

# Impact of an anthocyanin-rich blueberry extract upon *Lactobacillus* and *Bifidobacterium* adhesion to Caco-2 and HT29-MTX cell lines



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PORTO

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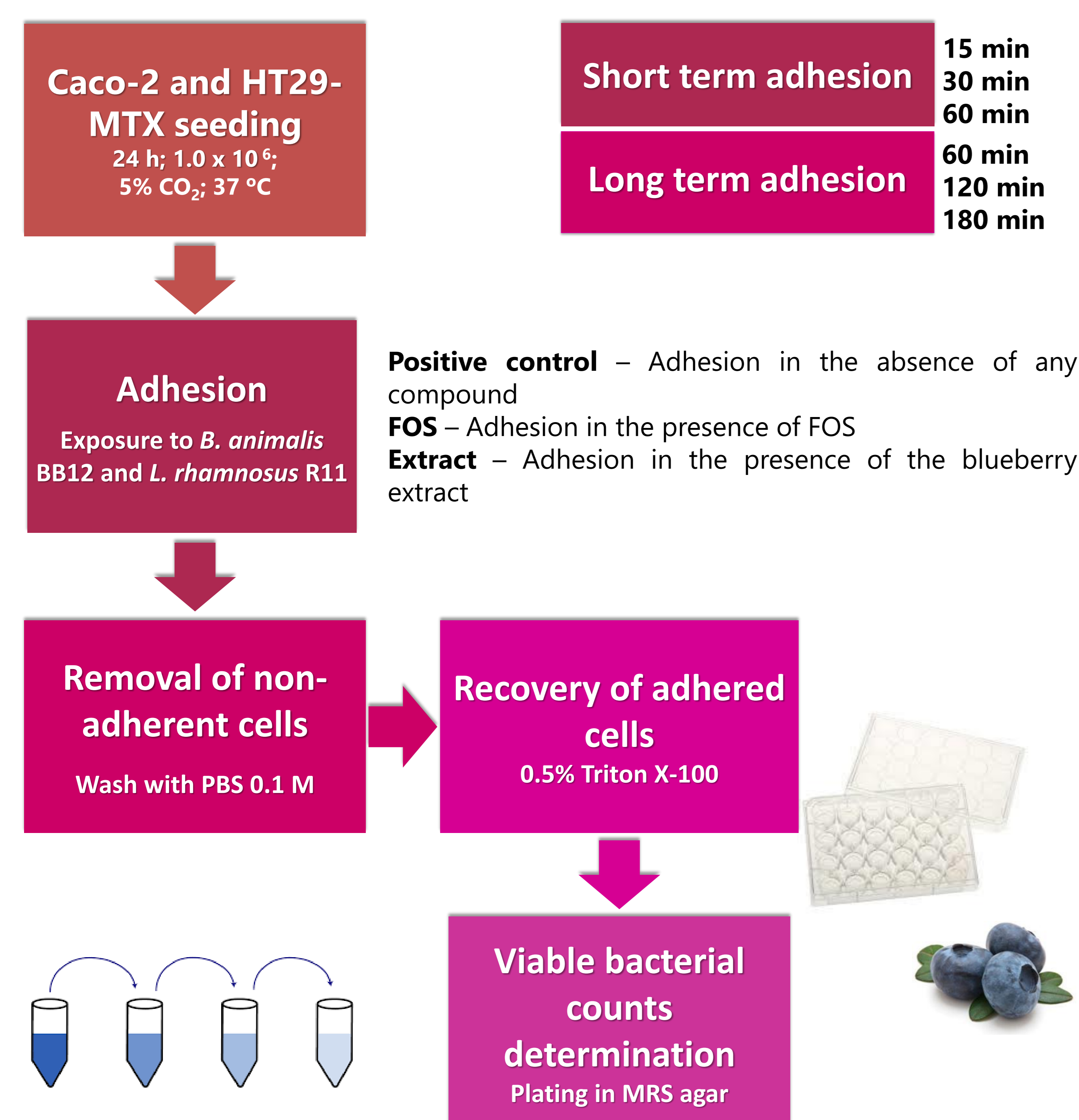
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## Introduction

