

# NAGASE's *Streptomyces* Technology for Production of Valuable Materials - N-StePP™ -

We dedicate ourselves to the technology development using *Streptomyces* strains as host cells for producing chemicals and ingredients.

## What is N-StePP™

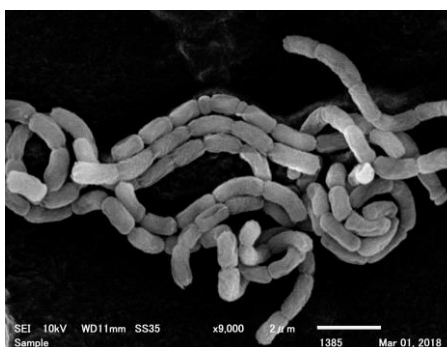
We, at NAGASE, together with our affiliate daughter company, Nagase ChemteX Corporation, initiated a project to develop proprietary technology using the *Streptomyces* bacterial strains as host cells to produce enzymes, chemicals and ingredients approximately 10 years ago. N-StePP™ is the abbreviation for NAGASE's *Streptomyces* Technology for Precious Products and is our registered trade mark in Japan. N-StePP™ made over-expression of enzymes from *Streptomyces* possible, resulted in multiple enzyme product launches. At NAGASE R&D CENTER, this technology is further expanded for efficient production of biochemical compounds.

## Characteristics of N-StePP™

*Streptomyces* is classified in the order of *Streptomycetales*. Although it is a prokaryotic bacterium, its morphology resembles that of filamentous fungus (Figure 1). *Streptomyces* is well known to produce antibiotics, as well as other bioactive compounds. A typical example is streptomycin, the first drug for curing tuberculosis found in 1943. Another example is a famous anti-parasite drug, ivermectin – the modified form of avermectin, discovered by the Nobel prize winner Prof. Omura at Kitasato University. As a matter of fact, new substances from *Streptomyces* are continuously discovered even now, proving the microbe to be a treasure trove in terms of material production.

## *Streptomyces* as hosts for material production

Compared to *E. coli* and yeast, the two renowned hosts for material production, knowledge about *Streptomyces* is still in short, both physiologically and genetically. Because of the difficulties of genetic engineering and a long fermentation period needed for *Streptomyces*, applications using the microbe for material production have been limited in precious antibiotic production. However, *Streptomyces* continues to produce materials long (>2 months) after cell proliferation. This characteristic of *Streptomyces* could be turned into an advantage. We, at NAGASE R&D CENTER, is overcoming *Streptomyces*' demerits and developing it into a new biotechnological platform for material production at industrial scales.



**Figure 1 *Streptomyces violaceoruber***  
(SEM image was taken by Dr. Hideki Yamamura, University of Yamanashi, Japan)

The NAGASE R&D CENTER is committed to developing processes for efficiently producing a wide range of compounds with proprietary fermentation technologies. Click on the following link to learn more about research partnerships with commercial applications (e.g., industrial process development, and the evaluation and exploration of various applications of lab samples).

[Contact Our R&D CENTER](#) 