

High-density culture of mutant filamentous fungi

Mass fermentative production of useful substances will be obtained !

Introduction

Filamentous fungi have an advantage to produce a wide variety of useful substances in industry. However, it is well-known that hyphal aggregation during the liquid culture often prevents fungi to grow with high density, resulting in low productivity of useful substances.

This invention discloses a mutant strain of a filamentous fungi, in which α -1,3-glucan synthase (AGS) gene is deficient, for high productivity of substances.

Effect

The α -1,3-glucan in the cell wall in AGS deficient mutant (AG Δ) is significantly reduced. The AG Δ cells are dispersed well in a liquid medium and cultured with higher density compared with that of wild type. Such phenotype of AG Δ results in an increasing productivity of useful substances per unit (See Fig. A and B).

It is expected that the productivity of substances of interests may be successfully higher by simply converting cells in use into AG Δ strains thereof without any changes in equipment such as jar fermenter.

[Reference]

Yoshimi et al (2013) PlosOne 8, e54893.

Miyazawa et al (2016) Biosci, Biotech, Biochem 80, 1853.

Fig A. Dispersed *A. nidulans* in liquid culture with high density and productivity

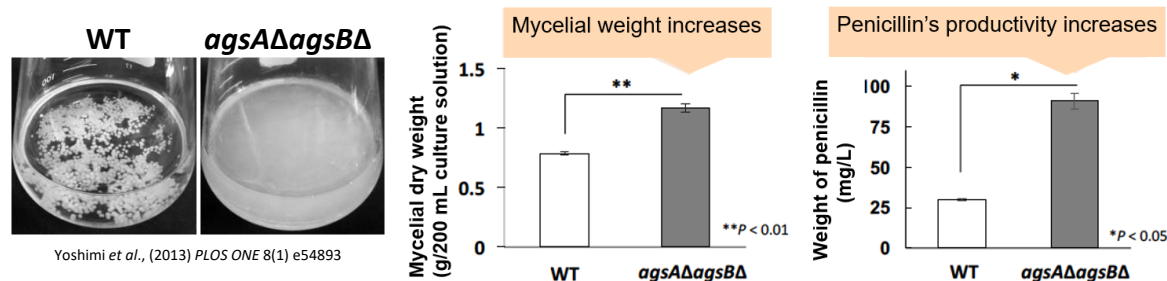
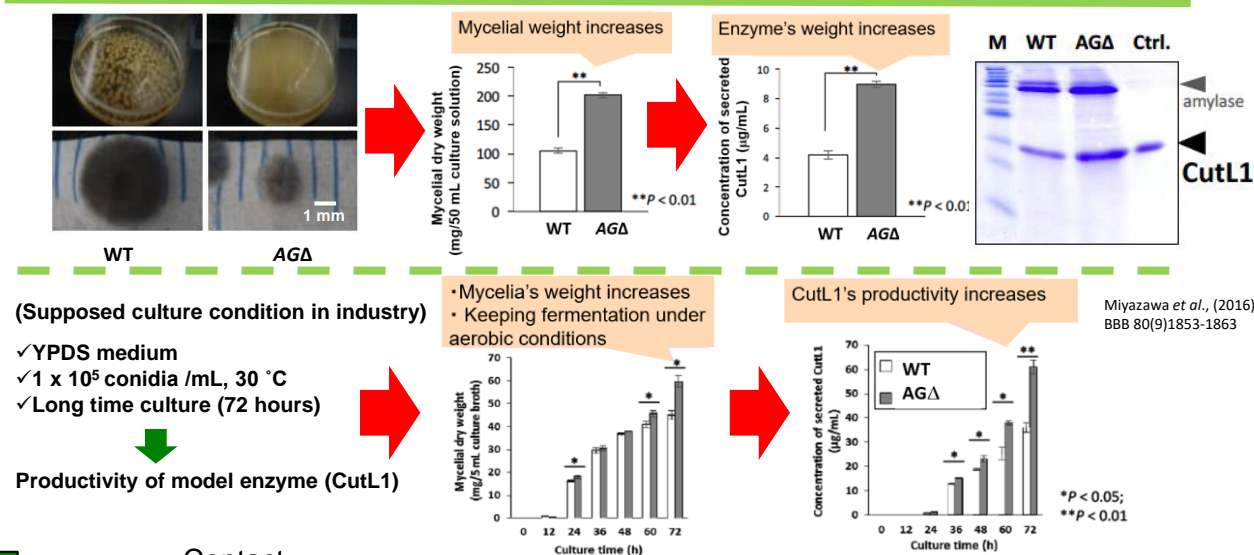


