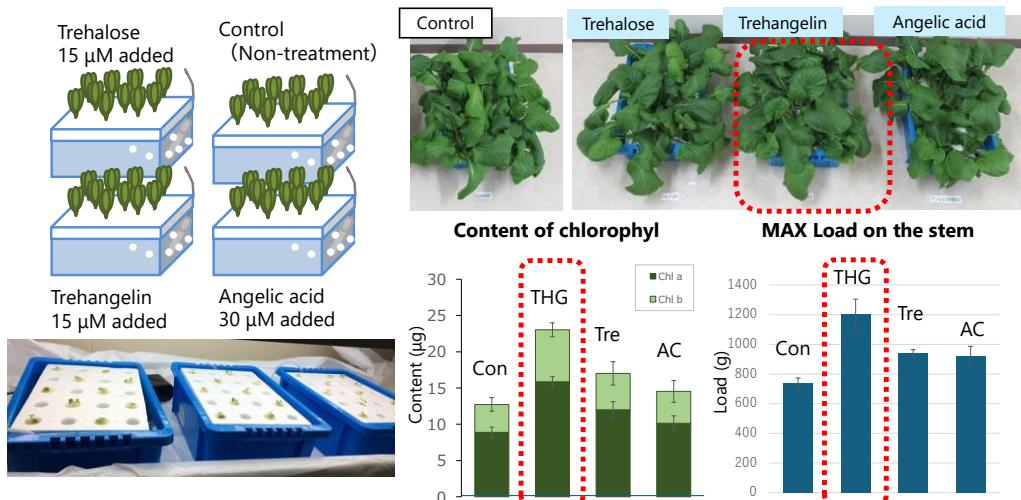


Figure 2. Increased chlorophyll and stem strength in Komatsuna treated with THG

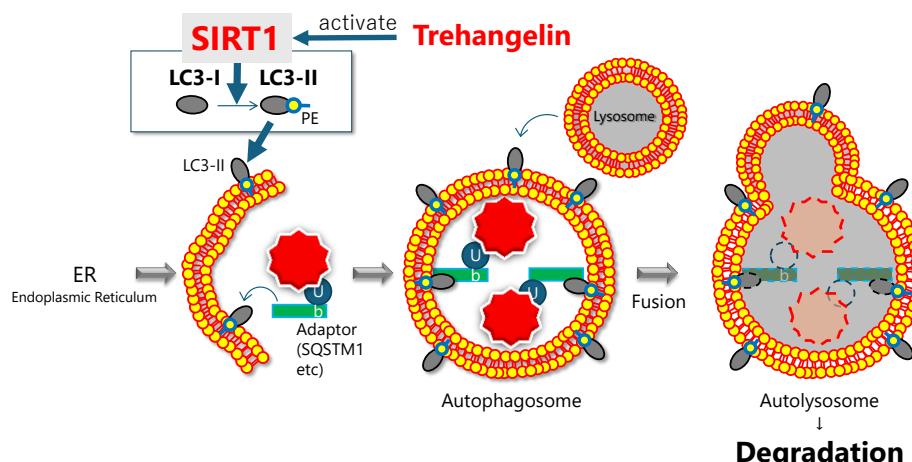
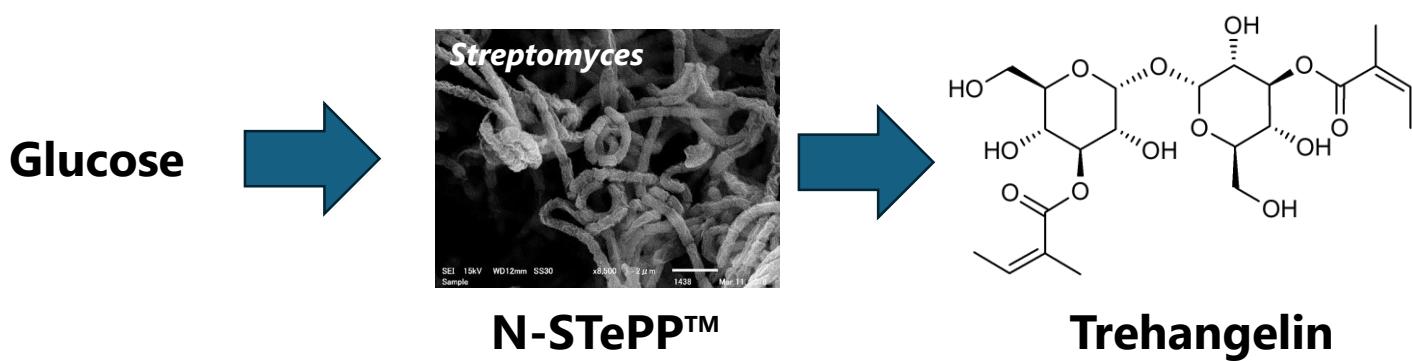


Figure 3. Hypothesis of autophagy activation by THG

Despite its promising potential as a bioactive compound in agriculture and personal care, the amount obtainable from microorganisms is extremely limited, posing a major challenge for practical application.

## Mass Production via N-STePP™

To overcome this challenge, Nagase & Co., Ltd. has been working since 2016 to develop mass production technology using its proprietary streptomyces-based production platform, N-STePP™. As a result, we have successfully developed a method that increases the production efficiency of the natural strain by approximately 1,000 times (Figure 4).



- Optimization of THG biosynthesis gene expression using N-STePP™
- Achievement of large-scale production (1000 times higher than the natural strain)

Figure 4. Large-scale production by N-STePP™

## Toward Social Implementation

The Nagase Bio-Innovation Center holds patents for the composition of THG and its production method and is seeking collaborative development partners interested in licensing. Through partnerships with those interested in high-yield production and functionality of THG, we aim to commercialize this rare and beneficial compound and contribute to a sustainable society.

If your company is interested in this technology, please feel free to contact us at the following address:



**Nagase & Co., Ltd.**  
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