THE EFFECTS OF RICE FIBRE ON PROBIOTIC FERMENTATION

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Warnakulasuriya Mary Ann Dipika Binosha Fernando

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ABSTRACT

The role of rice fibre in stimulating the growth and SCFA (Short Chain Fatty Acid) formation by human faecal micro-flora and individual probiotics and co-cultures was investigated. The effects of environmental factors on the adhesion of probiotics on rice fibre were also evaluated.

Fibre fractions of rice enhanced the growth of human colon microflora (*Bifidobacterium* species and *Lactobacillus* species) with a corresponding increase in the quantity of SCFA produced. However, individual microorganisms showed different preferences for different rice varieties and specific fractions of rice fibre. Pure cultures of the genus *Bifidobacterium* and genus *Lactobacillus* fermented rice fibre fractions irrespective of the rice variety. However, the genus *Bifidobacterium* produced more SCFA than genus *Lactobacillus*. Co-cultures of *Bifidobacteria* and *Lactobacilli* showed a greater ability than pure cultures to digest fibre and form SCFA, indicating synergism. Co-cultures used the fibre fractions irrespective of the rice variety. All microflora from mixed faecal inocula, pure and combinations of probiotic cultures showed a preference for total dietary fibre than insoluble and soluble dietary fibre fractions based on fermentation and SCFA production. All cultures tested, including human faecal cultures, pure cultures and co-cultures, produced more acetate than propionate and butyrate.

Pure cultures and co-cultures adhered to rice fibre. Adhesion was influenced by environmental factors and is believed to play a role in the fermentation of rice fibre. Rice fibre is a suitable substrate for probiotic microflora.

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PUBLICATIONS

Studies completed during candidature, some of which are reported in this thesis have been presented in books, Journals and in conferences.

Papers

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TABLE OF CONTENT

LIST OF TABLES

Chapter 8

Chapter 9

Chapter 10

Chapter 11

Appendix B

Appendix C

Appendix D

LIST OF FIGURES

Chapter 6

Chapter 7

Chapter 8

Chapter 9

Chapter 10

Chapter 11

Chapter 12

ABBREVIATIONS

ADF	Acid Detergent Fibre
DF	Dietary fibre
DP	Degree of polymerization
GC	Gas chromatography
GLC	Gas liquid chromatography
GIT	Gastrointestinal tract
HPLC	High performance liquid chromatography
NDF	Neutral Detergent Fibre
NDO	Non digestible oligosaccharides
NSP	Non starch polyaccharide
BB/B. breve	Bifidobactrea *breve*
BL/B. longum	Bifidobacterea *longum*
h	Hours
IDF	Insoluble dietary fibre
LA/,L. acidophilus	Lactoabcillus *acidophilus*
LR/, L. rhamnosus	Lactoabcillus *rhamnosus*
LAB	Lactic acid bacterea
OD	Optical Density
RS	Resistant starch