Blueberries have been associated with several potentially beneficial properties including antioxidant and anti-inflammatory activity and, more recently, with the modulation of the intestinal microbiota. Gut microbiota is considered as essential for the normal functioning of the body and the maintenance of health, with the connection between gut microbiota composition of the intestinal microbiota and the overall health and wellbeing having been widely and systematically reported by the scientific community. Previous works have shown that an anthocyanin rich blueberry extract, when in contact with certain bifidobacteria, was capable of inhibiting the adhesion of potential pathogens to a mucin coated surface, which mimicked the intestinal epithelium. As such, this work aimed to assess whether the blueberry extract was capable of modulating the adhesion of different probiotic bacteria to Caco-2 and HT29-MTX cells, which are representative of the intestinal epithelium. The adhesion was analyzed without any extract (control), in the presence of fructooligosaccharide (FOS) and the anthocyanin rich blueberry extract.

## Methods

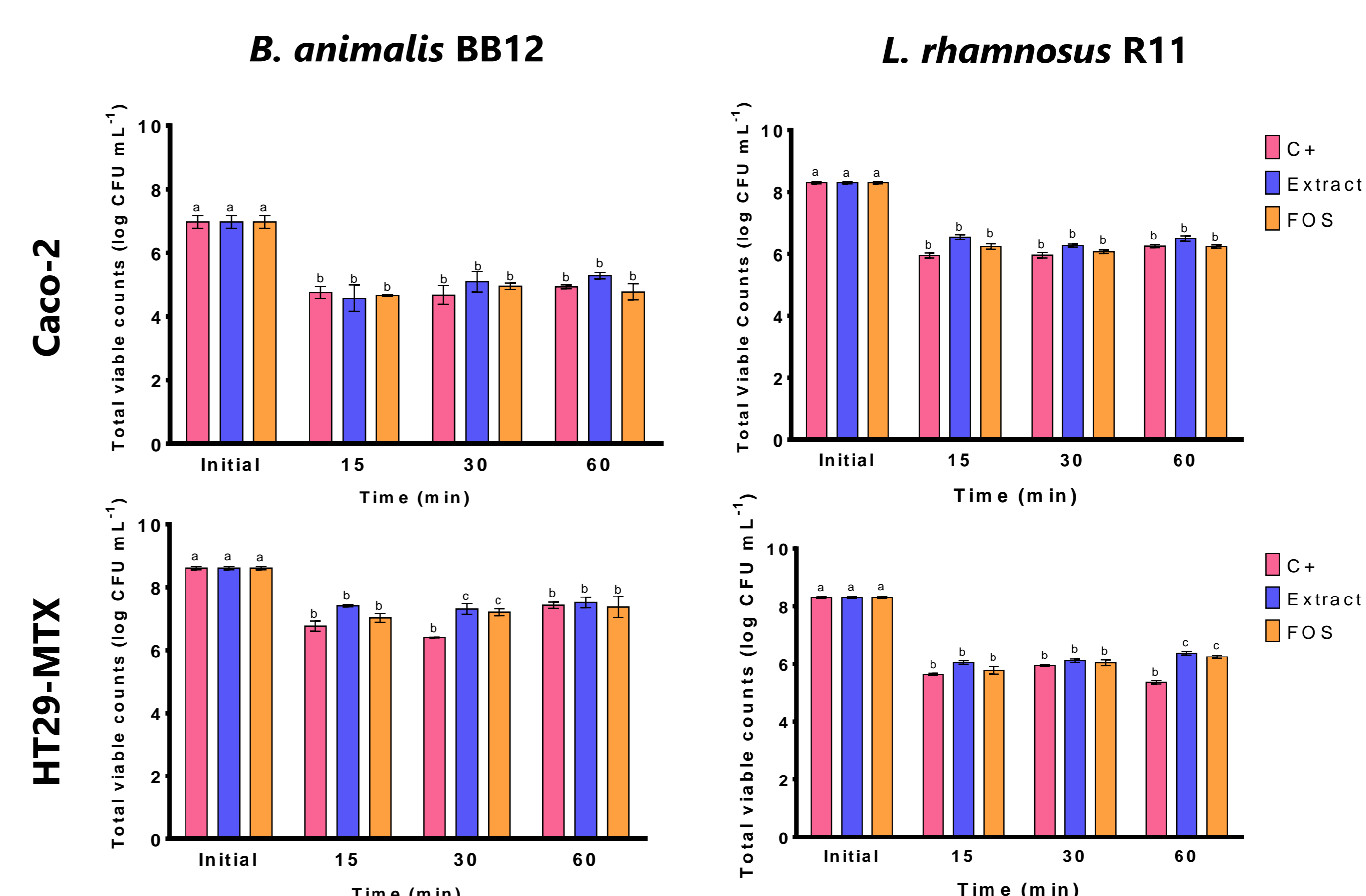


