

Keynote Speech

Physiology and enzymology in acetic acid bacteria

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Abstract

Acetic acid bacteria (AAB) are a group of aerobic bacteria, including a vinegar producer. In the twentieth century, basic research on the taxonomic study of AAB and on biochemical study for the unique oxidative reactions of AAB progressed as did during the industrial applications of AAB not only in vinegar fermentation but also in the bioconversion process for useful chemical or pharmaceutical products. Entering the twenty-first century, AAB research has continued to expand and is expected to show further progress in all aspects of AAB: classification and ecology, physiology and biochemistry, genetics, and biotechnology of vinegar fermentation and other oxidative fermentations. The research on AAB has developed significantly in the last decade, which makes these bacteria more valuable for various industrial applications.

This keynote initially describes the introduction of AAB. Then, traditional vinegar fermentation in Japan is explained. Then strategy for resistance against acetic acid in AAB is explained. Enzymes involved in vinegar production are explained in detail, especially about membrane-bound alcohol dehydrogenase (ADH). ADH contains pyrroloquinoline quinone (PQQ) as a prosthetic group. PQQ is a redox active compound and shows some physiological activity for not only bacteria but also plants and mammals. Finally, oxidative fermentation and thermo tolerance AAB will be discussed.

Keywords: Acetic acid bacteria, Oxidative fermentation, Pyrroloquinoline quinone, Vinegar

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