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13th Joint Conference on Chemistry

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Programme Booklet

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Capability of immobilised glucoamylase on mesostructured cellular foam silica to hydrolyse tapioca starch

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Abstract

The mesoporous size siliceous-based materials have been associated with the immobilisation of free glucoamylase and the soluble starches hydrolysis. Since ethanol and other chemicals can be made from insoluble substrates such as tapioca, application of the immobilised glucoamylase on mesostructured cellular foam (MCF) silica to hydrolyse this starch is studied. To get knowledge of this process for development of a large-scale operation, the free glucoamylase SQzyme AGP was immobilised on the MCF silica (9.2T-3D) type. The formed immobilised glucoamylase was used to hydrolyse tapioca starch. The free enzyme was able to be immobilised onto carrier with efficiencies of 39.20-84.84%. The operational factors i.e. temperature, agitation speed and pH affected the immobilisation process highly. During the enzymatic hydrolysis of the starch, effects of the operational temperature and agitation speed were high. The dextrose equivalent (DE) values in the range of 1.21-81.70% were produced. The optimum temperature and agitation speed were found at 70°C and 140 rpm. Other factors such as buffer pH, starch concentration and enzyme unit activity showed low effects on the hydrolysis process. Excellent DE were obtained at the conditions of pH, tapioca concentration and enzyme unit activity of 4.6, 3 mg mL⁻¹ and 2351 U, respectively.

Keywords: Glucoamylase, Silica-based support, Enzyme immobilisation, Tapioca hydrolysis, MCF (9.2T-3D) silica



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Certificate of Presentation

This is to certify that

Joni Agustian

has presented a paper entitled

**Capability of Immobilised Glucoamylase on Mesostructured
Cellular Foam Silica to Hydrolyse Tapioca Starch**

at the 13th Joint Conference on Chemistry held on 7-8 September 2018 in
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Semarang, 8 September 2018

The Chair of
13th Joint Conference on Chemistry



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