J Bioproces Biotechniq 2014, 4:6
http://dx.doi.org/10.4172/2155-9821.C1.007

OMICS International
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3rd International conference on

Bioprocess and Biosystems Engineering

September 14-15, 2015 Baltimore, USA

A batch process model of the human digestive system

Brian C Dobson
Performance Edge Systems, New Zealand

Faults in a batch process model of the small intestine create the symptoms of all types of irritable bowel syndrome. The model has three sequential processing sections corresponding to the natural divisions of the small intestine. A brain controller divided into four sub-controllers, each with a unique neurotransmitter, governs it. Each section has a sub-controller to manage transport. Sensors in the walls of the intestine provide input and output goes to the muscles lining the walls of the intestine. The output controls the speed of the food soup, moves it in both directions, mixes it, controls absorption, and transfers it to the next section at the correct speed (slow). The fourth sub-controller manages the addition of bile. It obtains input from the first section of the process via the signaling hormone cholecystokinin and sends output to the muscle that empties the gall bladder. The correct amounts of bile are then added to the first section. The sub-controllers produce output only when input is received. When output is missing, the enteric nervous system applies a default condition. The default condition is normally active when no food is in the intestine. If food is in the intestine and a transport sub-controller fails to provide output, then the default condition moves the food soup to the end of that section. The movement is in one direction only (forward), at a speed dependent on the amount & type of food eaten, and environmental factors affecting the autonomic nervous system. When the default transport speed is 'too fast', irritable bowel syndrome is caused

pesystems@vodafone.net.nz

Biotransformation of *Momordica charantia* fresh juice by *Lactobacillus plantarum* and its anti-diabetic properties

M S M Annuar, F A Mazlan and **Y Sharifuddin**
University of Malaya, Malaysia

A wild bacterium, *L. plantarum* BET003 isolated from *M. charantia* fruit was used to ferment the fruit's juice. It was found that *M. charantia* juice was a suitable medium to support good growth of the lactic acid bacterium. Nutrients supplementation was not necessary to achieve high growth rate and cell viability. In stirred tank reactor, agitation rate and initial inoculum volume showed significant effects on specific growth rate of the bacterium in the fruit juice medium. β-glucosidase showed no discernable effect of the hydrolysis of glycosides in the juice. LCMS analysis showed initially abundant momordicoside 23-O-β-Allopyranosyle-cucurbita-5,24-dien-7α,3β,22(R),23(S)-tetraol-3-O-β-allopyranoside was transformed into its corresponding aglycone known as methyl-2-[cyclohex-2-en-1-yl(hydroxy)methyl]-3-hydroxy-4-(2-hydroxyethyl)-3-methyl-5-oxoprolinate in addition to other new metabolites emergence following fermentation of the juice. The biotransformation of the *M. charantia* juice via *L. plantarum* BET003 fermentation resulted in elevated anti-diabetic activities as compared to fresh juice.

suffian_annuar@um.edu.my