Tohoku Univ. Technology

Aspergillus oryzae introduced with multi-copy genes

Extremely high production level of target protein by fermentation (3 g/L)

Overview

In protein production using *Aspergillus oryzae*, the introduction of multi-copy genes encoding target proteins can be used as a means of improving productivity. However, if the DNA fragment to be introduced is tandemly inserted at one chromosomal locus and the repair through homologous recombination is repeated, the sequence may be excised, and the production cannot be increased as a result.

Dr. Zhang and colleagues at the Graduate School of Agriculture, Tohoku University have developed a method to introduce DNA fragments into multiple loci of the chromosome of *A. oryzae* in a single transformation, and succeeded in obtaining a new *A. oryzae* in a short period of time. The *A. oryzae* of the present invention has been confirmed to have improved material productivity. Furthermore, by using a highly dispersible strain of mycelium as a host, it is expected to be low in viscosity when cultured in a fermenter, enabling continuous culture.

Possible Application

- ☐ Industrial fermentation production of functional proteins and peptides such as enzymes
- ☐ Industrial fermentation production of bioactive low-molecular compounds such as amino acids and antibiotics

IP Data

IP No.	:	PCT/JP2025/005036
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Admin No.	:	T24-084

Aspergillus oryzae chromosome (after introducing the target protein xylanase DNA fragment (*xynF1*))

Since the patent application has not been published, the details of the gene transfer method are not shown. Please feel free to contact us as we can disclose this information after signing a non-disclosure agreement.

Secretory production of xylanase in liquid culture (mg/L)

Medium	YPD		YPM	
Culture Time	48 h	96 h	48 h	96 h
1 Copy	131 114 108	277 161 135	127 219 154	329 324 240
Average (deviation)	118(17.39)	191(115.33)	167(80.89)	298(40.94)
13 Copies	409 384 337	730 651 647	1028 1477 1023	3234 3024 2511
Average (deviation)	377(38.94)	676(75.50)	1176(425.17)	2923(379.67)
	3.2 倍	3.5 倍	7.0 倍	9.8 倍

Experiments were conducted to confirm the production of xylanase in *Aspergillus oryzae* with 1 copy or 13 copies cultured in YPD and YPM media. It was confirmed that the production of xylanase in *A. oryzae* with 13 copies increased about 10 times compared with that with 1 copy in YPM medium.

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