Evaluation of “Ogi” – a fermented cereal gruel made in Nigeria, as a probiotic food for the treatment, prevention and management of diarrhoea Adetokunbo Osho RNutr MSc (PhD Student); Prof G.A Bonwick & Dr C. Birch (Supervisors)

Introduction: Food fermentation is generally carried out by microorganisms which are classed as lactic acid bacteria (LAB), yeast and moulds. It is proposed that some of these organisms may have potential of being probiotic, if they are live and viable at the point the product is being ingested. Consequentially, these fermented foods and beverages are sometimes described as functional foods since they are suggested to have the potential to provide health benefits other than nutrients. This claim has been investigated in various studies but results have been inconsistent. Where significant beneficial effects have been recorded, authors have been unable to provide information about what component of the fermented food matrix may have provided the effects - the activities of the fermentation organisms, metabolites or exopolysaccharides formed during fermentation. Understanding activities in the GIT when fermented foods are ingested may provide insights to which food matrix may give the therapeutic or disease prevention effect, if any.

Aim of study: To investigate the effect of orally ingested ‘Ogi’, a fermented maize product on the digestive tract using a simulated in-vitro human digestive system. To investigate the potentials of ‘ogi’ in the management of diarrhoea caused by selected bacterial pathogens.

Research questions: 1) Do the organisms involved in the production of ‘Ogi’ have probiotic potential? 2) Will ingestion of ‘Ogi’ cause a modulation in the gut microbiota, by increasing the population of Lactobacillus and Bifidobacteria species? 3) Will the fermented maize product cause an elimination of some diarrhoea causing organisms from the colon?

Method of data collection: 1) Dominant fermentation organisms will be isolated from spontaneously fermented maize and will be inoculated in sterile maize for controlled fermentation. Organisms will be identified using both culture dependent and culture independent mechanisms. Fermented product will be analysed for nutrient and metabolite (such as SCFAs and peptide compounds) composition using HPLC and GC. 2) In-vitro digestion of the fermented product will be carried out in an artificial system with components of the upper GIT, using standard methods approved by INFOGEST, in order to investigate the survival of the fermentation organisms in the harsh digestion conditions. 3) Output of upper GIT digestion will be inoculated in an artificial 4 chambered colon representing the ascending colon, transverse colon, descending colon and rectum to investigate the modulation the microbiota in the colon, increased production of SCFAs, lowered pH, production of antibacterial peptides in the colon and the effect on some diarrhoea causing pathogens. 4) All experiments will be done in triplicate and statistical analyses will be carried out in SPSS (version 22) using ANOVA.

Expected outcome: Organisms involved in the fermentation of maize will survive the harsh environments in the stomach and the small intestine; Intake of ‘ogi’ will cause a beneficial shift of the gut microbiota; Intake of ‘ogi’ will cause an elimination from the large intestine, of some pathogenic organisms by increasing population of Lactobacillus species, lowering colon pH with increased SCFAs, increased production of bacteriocin or improved immune response.

References