



ERU Research Dissemination Program April 2010

Organized by the

Department of Chemical & Process Engineering

29th April 2010 at 11.00 am

at the

**Seminar Room,
Department of Chemical & Process Engineering**

The speakers and topics covered in this program are as follows

- 1. Comparison of conventional and controlled drying of cinnamon chips on the yield and quality of cinnamon bark oil**
Presented by **K. Amila Chandra**
- 2. Rice bran oil Extraction: Effect of bran type on oil yield and properties**
Presented by **D.S. Kodituwakku**
- 3. The development of an extraction process for banana fibres and the use of banana fibres in dry rubber products**
Presented by **S.U. Lokubalasooriya**

For more information please contact Dr. ADUS Amarasinghe
(Ext 4104 , adusa2@cheng.mrt.ac.lk)

Note: Abstract of the presentation is attached herewith

Abstracts

[1]

Title: Comparison of conventional and controlled drying of cinnamon chips on the yield and quality of cinnamon bark oil

Presenter: K. Amila Chandra

Abstract- Conventional drying of cinnamon chips begins at peeler houses. Cinnamon chips are packed in poly sack bags or simply heap on floor until the traders collect them. The chips are paid for the weight after reducing a percentage for moisture. Since this percentage is rather a fixed value, the peelers prefer to stock chips after peeling without drying. Due to this reason chips are stored with high moisture level (about 65 -75%), sometimes more than a week. It tends to increase microbial and fungal activity on the chips. In the present study, samples of conventionally dried and controlled dried cinnamon chips were steam distilled and the yield of cinnamon bark oil was compared. All the samples were collected from Urugasmanhandiya area where cinnamon cultivation is popular. Samples for controlled drying were collected soon after peeling and the conventionally dried samples were collected from cinnamon traders in the area. A biomass driven tray dryer was designed and fabricated for drying the samples under controlled conditions. 4.8 kg of wet cinnamon chips were dried at several temperatures (room temp, 35°C, 40°C, 45°C and 50°C) until the moisture content was reduced to 20%-30% (wet basis) at an air flow rate of 0.0408m³/s. All the dried samples were steam distilled at 1 atm and 100°C. Considering the yield of cinnamon bark oil and drying time, the optimum drying temperature was identified as 35°C. The yield of cinnamon bark oil from the conventionally dried samples was significantly lower than that of samples dried under optimum drying conditions.

[2]

Title: Rice bran oil Extraction: Effect of bran type on oil yield and properties

Presenter: D.S. Kodituwakku

Abstract- Rice bran is the cuticle between the paddy husk and the rice grain and is obtained as a byproduct of rice processing. The oil content in rice bran varies from 12-25 wt%. Rice bran oil is a good substitute for vegetable oils and can also be used in pharmaceutical manufacturing processes, cosmetics, paints, soaps and detergents. In Sri Lanka rice bran is widely used as a raw material for animal feed. However, more efficient use of this valuable source of material is important. Commercially rice bran oil is extracted highly using hexane; however this process has some problems with respect to the oil quality. In this study Iso Propyl Alcohol (IPA) was used as the solvent to extract oil from different varieties of rice bran types. Oil yield and the analysis for different varieties of bran was carried out. The yield obtained for types LD356, BG450, BG360, BW364 and BG352 were 19.30%, 17.80%, 10.67%, 15.15% and 10.59% respectively. The appearance of oil was better compared to the oil extracted using hexane. The FFA levels were high; this can be avoided by better stabilization. The oil yield was determined as a function of time, with the intention of finding the mass transfer co-efficient. Further experiments will be carried out on cross flow extractions. Extracted oil will be analysed to determine properties such as FFA, Iodine value, saponification value, unsaponifiable matter and also a HPLC analyser. Finally, by comparing the results obtained on oil analysis and literature data, suitability of rice bran oil as a raw material for food items, pharmaceuticals and bio-fuel production will be investigated.

[3]

Title: The development of an extraction process for banana fibres and the use of banana fibres in dry rubber products

Presenter: SU Lokubalasooriya

Abstract- There is a new trend to use natural fibers in the rubber industry due to their low cost, easy availability, ease of chemical and/or physical modification and their environmental friendliness. In this research it is expected to investigate the use of banana fibers as a filler in natural rubber compounds. Banana is the most widely cultivated and consumed fruit in Sri Lanka, and is a perennial fruit crop which generates a large amount of fibrous residue. As a first step of this research, banana fibers were extracted from different parts of the banana tree using natural retting in water. Considering the time consumed, yield and easiness, fibers from banana stem were chosen for further experiments. As the second step rubber compounds were prepared replacing carbon black from fiber changing the fiber loading (0-10 phr), and physical and rheological properties were examined. Tensile strength, elongation at break and the viscosity decreased with the addition of fibers. It is expected to enhance the surface interactions between the banana fiber and the rubber through surface modification, in order to improve the properties of the resulting compound.