**Table 1.** Relative percentage values for *L. rhamnosus* R11 and *B. animalis* subsp. *lactis* BB12 adhesion to Caco-2 and HT29-MTX for the short and long-term adhesion assay. All values correspond to an average of five replicates.

	Caco-2		HT29-MTX		
	<i>B. animalis</i> BB12	<i>L. rhamnosus</i> R11	<i>B. animalis</i> BB12	<i>L. rhamnosus</i> R11	
15 min	Positive control	64% ± 0.31	72% ± 0.030	79% ± 0.090	65% ± 0.050
	FOS	67% ± 0.27	75% ± 0.060	82% ± 0.050	70% ± 0.070
	Extract	76% ± 0.080	79% ± 0.40	86% ± 0.020	73% ± 0.080
30 min	Positive control	67% ± 0.040	72% ± 0.28	74% ± 0.050	68% ± 0.050
	FOS	71% ± 0.060	73% ± 0.080	84% ± 0.010	73% ± 0.050
	Extract	78% ± 0.16	76% ± 0.040	85% ± 0.030	74% ± 0.16
60 min	Positive control	71% ± 0.11	75% ± 0.012	86% ± 0.18	72% ± 0.17
	FOS	75% ± 0.050	75% ± 0.17	86% ± 0.25	75% ± 0.040
	Extract	86% ± 0.33	78% ± 0.10	87% ± 0.030	77% ± 0.10
60 min	Positive control	66% ± 0.14	59% ± 0.010	62% ± 0.10	70% ± 0.36
	FOS	74% ± 0.23	66% ± 0.16	78% ± 0.060	74% ± 0.07
	Extract	90% ± 0.14	75% ± 0.05	78% ± 0.090	79% ± 0.03
120 min	Positive control	71% ± 0.080	60% ± 0.41	71% ± 0.050	71% ± 0.25
	FOS	70% ± 0.040	68% ± 0.36	77% ± 0.27	75% ± 0.19
	Extract	93% ± 0.50	75% ± 0.03	78% ± 0.44	80% ± 0.05
180 min	Positive control	67% ± 0.070	56% ± 0.06	69% ± 0.12	74% ± 0.39
	FOS	85% ± 0.090	67% ± 0.09	80% ± 0.05	78% ± 0.24
	Extract	95% ± 0.22	81% ± 0.15	80% ± 0.06	85% ± 0.09

