

Study Reference	Key Findings
<p>Giannini EG, Mansi E, Dulbecco P, Savarino V. Role of partially hydrolyzed guar gum in the treatment of irritable bowel syndrome. <i>Nutrition</i> 22 (2006) 334-342</p>	<p>A review on the role of PHGG in the treatment of irritable bowel syndrome (IBS). IBS is the world's most common gastrointestinal functional disorder and is associated with several social and economic costs. Health-related quality of life is often impaired in patients with IBS. In clinical trials, PHGG decreased symptoms in both constipation- and diarrhoea-related forms of IBS and decreased an important therapeutic endpoint, abdominal pain.</p> <p><b>Conclusion:</b> An improvement in quality of life was observed in patients with IBS during and after treatment with PHGG.</p>

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# Resource<sup>®</sup> OptiFibre<sup>®</sup> and Novasource<sup>®</sup>

## Summary of Clinical Studies supporting the use of Partially Hydrolysed Guar Gum



## Introduction

This booklet provides an overview of the published clinical studies which support the use of Partially Hydrolysed Guar Gum (PHGG) to help maintain normal bowel function in patients experiencing diarrhoea, constipation and irritable bowel syndrome (IBS).

### What is Partially Hydrolysed Guar Gum (PHGG)?

- It is 100% soluble fibre
- It is produced from guar gum (which is an extract of the Indian cluster bean) by controlled partial enzymatic hydrolysis
- It has a smaller molecular weight and is less viscous than native guar gum
- It is stable and therefore does not hold water
- It is soluble at pH levels commonly found in foods

PHGG is the sole source of fibre in the product Resource® OptiFibre® and the enteral feed range Novasource®.

Resource® OptiFibre® is a powdered dietary soluble fibre supplement, that mixes easily with hot or cold liquids or soft, pureed foods.

Novasource® is a range of disease specific enteral tube feeds.

## Benefits of PHGG in the management of diarrhoea

Clinical studies have confirmed that enteral tube feeds enriched with PHGG can:

- Reduce the occurrence of diarrhoea
- Reduce the mean frequency of diarrhoea days
- Reduce the need to discontinue an enteral feed due to diarrhoea
- Increase tolerance to enteral feeds

Study Reference	Key Findings
<p>Homann HH, Kemen M, Fuessenich C, Senkal M, Zumbel V. Reduction in diarrhoea incidence by soluble fiber in patients receiving total or supplemental enteral nutrition. <i>Journal of Parenteral and Enteral Nutrition</i> 1994;18:485-490</p>	<p>Prospective randomised double-blind trial to assess the effects of feeding a standard enteral feed versus a formula enriched with 20g per 1000ml PHGG on the occurrence of diarrhoea in 100 enterally-fed patients.</p> <p>30 of the patients were receiving total enteral nutrition (TEN) and 70 were receiving supplementary enteral nutrition (SEN).</p> <p>Patients were randomised to the following groups:</p> <ul style="list-style-type: none"> <li>○ PHGG enriched enteral feed</li> <li>○ Standard enteral tube feed</li> </ul> <p>Patients were fed for a minimum of 5 days and all patients received a minimum intake of 1000ml/d of feed.</p> <p>The incidence of diarrhoea was significantly reduced in the patients who received the PHGG enriched feed. Significantly more patients on the standard feed had their feeding discontinued due to diarrhoea compared with the group receiving the PHGG enriched feed.</p> <p><b>Conclusion:</b> Enteral nutrition supplemented with soluble fibre is beneficial in reducing the incidence of diarrhoea in patients who are at increased risk of developing diarrhoea.</p>

