Characterization of Starch Hydrolase Inhibitors in Lepisanthes alata

By **Ms. Zhang Yan**
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Abstract

Type-II diabetes is a chronic disease with gradual deterioration in glucose metabolism. Postprandial hyperglycemia is a concern in the management of type-II diabetes. Inhibition of α-amylase is postulated to be a preventive treatment among the available antidiabetic therapeutic methods. After screening around 350 natural plants from Singapore Botanical Gardens as starch hydrolase inhibitors, we discovered a promising edible plant named Lepisanthes alata (Sapindaceae Family) with extremely high α-amylase inhibition. The leaves of Lepisanthes alata show higher α-amylase inhibitory activity (IC_{50} = 0.007±0.001 mg/ml; equals to 1643.939 μmol acarbose equivalent/g) than that of the barks (IC_{50} = 0.012±0.001 mg/ml; equals to 863.934 μmol acarbose equivalent/g). Defat leaves with hexane before extraction of leaves with a mixture of acetone, ethanol, H_2O, and acetic acid (40.0:40.0:19.9:0.1, v/v). Evaporation of the supernatant centrifuged from mixture resulted in solid extracts. Fractionation of crude extracts was carried out by a solid-liquid extraction method, which is to wash crude extracts by ethyl acetate, chloroform, n-Butanol, and H_2O in sequence. Chloroform fraction and aqueous fraction show relatively high α-amylase inhibitory activity, which have IC_{50} values of 0.025 mg/ml and 0.002 mg/ml, respectively. The structural information of the active compounds are further elucidated by LC-MS^n approach and as well as NMR technique.

Host: Dr. Yang Hongshun
Date: 27th March 2015, Friday
Time: 1 to 2 pm
Venue: Seminar Room S14-06-19

ALL ARE WELCOME !

Fundamental Features of Food Fat Freezing Fouling

By **Dr. Huang Jen-Yi**
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Abstract

Fouling of fat melts in distribution lines occurs when flow-line wall temperatures reach the solution cloud point: crystallisation yields a viscous gel which can harden to a semi-solid deposit over time. This seminar reports an experimental investigation of the fouling behaviour of a model food fat solution consisting of tripalmitin, (PPP, the highest melting point component on palm oil) in a non-crystallising paraffin oil.

Fouling studies employed the spinning disc apparatus which features cooled, removable heat transfer surfaces with well defined heat and mass transfer characteristics. Heat transfer measurements were combined with computational fluid dynamics simulations to yield reliable estimates of surface temperature and shear stress. The effect of these parameters on fouling behaviour was studied, independently. Fouling studies were performed with model solutions operating in different starting modes, simulating different situations which arise in pipelines. Local heat flux measurements allowed the thermal fouling resistance and surface temperature to be monitored: final deposit mass coverage and composition were also measured.

When fouling is induced by a change in the test surface temperature, i.e. cold, warm and cooling starting modes, the presence of a subcooled surface promotes the rapid formation of an initial gel layer, followed by a period of linear fouling and finally falling rate fouling behaviour. The subcooling transient is absent when fouling is driven by a change in concentration and starts with a steady, linear growth. The linear fouling regime was relatively insensitive to temperature, shear stress and starting mode. A sigmoidal deposition profile was observed at low PPP concentrations, which is attributed to break-up of the weak gels formed from this composition. The composition of the deposit varied noticeably over the course of an experiment. The solids fraction within the deposit layer increased with time for all conditions tested, indicating rapid ageing and/or shear-related thickening.

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