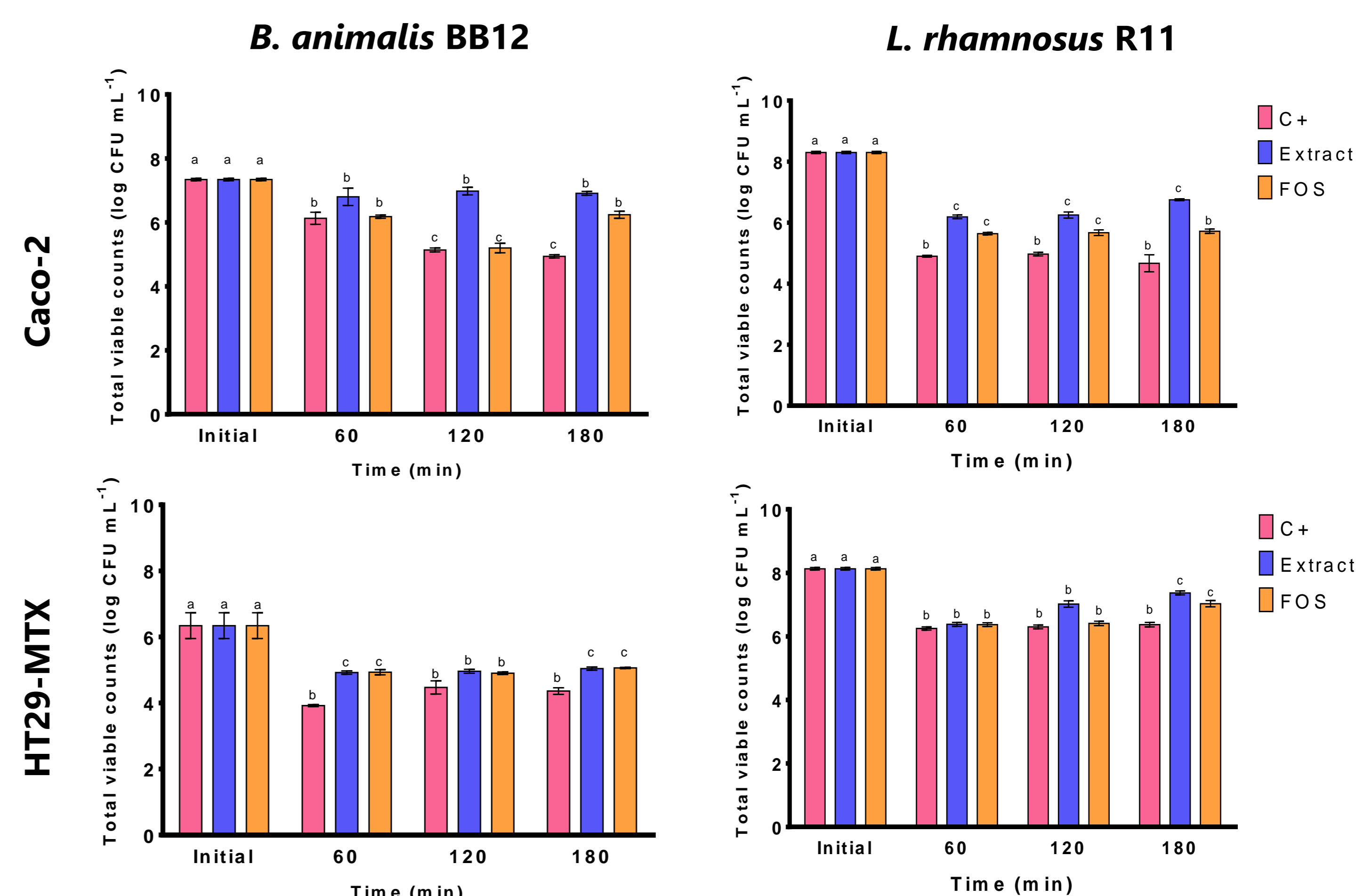
## Results

### Short term adhesion assay



**Figure 1.** Total viable counts resulting of the adhesion to Caco-2 cells (top row) and HT29-MTX cells (bottom row) by *B. animalis* subsp. *lactis* BB12 and *L. rhamnosus* R11 for the short adhesion assay. All values in log CFU mL<sup>-1</sup> correspond to the average of five replicates. Different letters represent the statistically significant differences ( $p < 0.05$ ) found between samples for each sampling time.

### Long term adhesion assay



**Figure 2.** Total viable counts resulting of the adhesion to Caco-2 cells (top row) and HT29-MTX cells (bottom row) by *B. animalis* subsp. *lactis* BB12 and *L. rhamnosus* R11 for the short adhesion assay. All values in log CFU mL<sup>-1</sup> correspond to the average of five replicates. Different letters represent the statistically significant differences ( $p < 0.05$ ) found between samples for each sampling time.

## Conclusions

- Extract helped modulate probiotic adhesion;
- Bacterial adhesion was higher in the presence of extract;
- Higher relative adhesion values obtained for bifidobacteria.

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