BAMI Seminar – February 2016

Llyza Mendoza, PhD Student, BioPRIA/Department of Chemical Engineering

Friday 12th February 2016, 12.30PM to 1.30PM
Room G03, BioPRIA, 15 Alliance Lane (Building 59), Clayton Campus

Moderator: Anurag Parihar, PhD Student, BioPRIA/Department of Chemical Engineering

Abstract:

Hydrogels are 3D structures composed of polymeric networks which entrap large amounts of water. Although these materials can be produced using a plethora of polymers, naturally occurring polymers such as cellulose are of special interest. Cellulose, found commonly as a component of plant matter, is the most abundant biopolymer present in nature. Its hydrophilic nature can be exploited to produce biodegradable and sustainable cellulose-based hydrogels. Due to the innate biocompatibility of cellulose, it is currently being studied and has emerged as a potential candidate for food and biomedical applications.

In the current study, surface modified nanocellulose is used to produce hydrogels. Stepwise characterisation and modification of these hydrogels is required in order to suit their intended applications. Preliminary work on the characterisation of these materials will be reported in the presentation. Moreover, a brief overview will be presented in order to highlight the major goals of the project.

Presentation and Q&A session will be from 12.30PM – 1.00PM. Lunch will be served at 1.00PM.

Enquires: BAMI Student Chapter coordinators Lionel Longe or Uthpala Garusinghe.

Michelle Isaac, Undergraduate student (Summer Intern), Chemical Engineering, Monash University

Friday 26th February 2016, 12.30PM to 1.30PM
Room G03, BioPRIA, 15 Alliance Lane (Building 59), Clayton Campus

Moderator: Thilina Gunawardana, PhD Student, BioPRIA/Department of Chemical Engineering

Microfibrillated cellulose production using extended PFI refining of Bleached Radiata Pine Kraft pulp

Abstract:

The objective of this experiment is to investigate the production of microfibrillated cellulose (MFC) using conventional pulp refining equipment at higher consistencies. Bleached Radiata Pine Kraft (BRPK) pulp was refined in the PFI mill from 10000 to 80000 revs. Refined pulp after 80000 revs was homogenised at 1000 bar for 2 passes. ~60 gsm sheets were made using the Automatic British Hand Sheet Maker. The effect of the level of refining on the fibre aspect ratio, tensile strength, sheet density and air permeance was evaluated. Fibres were observed using scanning electron microscope (SEM) to determine the fibril development.

Aspect ratio increased from 122 at 0 revs to 207 after 10000 revolutions. Beyond this, the aspect ratio shows a gradual decline. The tensile index also follows a similar trend with a maximum strength of 96.46 Nm/g after 20000 revs. This could be possible due to fibres getting fibrillated during initial refining and further refining encouraging cleaving. Homogenisation of refined pulp after 80000 revs showed a sharp increase in both aspect ratio and tensile strength. Sheet density showed a gradual increase with refining while air permeance showed a sharp decline. The SEM images show an increased amount of fibrils as the level of refining increases. This experiment has shown that the production of MFC using PFI refining could be possible. However, optimum combinations of PFI refining and homogenisation should be investigated in order to reduce the overall energy consumption.

Presentation and Q&A session will be from 12.30PM – 1.00PM. Lunch will be served at 1.00PM.

Enquires: BAMI Student Chapter coordinators Lionel Longe or Uthpala Garusinghe.