Study Reference	Key Findings
Spapen H, Diltoer M, Van Mladeren C, Opendacker G, Suys, L. Huyghens E. Soluble fiber reduces the incidence of diarrhea in septic patients receiving total enteral nutrition: a prospective, double-blind, randomized, and controlled trial. <i>Clinical Nutrition</i> 2001; 20(4): 301-305	<p>Double blind, prospective randomised controlled trial to determine the effect of early administration of enteral nutrition on the occurrence of diarrhoea in 25 tube fed patients with severe sepsis and septic shock. Patients were randomised to receive either of the following feeds for a minimum of 6 days:</p> <ul style="list-style-type: none"> <li><input type="radio"/> An enteral formula supplemented with 22g/l of PHGG</li> <li><input type="radio"/> An isocaloric, isonitrogenous control feed without fibre</li> </ul> <p>The mean frequency of diarrhoea days was significantly lower in the fibre treated group and the total number of diarrhoea days was significantly lower in the patients treated with PHGG. In the group receiving the PHGG enriched feed, diarrhoea occurred on 10.8% of feeding days compared to 31.5% in the control group.</p> <p><b>Conclusion:</b> This study highlights the potential benefit of adding soluble fibre to enteral nutrition on the occurrence of diarrhoea in septic patients.</p>
Rushdi RA, Pichard C, Khater YH. Control of diarrhea by fiber-enriched diet in ICU patients on enteral nutrition: a prospective randomized controlled trial. <i>Clinical Nutrition</i> (2004) 23, 1344-1352	<p>Prospective double-blind controlled study to evaluate the use of a soluble fibre (PHGG) enriched feed in preventing diarrhoea in 20 enterally fed patients on ICU with persistent diarrhoea. Patients were randomised to receive one of the following feeds for 4 successive days:</p> <ul style="list-style-type: none"> <li><input type="radio"/> Enteral feed enriched with 2% soluble fibre as PHGG</li> <li><input type="radio"/> Fibre-free standard enteral tube feed</li> </ul> <p>The patients receiving the soluble fibre enriched feed tolerated significantly higher volumes of feed on days one and four of feeding. On day 4 patients receiving the soluble fibre enriched feed tolerated 700ml more feed compared to the group receiving the standard feed. The number of liquid stools was significantly lower on day 4 in the group receiving the soluble fibre enriched feed compared to the control group.</p> <p><b>Conclusion:</b> Guar gum enriched enteral nutrition was related to a decrease in diarrhoeal episodes in ICU patients with pre-existing diarrhoea.</p>

## Benefits of PHGG in the management of constipation

Administering PHGG to patients with constipation can:

- Increase the frequency of bowel movements and faecal moisture content
- Decrease enema requirements
- Decreased laxative use

Study Reference	Key Findings
Sutton D, Dumbleton S, Allaway C. Can increased dietary fibre reduce laxative requirement in peritoneal dialysis patients? <i>J. Renal Care.</i> 2007 Oct-Dec;33 (4):174-8	<p>An audit project to review the management of constipation in peritoneal dialysis (PD) patients. The intervention phase of the audit aimed to assess the effectiveness of using a PHGG fibre supplement compared to laxatives or high fibre foods in managing constipation in these patients.</p> <p>A stool and laxative recording diary was sent to 126 PD patients. 46 patients reported using laxatives. All respondents using laxatives were invited to use a PHGG fibre supplement for 4 weeks, followed by dietary advice to see if they could achieve the same effect using high fibre foods. 23 patients entered the intervention stage of the study. 74% succeeded in replacing prescribed laxatives with the fibre supplement. 16 tried to increase their intake of high fibre foods, with 3 of these succeeding in improving their dietary intake of fibre; however only 2 were able to reduce their intake of fibre supplement.</p> <p><b>Conclusion:</b> The results of the study suggest that a fibre supplement can be as effective as current laxative treatment in preventing constipation, as well as being the preferred choice of patients as many felt it improved bowel habits while not having the side effects of stimulant laxatives.</p>
Takahashi H, Wako N, Okubo T, Ishihara N, Yamanaka J, Yamamoto T. Influence of partially hydrolysed guar gum on constipation in women. <i>J Nutr Socio Vitaminol</i> 1994;40:251-259	<p>Prospective trial to assess the benefits of PHGG in patients with constipation. Fifteen constipated women were selected as volunteers for the nine week study. Subjects all suffered severe abdominal pain and their faecal output was usually below 3 days a week. The study was divided into three periods each of 3 weeks.</p> <p>Periods 1 and 3 were designed as control periods. Subjects maintained their regular diets during the whole study period, with the exception of laxatives, other fibre drinks/yoghurts or fermented soya beans.</p> <p>During period 2, subjects took a PHGG preparation dissolved in 70-100ml of water as a beverage twice per day after meals. The total intake of PHGG was 11g per day. Bowel habits were monitored throughout all of the periods.</p> <p>The ingestion of PHGG (during period 2) caused an increase in the defecating frequency compared to periods 1 and 3, from a mean frequency of 0.45 per day in the control period to 0.63 per day in the study period. Faecal moisture content significantly increased from 69.1% in the control periods to 73.8% during the PHGG period.</p> <p><b>Conclusion:</b> The administration of PHGG results in softer faeces and increases the defecating frequency of constipated patients.</p>

