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journal or publication title	三重大學農學部學術報告 = The bulletin of the Faculty of Agriculture, Mie University
volume	64
page range	51-53
year	1982-03-01
その他のタイトル	酸性条件下でのTrichosporon属X-19株による顆粒の生成
URL	http://hdl.handle.net/10076/3242

Production of Granules by *Trichosporon* sp. X-19 Strain in Acidic Condition

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In the previous paper¹⁾, we reported that *Trichosporon* sp. X-19 strain accumulated protein in culture medium and on cell surface when the yeast was cultured in extremely acidic condition, and the protein accumulated on the cell surface was gathered by washing the cell with 0.05N NaOH solution. In this article, we deal the production of granule excreted from the cell.

After a couple of days since *Trichosporon* sp. X-19 strain was inoculated in YM medium adjusted to pH 3.0¹⁾, a lot of small granules produced among the mycelium were observed as shown in Fig. 1. Scanning electron micrograph suggested that the granules produced might be excreted from the cell surface as shown in Fig. 2. The granules were easily collected from culture broth by filtration on the filter paper (Toyo No. 2) after removing the mycelium by filtration with cheese clotting cloth. These granules were easily dissolved in 0.05N NaOH solution and the result of elemental analysis, N: 13.2% C: 42.6%, H: 5.7%, suggested that the granules might be protein. It was proved by amino acid analysis that the amino acid composition of granule was almost same to that of protein from cell surface of the yeast. In spite of the fact that protein accumulation on cell surface could be observed for many species of yeast¹⁾, i.e., *Candida utilis*, *Debaryomyces globosus*, *Hansenula anomala*, *Mycotorula japonica*, *Pichia farinosa*, *Saccharomyces cerevisiae*, *Pelaspora* sp. and *Rhodotorula* sp., when they were cultured in extremely acidic condition, the production of such a granule could not be observed in culture broth of the yeast mentioned above.

It was noticed that the form of yeast apparently was affected by pH change of medium, namely, a large amount of single cell could be observed among the mycelium in the medium at pH 6.0, but no single cell could be observed and the mycelium itself changed to more complicatedly branched form in the medium at pH 3.0. We found another phenomenon that there was difference between the yeast cell cultured at pH 6.0 and pH 3.0, namely, the former cell only gave obscure scanning electron micrograph against that the latter cell gave clear figure by SEM without pretreatment of potassium permanganate as fixation of sample as shown in Fig. 3. However, the latter cell also gave only obscure SEM picture without the pretreatment after the cell washed with 0.05N NaOH solution. This fact suggests the occurrence of cor-pulence of the cell wall with protein accumulated when the yeast was cultured at pH 3.0.

Taking case of separation process of the granules from culture broth into consideration, this granule produced would become a favourable protein resource in future²⁾.

References

- 1) M. Akaki, Y. Nakaseko and T. Yamada, *Agric. Biol. Chem.*, **42**, 2391 (1978).
- 2) M. Akaki, Y. Nakaseko and T. Yamada, *Kagaku to Seibutsu*, **18**, 607 (1980).

和 文 要 約

酸性条件下での *Trichosporon* 属 X-19 株による顆粒の生成

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前報で、X-19 株が酸性培養条件下で培地中および菌体表面に多量の蛋白質を生産することを報告した。

本報で、この株が多量の顆粒状物質を培地中に生産すること、この物質は稀アルカリ溶液に容易に溶解し、その窒素含量は 13.2% で蛋白質と推定されること、走査型顕微鏡でこの物質が細胞表面から分泌される状態が観察されたこと、未固定の菌体を走査型顕微鏡で観察すると pH 6 で培養したものは像が不鮮明であるのに pH 3 のそれは鮮明な像を与えること、しかし後者の菌体もアルカリ洗滌後は不鮮明な像しか与えないこと、このことは後者の菌体表面層が固化した蛋白質の蓄積で変化していることを示唆すること、などを報告した。

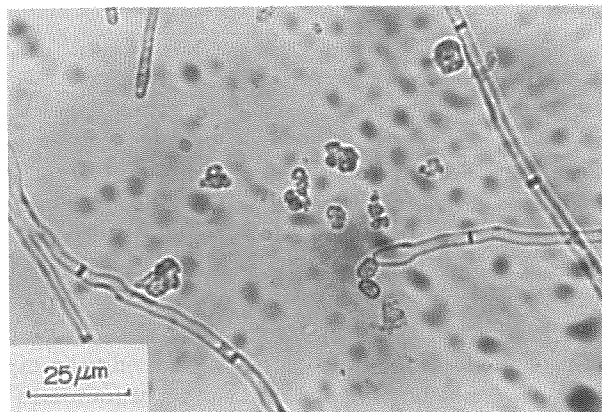


Fig. 1. Micrograph of granules among mycelium of *Trichosporon* sp. X-19 strain.

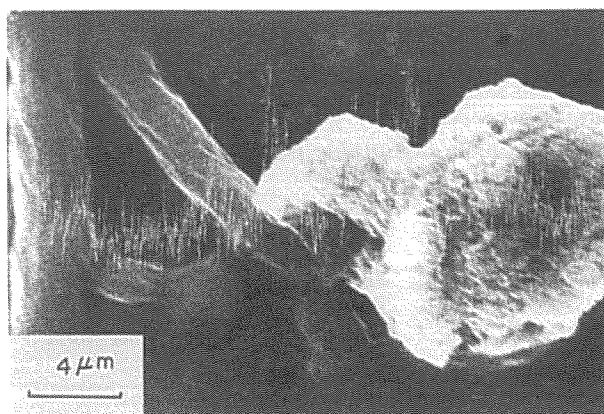


Fig. 2. Scanning electron micrograph of granule excreted from *Trichosporon* sp. X-19 strain cell.

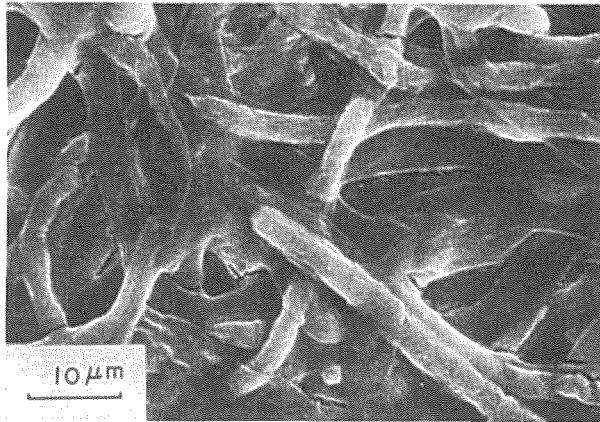


Fig. 3. Scanning electron micrograph of mycelium of *Trichosporon* sp. X-19 strain without pretreatment of fixation.