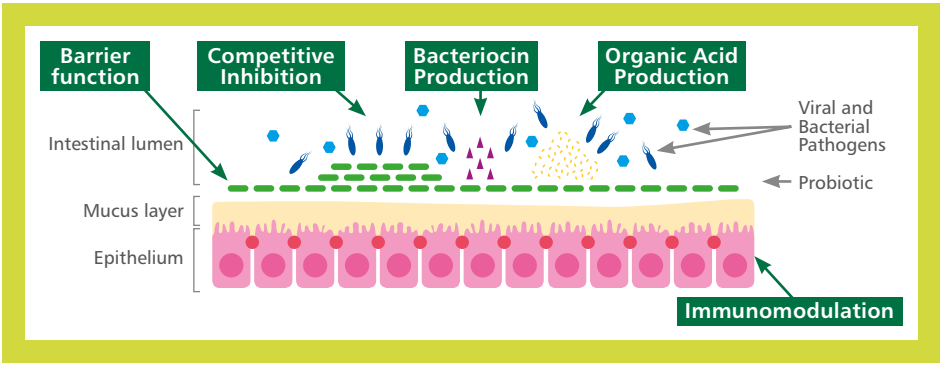
Treatment of Acute Infectious Gastroenteritis (AIG) in Children

Evidence series

- Worldwide 2.5 billion cases of acute infectious gastroenteritis (AIG) occur annually in children <5 yrs.[1]
- AIG claimed the lives of more than half a million children <5 years in 2013 (>9% of total deaths in this age range).[2]
- The incidence of diarrhoea ranges from 0.5 to 2 episodes per child per year in children <3 years in Europe.[3]
- AIG accounts for over 10% of GP consultations in children <5 years.[4]
- Numerous viruses (70%), bacteria (10-20%) and protozoa (<10%) are responsible for AIG.[5]
- Rotavirus is the most important viral pathogen worldwide, responsible for 37% of diarrhoea-related deaths in children <5 years.[6]
- Norovirus is now the leading cause of acute gastroenteritis in children <5 years.[7]
- Bacterial gastroenteritis is also commonly seen in primary care and emergency department settings, particularly in children under <5 years[8].
- **In children, probiotics have been shown to reduce the mean duration of diarrhoea by more than 1 day and reduce the relative risk of diarrhoea lasting 4 days or more days by almost 60%.[9]**

Figure 1 Probiotic mechanisms of action against AIG pathogens



The evidence behind Bio-Kult probiotics

- Several studies demonstrate that multi-strain probiotic preparations are more effective in counteracting the growth of pathogens when compared with single strain preparations.[10–13]
- **Antimicrobial activity against *S. typhirium*, *S. aureus*, *E. coli*, *E. faecalis* and *C. difficile* is detected for all the strains found in Bio-Kult (Table 1).[13]**
- **Organic acids produced by Bio-Kult specific strains effectively inhibit a range of pathogenic Gram-positive and Gram-negative bacteria commonly responsible for AIG.[13]**

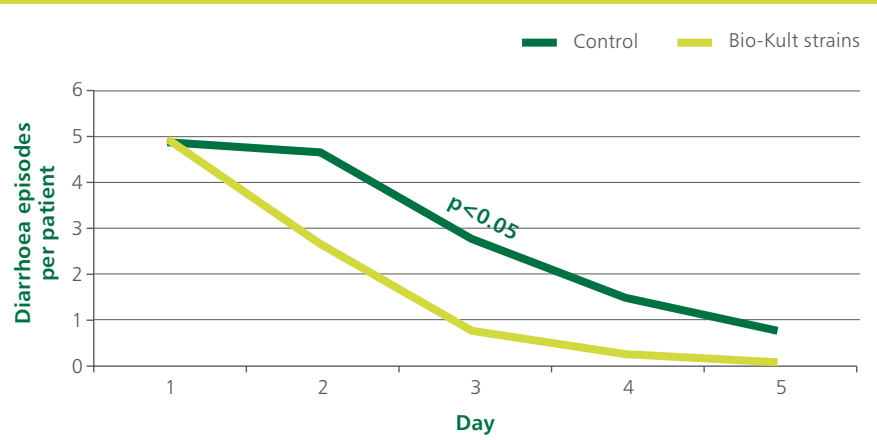
Table 1 Inhibition effect of Bio-Kult strains on selected pathogens

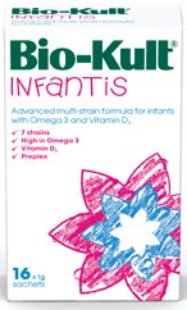
	Pathogen				
	S. typhimurium	*S. aureus*	*E. coli*	*E. faecalis*	*C. difficile*
	48h	48h	48h	48h	48h
L. acidophilus	+++	++	++	++	+++
L. rhamnosus	++	++	+	++	++
L. plantarum	+++	++	++	++	++
L. bulgaricus	++	+	++	++	+
L. casei	+++	++	++	++	++
L. lactis	++	+	++	+	+
L. salivarius	+++	++	+++	++	+++
L. fermentum	+	-	++	-	++
L. helveticus	++	++	++	+	++
B. bifidum	++	++	++	++	-
B. breve	++	+	++	+	++
B. infantis	-	-	-	-	-
B. longum	++	++	++	++	-
S. thermophilus	±	±	±	-	-

