Benicaros

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Benicaros® is a patented and upcycled precision prebiotic fibre, derived from carrot pomace, with studies demonstrating its ability to train the innate immune system for smarter, faster and stronger responses and stimulate beneficial gut bacteria and their metabolites in any type of gut ecosystem.

PRODUCT PROFILE SHEET

It all begins with responsible sourcing. Benicaros® is made from the patented cRG-I (carrot pectin-derived polysaccharide enriched in rhamnogalacturonan-I) which is extracted from upcycled carrot pomace. What makes this fibre so unique is its ability to train the innate **immune system to respond faster, smarter and stronger, and its capacity to specifically modulate the gut microbiota composition** consistently in every type of gut ecosystem, making the outcomes more predictable.

Unlocking Carrot's Gold

When just eating carrots, the RG-I fibre can remain trapped in the insoluble carrot cell walls, making it difficult for the RG-I fibre to be accessed by the immune system. Thanks to a natural proprietary extraction process, the RG-I fibre in Benicaros® is unlocked from the carrot cell walls while preserving its integrity, and making it readily available to interact with the innate immune system and be fermented by the gut microbiota.

Benicaros® has 'the right specificity' to consistently stimulate beneficial microorganisms & the production of their metabolites. Scientific research shows that unlike the common prebiotic inulin, Benicaros® leads to significantly less gas production and gives consistent effects despite variation in human microbiota composition.[1]

FODMAPs are a group of sugars that are not completely digested or absorbed in the intestines. When FODMAPs reach the small intestine, they move slowly, attracting water. When they pass into the large intestine, FODMAPs are fermented by gut bacteria, producing gas as a result. The extra gas and water cause the intestinal wall to stretch and expand. Because people with IBS (Irritable Bowel Syndrome) have a highly sensitive gut, 'stretching' the intestinal wall causes exaggerated sensations of pain and discomfort. **Benicaros® SF P has been tested by Monash University in Australia and confirmed to meet the** low-FODMAP criteria**. As a result, it is considered suitable for consumers following a low-FODMAP diet**.

Product Advantages

- ✔ **Clinically researched to accelerate the natural immune system**
  Trains the immune system for faster, smarter and stronger responses
- ✔ **Precision Prebiotic**
  Predictable and consistent outcomes
- ✔ **Proprietary extraction process**
  Unlocks cRG-I (carrot rhamnogalacturonan-I) from carrot cell walls
- ✔ **Natural, Plant-Based and Clean Label**
- ✔ **Upcycled**
  Produced by upcycling carrot pomace from juice production
- ✔ **Proprietary water-based extraction technology**
  Free from organic solvents
- ✔ **Good Solubility**
- ✔ **Good Organoleptic Properties**
  No negative impact on taste, odour, or texture of the finished product
- ✔ **Heat and pH stable**
- ✔ **Safe**
  US GRAS Certified
- ✔ **Patented**
  Protected by a broad portfolio of intellectual property
- ✔ **Kosher and Halal**
- ✔ **Gluten-Free**
- ✔ **Easily added to various delivery forms**
  Including capsules, tablets, sachets and liquid applications
- ✔ **Meets the low-FODMAP criteria**

Research

Research supporting immune health

Benicaros® (300mg/daily serving size) was shown to be effective in a single centre, randomised, double-blind, placebo-controlled study conducted with 177 healthy adults (18-65 years). Benicaros® was demonstrated to accelerate and augment innate immune and anti-viral responses to an immune challenge with a common cold infection after 8 weeks supplementation[2].

The study also demonstrated that Benicaros® was able to reduce symptom severity to this acute respiratory viral infection by up to 33% and reduce the duration of symptoms by up to 3 days[3]. The study concluded that Benicaros® offered clinically relevant benefits to immune challenges caused by an infection. With this study it was also

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demonstrated that cRG-I ameliorated the negative effects of a common cold infection on wellbeing, as assessed by a validated questionnaire scoring symptoms and quality of life attributes[3].

Fig. 1
Benicaros® Response to Controlled Virus Challenge
(Lutter et al. 2021 ; Mckay et al. 2022)