Fig. B. Highly dispersed *A. oryzae* lacking AGS gene improves the productivity



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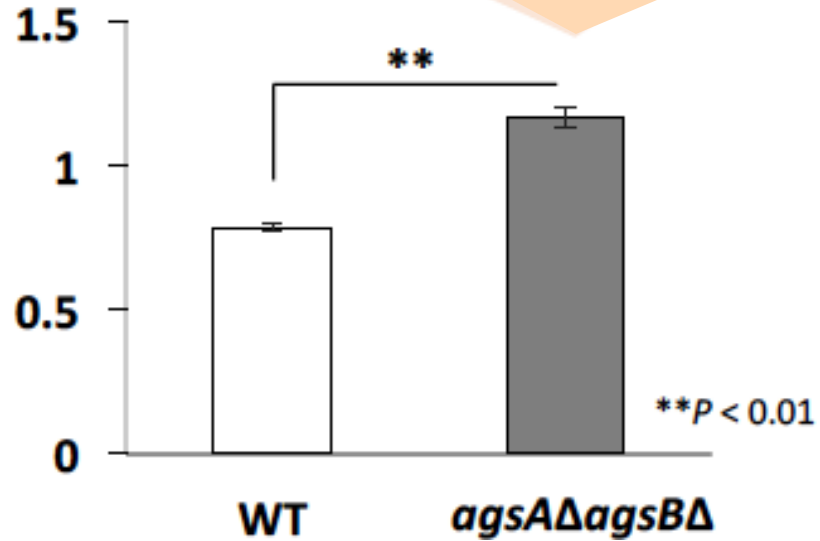
Patent Data Sheet

Application No.(Serial No.): PCT/JP2013/080352(T12-060)

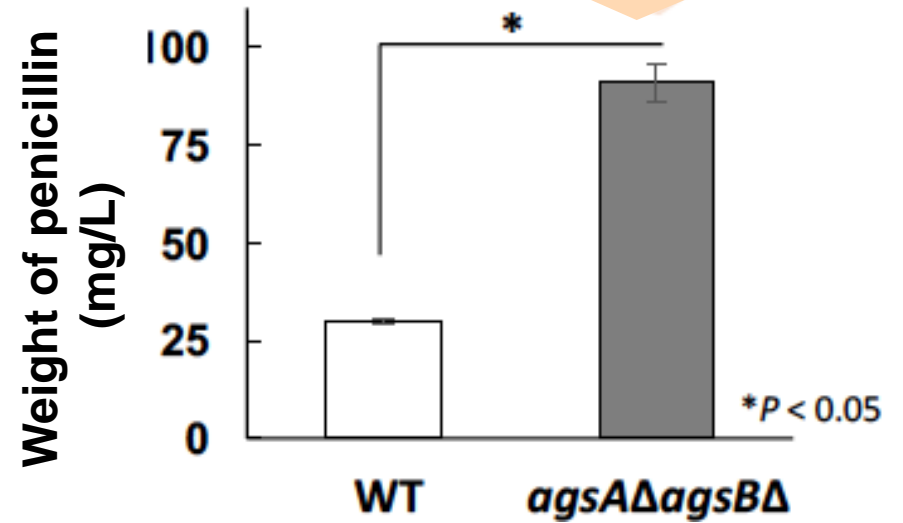
Inventor: YOSHIMI Akira, GOMI Katsuya, ABE Keietsu

Mycelial dry weight
(g/200 mL culture solution)

Mycelial weight increases

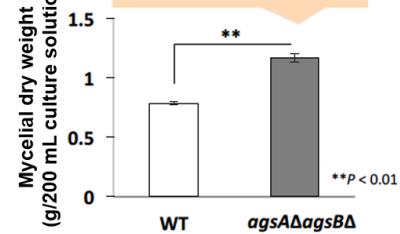


Penicillin's productivity increases



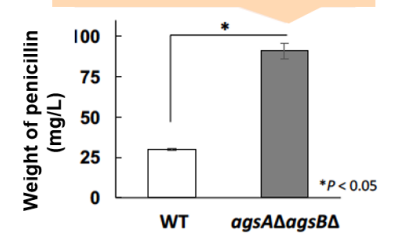
Mycelial dry weight
(g/200 mL culture solution)

Gained weight of fungi

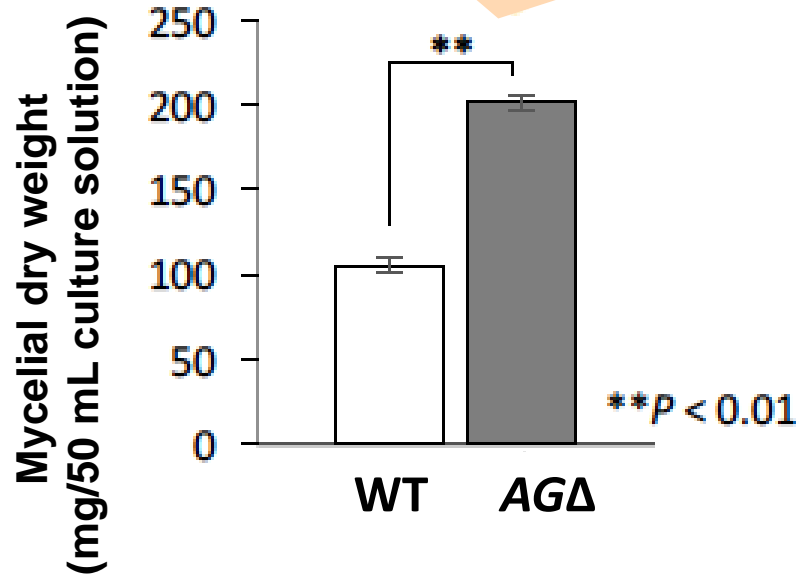


Weight of penicillin
(mg/L)