Key: (±) < 1 cm of inhibition but no clear halo
(-) no inhibition
(+) zone of inhibition between 0.5 – 1 cm
(++) zone of inhibition between 1.1 - 1.7 cm
(+++) zone of inhibition > 1.7 cm

- **In a randomised, blinded, clinical trial of patients (2 months – 2 years) with acute gastroenteritis, Bio-Kult strains significantly reduced frequency of diarrhoea (Figure 2).[14]**
- **Clinical evidence demonstrates that the addition of Bio-Kult probiotics to oral rehydration therapy may reduce the morbidity and financial burden associated with AIG.**

Figure 2 Bio-Kult 7 strains have demonstrated, in the context of a clinical trial, to reduce the frequency of diarrhoea.





LIVE BACTERIAL CULTURES	*Lactobacillus casei* PXN 37 *Lactobacillus rhamnosus* PXN 54 *Streptococcus thermophilus* PXN 66 *Lactobacillus acidophilus* PXN 35 *Bifidobacterium breve* PXN 25 *Lactobacillus delbrueckii* ssp. *bulgaricus* PXN 39 *Bifidobacterium infantis* PXN 27
OTHER INGREDIENTS	DHA + EPA Powder: >1mg per sachet (Omega-3 fatty acid from fish) Vitamin D_3: 2.5mcg per sachet (50% of Nutrient Reference Value) Preplex® (fructooligosaccharide (FOS) and gum acacia)
TOTAL VIABLE COUNTS (CFU)	1 x 10^9 CFU/sachet
USAGE GUIDELINES	½ -1 sachet once a day mixed with milk, water or food (start with ¼ of a sachet for babies <6 months) during the antibiotic treatment and for least 2 weeks after completion of the antibiotic course

References:

1 UNICEF, WHO. Diarrhea: Why children are still dying and what can be done? http://www.who.int/maternal_child_adolescent/documents/9789241598415/en/. 2009; : 68.
2 Liu L. Global, regional, and national causes of child mortality in 2000–13, with projections to inform post-2015 priorities: an updated systematic analysis. *Lancet* 2015; **385**: 371–9.
3 Whyte LA, Mcloughlin LM. Guidelines for the management of acute gastroenteritis in children in Europe. *Arch Dis Child Educ Pr Ed* 2015; **100**: 308–12.
4 Damme P Van, Giaquinto C, Gothefors L, Maxwell M. Multicenter Prospective Study of the Burden of Rotavirus Acute Gastroenteritis in Europe , 2004 – 2005 : The REVEAL Study. *J Infect Dis* 2007; **195**: 4–16.
5 Elliott EJ. Acute gastroenteritis in children. *BMJ* 2007; **334**.
6 Tate JE, Burton AH, Boschi-pinto C, *et al.* 2008 estimate of worldwide rotavirus-associated mortality in children younger than 5 years before the introduction of universal rotavirus vaccination programmes : a systematic review and meta-analysis. *Lancet Infect Dis* 2012; **12**: 136–41.
7 Payne DC. Norovirus and Medically Attended Gastroenteritis in U.S. Children. *N Engl J Med* 2013; **368**: 1121–30.
8 Dennehy PH. Acute Diarrheal Disease in Children : Epidemiology , Prevention and Treatment. *Infect Dis Clin North Am* 2005; : doi:10.1016/j.idc.2005.05.003.
9 Allen SJ, Martinez EG, Gregorio G V, Dans LF. Cochrane Review: Probiotics for treating acute infectious diarrhoea. *Evidence-Based Child Heal A Cochrane Rev J* 2011; **6**: 1894–2021.
10 Timmerman HM, Koning CJM, Mulder L, Rombouts FM, Beynen AC. Monostrain, multistrain and multispecies probiotics — A comparison of functionality and efficacy. *Int J Food Microbiol* 2004; **96**: 219–33.
11 Chapman CMC. Health benefits of probiotics : are mixtures more effective than single strains? *Eur J Nutr* 2011; **50**: 1–17.
12 Chapman CMC, Gibson GR, Rowland I. In vitro evaluation of single- and multi-strain probiotics : Inter-species inhibition between probiotic strains , and inhibition of pathogens. *Anaerobe* 2012; **18**: 405–13.
13 Tejero-Sariñena S, Barlow J, Costabile A, Gibson GR, Rowland I. In vitro evaluation of the antimicrobial activity of a range of probiotics against pathogens: evidence for the effects of organic acids. *Anaerobe* 2012; **18**: 530–8.
14 Yala ET. The clinical efficacy of multi-strain probiotics (Protexin) in the management of acute gastroenteritis in children two months to years old. *PIDSP* 2010; **11**: 86–91.

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