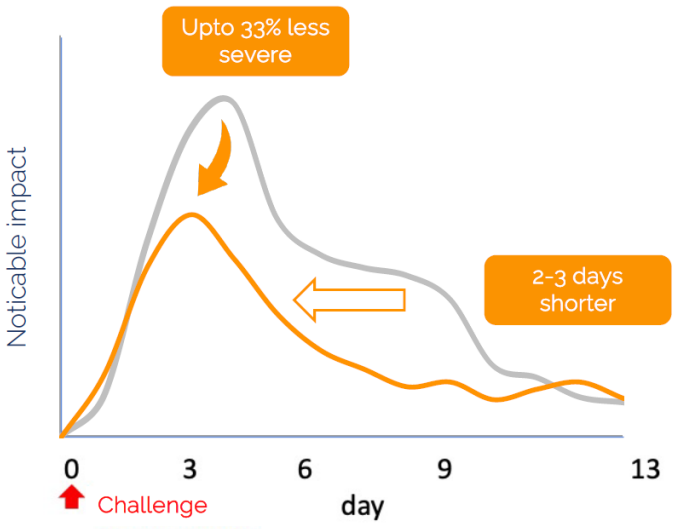
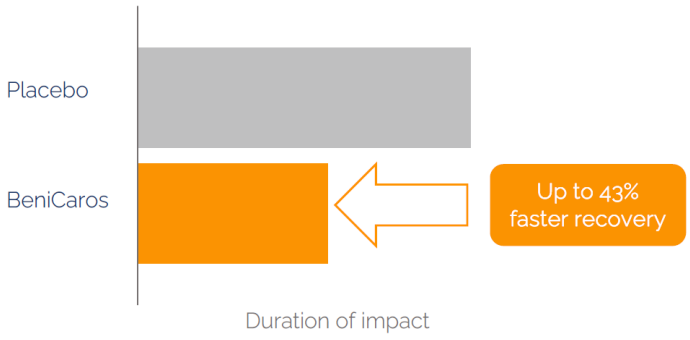


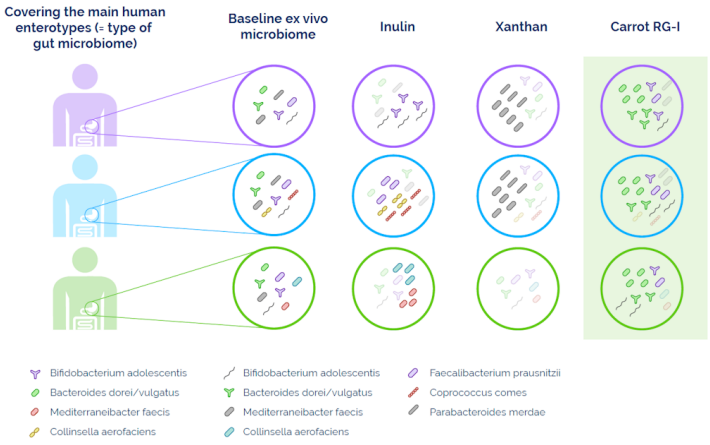
Fig. 2
Benicaros® Response to Controlled Virus Challenge
(Lutter et al. 2021 ; Mckay et al. 2022)



Research supporting gut health

A study[4] compared the prebiotic effects of three dietary fibres of various specificity (i.e. structural complexity) on the intestinal microbiota of healthy adults. Fecal samples from 24 subjects were incubated for 48 hours with the medium-high specificity fibre Benicaros® (300mg and 1500mg), 1500mg of inulin (a low specificity fibre) or 1500mg of xanthan (a high specificity fibre). The SIFR® high-throughput ex vivo validated gut digestion and fermentation simulator that generates predictive insights for clinical findings was used to measure changes in gut microbiota composition and function.

Fig. 3
Benicaros® Stimulation of Gut Microbiome vs Others
(Van den Abbeele et al. 2023)



Results:

- **Benicaros® significantly increased** a broad spectrum of operational taxonomic units (OTUs) belonging to Bifidobacteriaceae, Bacteroidaceae, Acidaminococcaceae, unclassified Clostridiales, Lachnospiraceae, Ruminococcaceae, and Veillonellaceae, including OTUs of health-related species such as Bifidobacterium longum, Bifidobacterium adolescentis, Anaerobutyricum hallii and Faecalibacterium prausnitzii.
- **Benicaros® selectively stimulated** taxa or species of bacteria that were consistently present among human adults, resulting in lower microbiota composition differences between subjects. This homogenising effect of Benicaros® on the gut microbiota was dose dependent. In contrast, both inulin and xanthan increased interpersonal differences.
- All three test compounds significantly increased the production of short chain fatty acids (acetate, propionate and butyrate) that play an important role in host-microbiome "cross talk" and that modulate many human bodily functions, including the immune system. However, **Benicaros® led to higher and more inter-individual consistent levels of SCFA than the other fibres.**
- Benicaros® also demonstrated notably lower gas production than the other two fibres in the study

A new randomized, double-blind, placebo-controlled clinical trial[5] published recently (2025) evaluated the effects of Benicaros® after 4-weeks' supplementation in healthy adults. The study assessed gut microbiota composition, metabolic activity, immune cell activation, and gut health outcomes using validated questionnaires.