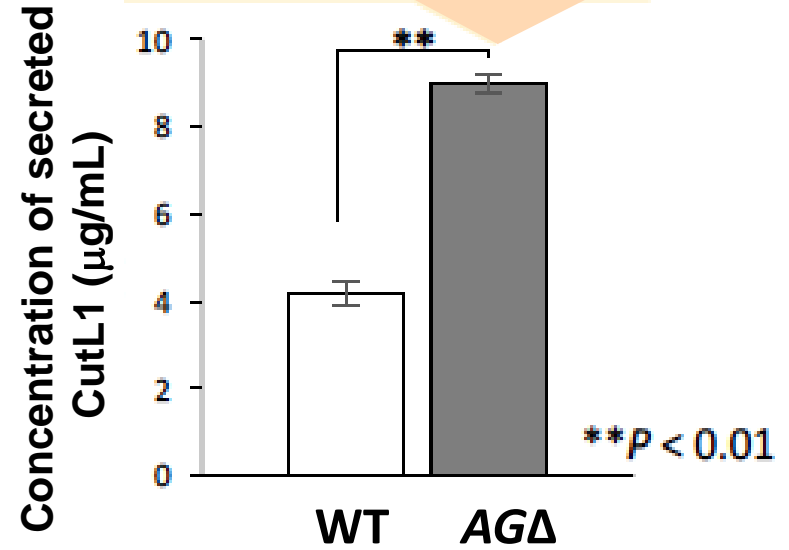
Gained productivity of penicillin



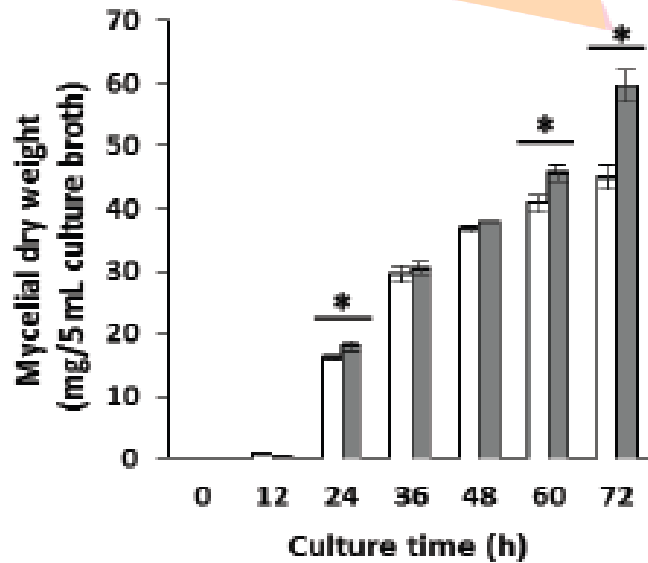
Mycelial weight increases



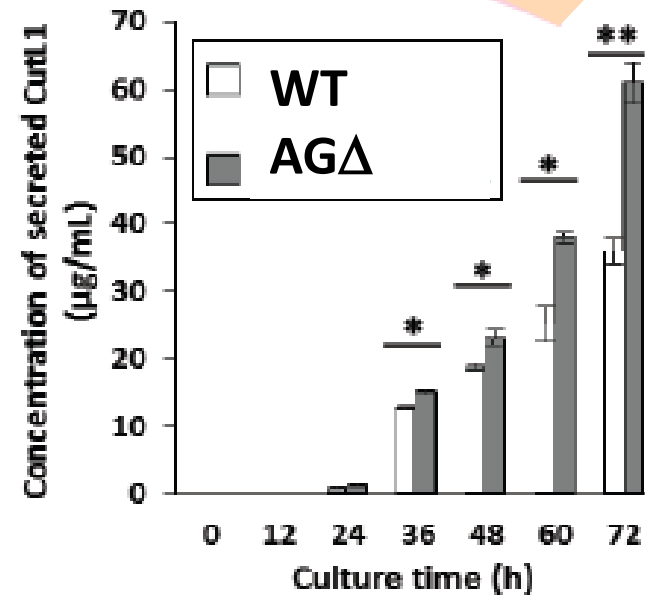
Enzyme's weight increases



- Mycelia's weight increases
- Keeping fermentation under aerobic conditions



CutL1's productivity increases



* $P < 0.05$;
** $p < 0.01$