KUMIAI CHEMICAL INDUSTRY CO., LTD.

April10, 2026

Launch of NATSU-TSUYOSHI, a biostimulant for measures against heat stress in crops

We, Kumiai Chemical Industry Co., Ltd. launched NATSU-TSUYOSHI, a plant-derived biostimulant, in domestic market on February 27, 2026.

NATSU-TSUYOSHI's main ingredient is extract of the root of dye plant, *Lithospermum erythrorhizon*. Menicon Co., Ltd. developed this based on the results of joint research with Shizuoka University. NATSU-TSUYOSHI is our first biostimulant.

NATSU-TSUYOSHI promotes the expression of HSP (heat shock protein) gene. This product will contribute to improving crop damage (Paddy rice: increased chalky grain and sterile grain, yield decline; Fruits and Vegetables: reduced pollen fertility, poor fruit set) caused by high temperature, which has become more severe due to global warming in recent years.

In paddy rice, it has been found that treatment with NATSU-TSUYOSHI suppresses the activity of the starch-degrading enzyme, α-amylase, which is the factor in chalky grain.

＜The main roles of HSP＞

Plants respond to heat stress by synthesizing HSP in their bodies. HSP is thought to enhance tolerance to heat mainly through the following functions (Figure 1).

(1) Protein repair and degradation (main function): By repairing proteins whose structure has been damaged by stress such as high temperatures and promoting the degradation of unnecessary proteins, proteins in cells are regulated, and cell functions are maintained.

(2) Protection from active oxygen stress: By protecting the function of proteins involved in the processing of active oxygen, such as antioxidant enzymes, it contributes to the creation of a state that is less susceptible to damage from active oxygen caused by stress such as high temperatures.

(3) Maintenance of pollen fertility: Under high temperature conditions, proteins involved in pollen formation and pollen tube elongation are also prone to damage. HSP is thought to support the function of these proteins to reduce the decline in pollen fertility and contribute to the stabilization of pollination and fruiting.

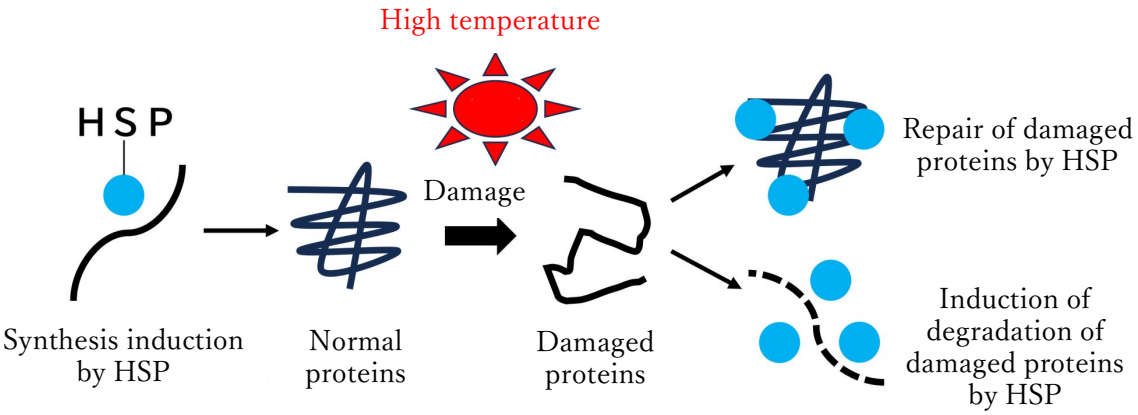

Figure 1 The image of HSP's action (Source: Menicon)

＜NATSU-TSUYOSHI's mechanism of action＞

When plants are treated with NATSU-TSUYOSHI, they are in a "primed state" that facilitates the synthesis of HSP to cope with heat stress. When heat stress actually occurs in this state, more HSP can be synthesized more quickly than usual (priming effect, Figure 2).

In this way, NATSU-TSUYOSHI is thought to mitigate heat stress in crops by stimulating HSP synthesis in plants.

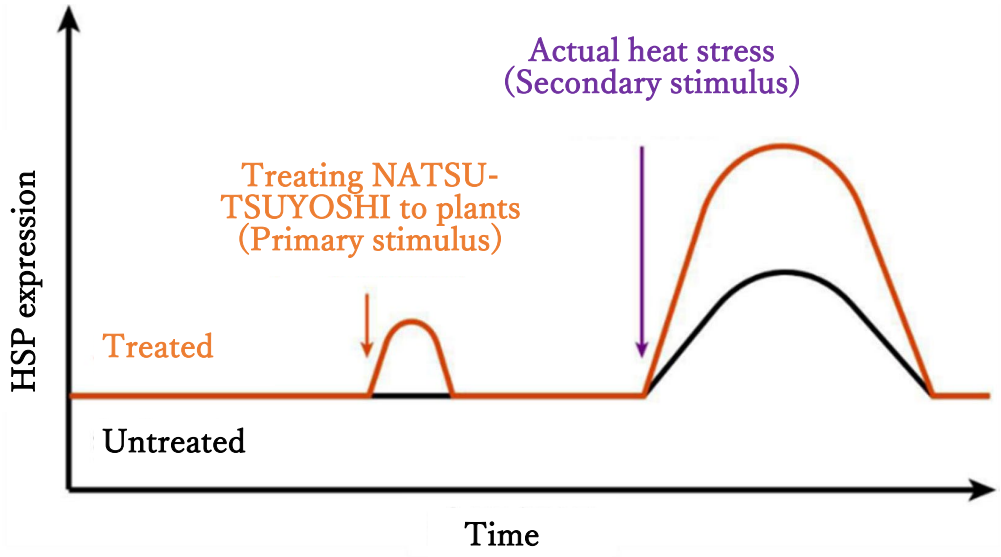

Figure 2 The image of priming effects

(Source: Menicon based on Khan A, etc., 2022, Plant Sci.13:866409.)

