



POTENTIAL PREBIOTIC EFFECT OF FRUCTAN FRACTIONS FROM *Agave angustifolia* HAW, ON *Bifidobacterium* and *Lactobacillus* STRAINS

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Introduction. Prebiotics are carbohydrates resistant to human gastric digestion, when they reach intact into the gastrointestinal tract, they selectively stimulate growth of probiotic bacteria which in turn, activate the production of health beneficial metabolites for the host. Among probiotic bacteria *Bifidobacterium* and *Lactobacillus* are the most frequently microorganisms used for probiotic and symbiotic product manufacturing. On the other hand, fructans have been recognized as prebiotics, these carbohydrates are abundant in nature, present in approximately 15% of flowering plant species such as *Agave* which presents fructans with a polymerization degree (PD) from 2 to 70 units.

This study proposal aims to evaluate the potential prebiotic effect of three different PD fructan fractions from an extract of *Agave angustifolia* HAW (FAaH).

Methods. Extraction of fructans were achieved by leaching the pine followed by filtration, chromatography and ultrafiltration. Three different fructan fractions were obtained: low (FAaH3), medium (FAaH2) and high molecular weight (FAaH1) by ultrafiltration. These fractions were further dried by lyophilisation (1). Fractions obtained were tested as carbon source for seven *Bifidobacterium* and three *Lactobacillus* strains. Fermentations were run in semi-synthetic medium in anaerobically conditions at 37°C and 200 rpm (2).

Results. Four patterns in growth behaviour were observed in response to the fructan fraction used as carbon source. These responses are attributed to the individual nature of each strain even of the same species, different fermentation patterns have been observed before in similar studies (3). Description of each pattern is as follows:

Group 1. Strains that were not able to grow in any of the fructan fractions supplemented in the culture medium.

Group 2. Strains with growth only in the presence of low molecular weight fructans (FAaH3). PD of this fructan fraction could be from two to up to 12 units.

Group 3. This group refers to the strains capable of metabolize fructans of the three fractions. However, Best growth was according to the PD of the fraction used, *i. e.*, Higher growth in low molecular weight fructans, medium growth in medium molecular weight fraction and low

growth in the high molecular weight fructan fraction medium.

Group 4. These strains observed a good growth behaviour in all fructan fractions utilized in the culture medium.

Table 1. *Bifidobacterium* and *Lactobacillus* strains clustered in four groups (G), with different patterns in growth behaviour

| Strain | G1 | G2 | G3 | G4 |
|---|----|----|----|----|
| <i>B. adolescentis</i> ATCC 15703 | | | X | |
| <i>B. animalis</i> ATCC 25527 | | X | | |
| <i>B. bifidum</i> ATCC 29521 | | | | X |
| <i>B. breve</i> ATCC 15700 | | X | | |
| <i>B. infantis</i> ATCC 17930 | | | X | |
| <i>B. longum</i> ATCC 15707 | | X | | |
| <i>B. lactis</i> DSM 10140 | | X | | |
| <i>L. casei</i> subsp. <i>rhannosus</i> ATCC 9595 | X | | | |
| <i>L. paracasei</i> sp. | | | | X |
| <i>L. plantarum</i> 299V | X | | | |

Conclusions. Fructans derived from *A. angustifolia* Haw, could generate a prebiotic effect stimulating growth of several probiotic strains used in this study. Different fermentation patterns were observed for each strain.

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