Study Reference	Key Findings
<p>Patrick PG, Gohman SM, Marx SC, DeLegge MH, Greenberg NA. Effect of supplements of partially hydrolyzed guar gum on the occurrence of constipation and use of laxative agents. <i>Journal of the American Dietetic Association</i> 1998; 98(8):912-914</p>	<p>Dual centre, prospective trial, in which each subject served as their own control, to evaluate the effect PHGG on constipation occurrence and laxative use in a population of elderly nursing home residents. All subjects took laxatives on a regular basis. The study period was 8 weeks and consisted of the following three stages:</p> <ul style="list-style-type: none"> <li>○ During the first three weeks information was collected on subjects laxative use and bowel function. <b>(Baseline)</b></li> <li>○ Beginning at week 4, each resident's prescribed laxative dose was decreased by approximately 50% and all residents began taking a PHGG supplement (4g fibre mixed into 120ml fluid). This dose was gradually increased to 12g/d dietary fibre by the end of week 4. <b>(Transition Phase)</b></li> <li>○ At the beginning of week 5, all laxatives were discontinued and subjects remained on a daily dose of PHGG for the remaining 4 weeks of the study <b>(Full Fibre Phase)</b></li> </ul> <p>Bowel habits were monitored during each of the stages.</p> <p>Sixteen residents completed all 8 weeks of the trial. A significant reduction in laxative use was noted during the fibre-supplemented phases without a significant change in the number of bowel movements, from 2.0 laxative doses per day at baseline to &lt;0.1 doses per day during the full fibre phase.</p> <p>A daily intake of PHGG which provided 8-12g of soluble fibre significantly reduced laxative use in nursing home residents.</p> <p><b>Conclusion:</b> PHGG should be considered in place of laxatives for residents who find traditional fibre supplements unpalatable.</p>
<p>Sariano CV, Hibler KD, Maxey K. Long-term fiber intervention program: reduction in enema use at a developmental care facility. <i>Journal of the American Dietetic Association</i> 2000s; 100(9):A82</p>	<p>Case controlled study to evaluate the effect of a PHGG fibre supplement on enema use in residents with profound mental and physical disabilities at a care facility.</p> <p>Baseline data on enema usage in the unit was collected. One-hundred and eighty seven residents were given a PHGG supplement – which was incorporated into menu items to provide 18g fibre per day – for up to 9 months.</p> <p>After fibre supplementation, residents with higher enema usage at baseline had a significant reduction in enema requirements.</p> <p><b>Conclusion:</b> The results indicate that long-term administration of a PHGG fibre supplement is well tolerated and supports a beneficial effect on enema usage.</p>

## Benefits of PHGG in the management of irritable bowel syndrome (IBS)

Scientific studies suggest that PHGG can lessen symptoms in individuals with IBS, such as flatulence, abdominal tension and abdominal spasm.

Study Reference	Key Findings
<p>Parisi GC, Zilli M, Miani MP, Carrara M, Bottona E, Verdianelli G, Battaglia G, Desideri S, Faedo A, Marzolino C, Tonon A, Ermani M, Leandro G. High-fiber diet supplementation in patients with irritable bowel syndrome (IBS): A multicenter, randomised, open trial comparison between wheat bran diet and partially hydrolyzed guar gum (PHGG). <i>Digestive Diseases and Sciences</i> 2002;47(8): 1697-1704</p>	<p>Open randomised trial to assess the benefits of a PHGG fibre supplement in 188 adult IBS patients compared to wheat bran.</p> <p>Patients were classified as having one of the following:</p> <ul style="list-style-type: none"> <li>○ Diarrhoea-predominant IBS</li> <li>○ Constipation-predominant IBS</li> <li>○ Changing bowel habits</li> </ul> <p>Patients were randomly assigned to receive 30g/day of wheat bran or 5g/day of PHGG for 4 weeks.</p> <p>After 4 weeks, patients were given the opportunity to switch study groups if they judged their health status to have worsened. All subjects then continued the trial for a further 8 weeks.</p> <p>Significantly more patients switched from wheat bran to PHGG than from PHGG to wheat bran at 4 weeks. Both fibre products were effective in improving pain and bowel habits, however the PHGG supplement was better tolerated and preferred by the patients.</p> <p><b>Conclusion:</b> PHGG is as effective as a high fibre diet in improving IBS symptoms but is better tolerated by patients.</p>
<p>Giaccari S, Grasso G, Tronci S, Allegretta L, Sponziello G, Montefusco A, Siciliano IG, Guarisco R, Candiani C, Chiri S. Partially hydrolyzed guar gum: a fiber as coadjuvant in the irritable colon syndrome. <i>Clin Ter</i> 2001;152(1):21-5</p>	<p>A study to evaluate the progress of symptoms and changes in the frequency of defecation in 134 subjects with IBS.</p> <p>Subjects were divided into two groups, based on their BMI (either healthy weight or overweight) and were asked to follow either a balanced, low or normal calorie diet, supplemented with 5g/d PHGG for 24 weeks.</p> <p>After 3 weeks of PHGG supplementation, all subjects showed a decrease in frequency of IBS symptoms such as flatulence, abdominal tension and abdominal spasm.</p> <p><b>Conclusion:</b> PHGG, due to its water solubility and non-gelling properties can be useful in IBS.</p>