Results showed **a rapid prebiotic effect**, with significant increases in Bifidobacteria

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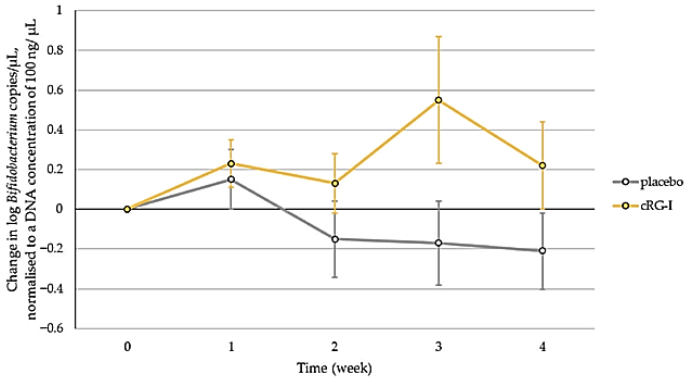
(good bacteria associated with health) that peaked at week 3. Data also supported earlier findings related to innate immune training by priming dendritic cells (the body's immune "scouts" that help detect and respond to threats). In addition to this, Benicaros® **improved gut microbiota balance** even in participants already consuming fibre-rich diets, and also **improved stool consistency**. Benicaros® was well tolerated by participants to the study.

Fig. 4
Benicaros® Supports Bifidobacteria Increase
(Evangelia N. Kerezoudi et al. 2025)



Findings from these studies show that this unique precision prebiotic robustly stimulated growth of common beneficial gut bacteria, significantly increased metabolite production and creates a more consistent gut microbiota composition among healthy subjects, **highlighting its role in protecting the gut barrier.**

Manufacturing Process

The concept of upcycling is the basis of the Benicaros® production process. The carrot pomace is obtained as a by-product from EU carrot juice production. Every batch of carrot pomace used for the Benicaros® production comes from selected local farmers and maintains exceptional quality thanks to precise processing technologies, strict food safety controls and experience in the raw material processing.

The carrot pomace is processed using a proprietary natural extraction process to obtain the Benicaros® cRG-I fibre. The fibre is then concentrated and dried into a water soluble powder.

Product Safety

NutriLeads (brand owner) is IFS broker certified, which is a Global Food Safety Initiative (GFSI) benchmarked standard. This certification assures that ingredients meet the most rigorous quality and safety standards.

Furthermore, toxicity studies[7] have demonstrated that Benicaros® is safe and in all published human clinical trials no adverse effects have been reported.

Product Range

Ingredient	Active Content	Grade	Mesh Size
Benicaros SF P	20-30% cRG-I content	Powder	< 2000 microns

Product Applications

Benicaros® can easily be incorporated and combined with micronutrients into a variety of dietary supplements in different formats such as gummies, capsules, tablets, sachets and cubes. It can also be easily formulated into varying functional foods and beverages such as snacks, sports drinks, health shots, cereals and nutritional bars.

Product Dosage

The recommended daily intake for Benicaros® SF P (Powder) is 850mg per day based on the cRG-I content and assures an intake that is equivalent to the effective dose used in the clinical studies.

About

NutriLeads
Ingredients for health

NutriLeads develops and supplies award-winning, plant-based, precision prebiotic fibres that are clinically proven to promote human health, naturally.

References

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2. *Lutter et al.* The Dietary Intake of Carrot Derived Rhamnogalacturonan I Accelerates and Augments the Innate Immune and Anti Viral Interferon Response to Rhinovirus Infection and Reduces Duration and Severity of Symptoms in Humans in a Randomized Trial*: doi: 10.3390/nu13124395. Pub Dec 2021*
3. *McKay et al.* Effects of Dietary Supplementation with Carrot-Derived Rhamnogalacturonan-I (cRG-I) on Accelerated Protective Immune Responses and Quality of Life in Healthy Volunteers Challenged with Rhinovirus in a Randomized Trial*: doi: 10.3390/nu14204258. Pub Oct 2022*
4. *Van den Abbeele et al.* A Novel Non-Digestible, Carrot-Derived Polysaccharide (cRG-I) Selectively Modulates the Human Gut Microbiota while Promoting Gut Barrier Integrity: An Integrated in Vitro Approach*: doi: 10.3390/nu12071917. Pub Jun 2020*
5. *Evangelia N. Kerezoudi et al.* Carrot Rhamnogalacturonan-I Supplementation Shapes Gut Microbiota and Immune Responses: A Randomised Trial in Healthy Adults*, Microorganisms 2025, 13(9), 2156; https://doi.org/10.3390/microorganisms13092156*
6. *Krishna Desai et al.* Associating structural characteristics to immunomodulating properties of carrot rhamnogalacturonan-I fractions*. doi.org/10.1016/j.carbpol.2024.122730. Pub Jan 2025*
7. *Jonkers et al.* Safety assessment of rhamnogalacturonan-enriched carrot pectin fraction: 90-Day oral toxicity study in rats and in vitro genotoxicity studies*: doi: 10.1016/j.fct.2020.111243. Pub May 2020*