

The intestinal microflora in Australian breast-fed and formula-fed infants

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Previous studies have found that breast-fed (BF) infants have an intestinal microflora dominated by bifidobacteria possibly caused by bifidobacterial growth factors present in human milk which protect infants against bacterial pathogens. In contrast, formula-fed (FF) infants have more *Bacteroides*, enterobacteria and clostridia. In this study, we compared the effect of the type of feeding on the composition of the faecal microflora in 10 full-term, healthy Australian infants (five BF and five FF) aged 4 to 12 weeks.

Faecal samples were placed in an anaerobic chamber within 3 h of collection. Faeces (1 g) were homogenised and diluted 10-fold (10^{-1} – 10^{-8}) g/ml in Wilkins-Chalgren anaerobe broth. One hundred microlitres of each dilution were plated in duplicate and incubated anaerobically at 37°C on Wilkins-Chalgren anaerobe blood agar (2 days, total anaerobes), and supplement (2 days, *Bacteroides*), Reinforced Clostridial agar (preparations were heat treated for 10 mins at 90°C to select for clostridial spores) (2 days, clostridia), Rogosa agar (2 days, lactobacilli) and raffinose bifidobacteria agar (3 days, bifidobacteria). Plates which contained the following media were incubated aerobically on nutrient agar (1 day, total aerobes), and MacConkey agar (1 day, enterobacteria). After incubation, colonies were counted and identified by colony morphology. Bacterial counts were calculated as log 10 of colony-forming units/g of faeces. Faecal pH was measured with a digital pH meter.

	Faecal bacterial counts ¹	
	Breast-fed (n = 5)	Formula-fed (n = 5)
Total anaerobes	11.21 ± 0.39	10.08 ± 0.71
Bacteroides	8.88 ± 0.91	9.86 ± 0.62
Bifidobacteria	9.35 ± 0.33	7.82 ± 0.79
Lactobacilli	7.94 ± 0.90	2.72 ± 0.792
Clostridia	1.98 ± 1.22	4.76 ± 2.05
Total aerobes	8.49 ± 0.10	9.06 ± 0.17
Enterobacteria	7.03 ± 0.71	9.22 ± 0.052

¹mean ± SEM. Colony forming units.

²significantly different from breast-fed group, (P < 0.05).

The composition of the intestinal flora was found to be different between BF and FF infants. Breast-fed infants had higher faecal bacterial counts of lactobacilli than FF infants (P < 0.05). Lactobacilli were present in the faeces of all BF infants but only three of the five FF infants. Formula-fed infants had higher counts of enterobacteria than BF infants (P < 0.05). Bifidobacteria were the predominant faecal bacteria in BF infants. Conversely, *Bacteroides* were the predominant faecal bacteria in FF infants. There were no marked differences between the groups in counts of *Bacteroides* or clostridia. Faecal pH was significantly lower in the BF group (5.47 ± 0.06) than in the FF group (7.34 ± 0.17) (P < 0.05). This study supports other research findings on the benefits of breast-feeding on the intestinal microflora of infants.