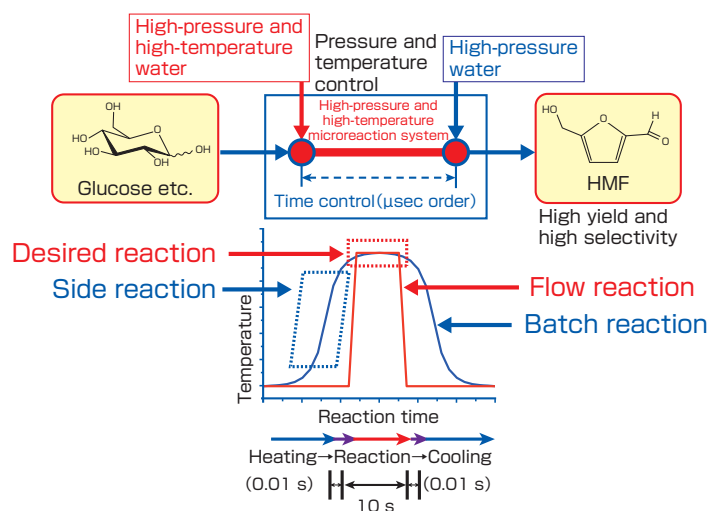


Rapid production of bioactive substance, HMF, from saccharides

Realized by using high-pressure and high-temperature water in a microreaction system

We have developed a new facile and continuous method for production of 5-hydroxymethylfurfural (HMF) which is expected to have beneficial effects on the prevention of life-style related diseases such as hypertension and diabetes. HMF is made from inexpensive saccharides such as glucose, in high-pressure and high-temperature water medium. The system enables rapid heating from room temperature to 400 °C within a very short time (less than 0.01 s) by mixing high-pressure and high-temperature water and an aqueous solution of saccharide in a microreactor (micromixer). The reaction method with rapid heating and cooling achieves the production of HMF in high yield (70 %) and high selectivity (80 %).



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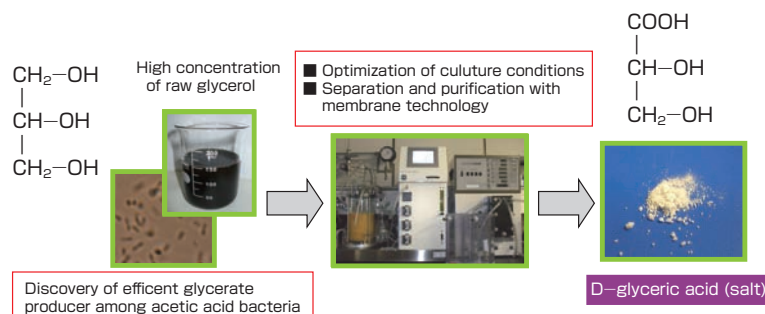
AIIST TODAY Vol.9 No.8 p.16 (2009)

Schematic diagram
and temperature profile
of high-pressure and
high-temperature
microreaction system
(blue box, size: 10 cm
× 15 cm)

Development of an effective method of producing D-glyceric acid from glycerol

Materials for chemicals and pharmaceuticals to be produced from a by-product of biodiesel fuel productin

We have developed a new technique to effectively produce D-glyceric acid from glycerol, which is in abundant supply due to the proliferation of biodiesel fuel. The total amount of glycerol produced worldwide is estimated to be around a million tons a year, and therefore, an effective use for this surplus glycerol has been sought. In our new method for producing D-glyceric acid effectively, a highly oxidative microorganism belonging to acetic acid bacteria, and a membrane that selectively permeates ions for separation and concentration of the product were used. Although D-glyceric acid and its derivatives have excellent biological functions, including an action to accelerate alcohol metabolism, they are expensive because industrial methods have not been established for their production. If they can be produced at low cost, various uses will be expected, including raw materials for chemical products such as bioplastics, pharmaceuticals for alcohol metabolism acceleration or liver disease treatment, and cosmetics.



Effective production of D-glyceric acid from concentrated crude glycerol produced as a by-product

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