＜Results of internal trials＞

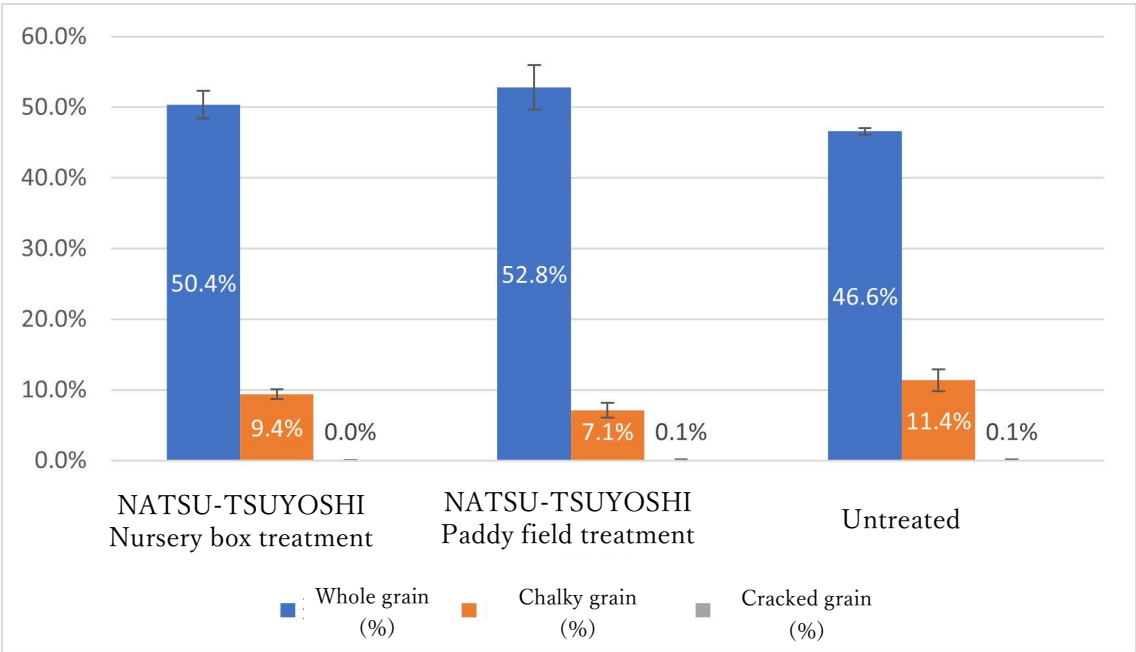

Figure 3: Results of investigation for paddy rice quality (Ehime Prefecture B City, 2025)

Variety: Hinohikari, Nursery box treatment (June 7, 500x dilution, 500ml/box, drenching)
Transplant date: June 8, Paddy field treatment (August 25, 5,000x dilution, 100L/10a, application by sprayer at the earing stage)
Heading date: August 20, harvest date: October 7
Temperature for 20 days after the heading: Average daily highest temperature 32.1° C, average daily lowest temperature 25.8° C

In a field trial of paddy rice in Ehime Prefecture, a brown rice quality investigation for the harvest after nursery box treatment and paddy field treatment of NATSU-TSUYOSHI showed that the proportion of whole grain increased, and chalky grain decreased.

Biostimulants are attracting attention against the backdrop of the "MIDORI Strategy for Sustainable Food Systems" promoted by the Ministry of Agriculture, Forestry and Fisheries, and the market is expected to expand in the future.
We have entered the biostimulant field by utilizing the technical and sales capabilities we have cultivated in the field of agrochemicals, and with this product, we will contribute to solving problems at food production sites due to the effects of global warming.

About Menicon
Menicon Co., Ltd., based in Nagoya, Japan, is a global contact lens manufacturer committed to monozukuri - a tradition of craftsmanship that values precision, quality, and continuous improvement. Since introducing Japan's first corneal contact lenses in 1951, Menicon has upheld its corporate slogan, "Contributing to society by providing superior visual correction." The company continues to prioritize eye safety, advanced research and development, and innovative manufacturing technologies. Today, Menicon operates in more than 80 countries, offering a comprehensive portfolio that includes lens materials, specialty lens designs, care solutions, and long-term eye health programs such as the MELS Plan.
https://www.menicon.com/corporate

About Kumiai Chemical
Kumiai Chemical Industry Co., Ltd. is a research and development-oriented chemical company that contributes to the realization of a sustainable society by developing and providing innovative agricultural production technologies, mainly crop protection products that can support agricultural production around the world, as well as a variety of fine chemical products that enrich daily life of people.
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