

## ABSTRACT FOR PARALLEL SESSIONS

S1-E02

**Anti-Microbial Activity Of Tualang, Gelam And Acacia Honey Samples From Malaysia****Nurul Izzati Binti Mohd Ismail, Lee Suan Chua**

Institute of Bioproduct Development (IBD), Universiti Teknologi Malaysia (UTM), Johor Bahru, Malaysia

**Abstract**

Honey has been reported to have anti-microbial property, due to the presence of hydrogen peroxide, sugar and other unknown compound. Therefore, this study was focused on the anti-microbial activity of crude and fractionated Malaysian honey samples, namely Gelam, Acacia and Tualang honey in relation to the detection of polyphenols and phenolic acids. The fractionation was carried out by a C18 column using acidified water at pH 2. A number of five microbial strains consisted of gram positive (*Staphylococcus aureus*) and gram negative (*Salmonella typhimurium*) bacteria and yeast (*Candida albican*), as well as fungi (*Fusarium oxysporum*) were assayed and compared to the result exhibited by Manuka honey. The results found that only *S. typhimurium* and *C. albican* were inhibited by the crude and acidified honey fraction of the three selected honey samples. The minimum inhibitory concentration (MIC) of the crude honey and its acidified honey fractions on *S. Typhimurium* was about 12-50%w/v and 25-75%w/v, respectively which was about two to four times higher than MIC of Manuka honey and its fraction (6%w/v). Interestingly, the MIC shown by the acidified honey fractions of Tualang, Gelam and Acacia (3%w/v) on *C. albican* was comparable to the MIC of Manuka honey and its fraction (3%w/v). The results also detected chlorogenic acid (phenolic acid), rutin, acacetin and apigenin-7-*o*-glucoside (flavonoids) in the honey fractions. The existence of phenolic acid and flavonoids could attribute to the anti-microbial activities of the honey samples, besides the detection of hydrogen peroxide as reported to Manuka honey by previous researchers.

**Keywords:** Anti-microbial activity; Tualang honey; Gelam honey; Acacia honey

## ABSTRACT FOR PARALLEL SESSIONS

S2-G01

**Bioprocess Development For Anaerobic Cultivation Of Probiotic *Bacteria Bifidobacterium Longum* For High Cell Mass Production****Malek, M.K<sup>1</sup>, Abd Malek, R<sup>1</sup>, Othman, N.Z<sup>1</sup>, Aziz,R<sup>1</sup>, Awad, M.H<sup>2</sup>, El Enshasy, H.A<sup>1,3</sup>**<sup>1</sup>Institute Bioproduct Development (IBD), Universiti Teknologi Malaysia (UTM), Johor Bahru, Malaysia.<sup>2</sup>Chemistry of Natural and Microbial product Dept., National Research Centre, Cairo, Egypt.<sup>3</sup>Bioprocess Development Department, City for Scientific Research and Technology Applications (CSAT), New Burg Al Arab, Alexandria, Egypt.**Abstract**

*Bifidobacteria* are used as probiotics mainly in the dairy industry as cell suspensions or as freeze-dried additives. *Bifidobacterium longum* (*B. longum*) are important in maintaining general health. The potential health benefits of *B. longum* to the human have led to their wide application in dairy products and food additives. Fastidious anaerobic growth of *B. longum* plus organic acids production as their byproducts give some restriction in their growth as high cell mass become major concern. Therefore, the goal of this research is to select suitable medium as production media and optimization of the medium component for high cell mass production of *B. longum* by using one-factor-at-a-time (OFAT). Among nine growth media were evaluated to determine their suitability for high cell mass of *B. longum*, the best medium was yielded a cell mass of 4.5 g L<sup>-1</sup> in shake study with the main components are glucose (20 g L<sup>-1</sup>), yeast extract (5 g L<sup>-1</sup>), meat extract (10 g L<sup>-1</sup>) and peptone (10 g L<sup>-1</sup>). Then, five different carbon sources which were glucose, lactose, sucrose, mannitol, and glycerol were screened in shake flasks and the best carbon source that contribute to the highest cell mass was glucose. Moreover, application of highly nutritious and costly nitrogen sources was incomplete application for industrial scale. Therefore, in this study peptone was found to be the best nitrogen source after screened with two others different nitrogen sources which were yeast extract and meat extract. Optimization by classical approaches achieving the maximum cell mass of 5.8 g L<sup>-1</sup> increased up to 28.88 % when compared with un-optimized media. Finally, batch cultivation was conducted in 16-L semi-scale bioreactor using the new formulated optimized medium under controlled and uncontrolled pH conditions at 37°C for 72 hours under anaerobic cultivation. It showed that under controlled pH, the maximal cell mass obtained in batch cultures was 13.8 g L<sup>-1</sup> when compared with uncontrolled pH which only 6.8 g L<sup>-1</sup> with the percentage difference of 67.96 %. Thus the batch cultivation under controlled pH is the most suitable cultivation strategy for high cell mass production for industrialization of this bioprocess.

**Keywords:** *Bifidobacterium longum*, cell mass, medium optimization, classical, batch, and bioreactor.