

EDITORIAL

Diet low in fodmaps: fundamentals, evidence and controversies



Dieta pobre en FODMAP: fundamentos, evidencias y controversias

Ana Zugasti Murillo

Sección de Nutrición, Servicio de Endocrinología y Nutrición, Hospital Universitario de Navarra, Pamplona, Spain

The term “FODMAP” was first coined in 2005 by a team of researchers at Monash University in Australia.¹ Dr Sue Shepherd and Prof. Peter Gibson, along with their team, developed the concept of FODMAP as a way to classify certain types of short-chain, fermentable carbohydrates (*fermentable oligo-, di-, mono-saccharides and polyols*), which can trigger gastrointestinal symptoms in some people, especially those with irritable bowel syndrome (IBS) or other functional disorders. Since then, the low FODMAP diet has been widely studied and used as a treatment strategy to relieve symptoms in people with sensitivity to these carbohydrates.

FODMAP are found in a variety of very common and varied foods, such as fruits, vegetables, legumes, cereals, honey, sweeteners, milk and dairy products.¹ All FODMAP are potential triggers, but fortunately, not all of them exacerbate abdominal pain and other symptoms in the same patient with IBS. FODMAP have a number of unique and important characteristics with respect to the symptoms they generate in some people: they are poorly absorbed in the small intestine; they are osmotically active (causing bloating, abdominal pain and loose stools); and they ferment rapidly (which causes distension and activation of some nociceptive pathways).²

The total daily intake of FODMAP in a typical diet range from 15 to 30 g. The low FODMAP diet approach is not simply an “avoidance diet”. It is also a diagnostic tool to confirm

patients’ tolerance to some foods by temporarily eliminating them from their diet and making significant lifestyle changes.

This type of diet plan consists of 2 phases. In the first phase FODMAP are highly restricted for 4–8 weeks. In the second phase, the excluded foods are gradually reintroduced according to individual tolerance, in order to define, according to the symptoms detected, a diet that is as least restrictive as possible (*top-down method*).^{3,4} While this is the most common treatment available, dietary FODMAP content can also be managed the other way around (*bottom-up method*), that is, only high-FODMAP foods are restricted at first and then foods low in FODMAP content are also removed until tolerance is reached.

If the *top-down* approach is followed, the exclusion of FODMAP must be complete for the first 4–8 weeks and until remission of symptoms.

If the *bottom-up* approach is followed, the exclusion is partial, starting with the foods richest in FODMAP for 4–8 weeks until reaching the patient’s tolerance level. The bottom-up approach is usually applied in patients who consume a large amount of FODMAP, who have moderate symptoms, or who prefer this approach. Both strategies allow the diet to be personalised, according to the improvement in symptoms, and its long-term implementation.

The design and monitoring of the low FODMAP diet should take place under the supervision of an experienced dietitian specialised in gastroenterology.^{4,5} It is recommended that any nutritional deficit be identified prior to starting the low

E-mail address: ana.zugasti.murillo@cfnavarra.es

FODMAP diet, supplementing in the case of deficiency and monitoring throughout the intervention period. In addition, the intake of fibre, calcium, iron, zinc, folic acid and vitamin D should be monitored, especially in those patients who may not have access to alternative low-FODMAP foods for financial reasons.

Developing a low FODMAP diet requires not only extensive data on the composition of foods, but also the setting of "cut-off points" to classify foods as high and low in FODMAP. These cut-off points relate to each particular element present in a food. FODMAP composition is affected by food processing techniques and ingredient selection. For example, the use of high-fructose corn syrups may contribute to the higher levels of FODMAP detected in some processed foods. Because food processing techniques and ingredients vary by country, more complete data on food composition are needed to make this diet model more easily implementable internationally. There are currently several applications (Monash Uni Low FODMAP Diet, FODMAP friendly app, The Low FODMAP Diet for IBS app) which, although they do facilitate the selection of foods and dishes, are often based on foods that are not so commonly consumed in our setting. Our team made a proposal in 2016 that may be useful for many patients.⁶

In addition to their effect and indication in patients with IBS,^{5,7} the role of FODMAP has been investigated in other conditions, such as inflammatory bowel disease,^{8,9} coeliac disease¹⁰ and non-coeliac gluten sensitivity¹¹. In a study carried out by Marum et al. in 38 female patients with fibromyalgia, with the use of this dietary plan, a significant improvement in pain was found.¹² In these diseases, FODMAP may be the cause of symptoms and a low FODMAP diet has therefore been studied as a possible management strategy.

The gastrointestinal symptoms, including diarrhoea, are also possible complications in patients on enteral nutrition. However, the cause is not always clear. Since FODMAP are commonly added to enteral formula (but are not typically listed in the ingredients list) and enteral nutrition is frequently used as the primary source of nutrition, it is reasonable to assume that this enteral nutrition provides more FODMAP than normal dietary intake and that it increases the risk of developing diarrhoea. This hypothesis was evaluated through a retrospective study which showed that a standard-use enteral formula had a protective effect on the development of diarrhoea. The only unique feature of this formula was the lower FODMAP content.^{13,14}

The low FODMAP diet can have a negative impact on the intestinal microbiota, by decreasing the substrate available for bacterial fermentation in the intestine. In different studies, a decrease in microbial diversity and changes in the relative abundance of certain bacterial species have been observed. Given the potential adverse health effect, the microbial changes induced by a low-FODMAP diet should raise some concern. Supplementation with probiotics could be considered to partially counteract these changes. Staudacher et al. have successfully applied such a strategy, leading to an increase in the number of bifidobacteria while maintaining symptom improvement.¹⁵ Future studies should focus on evaluating whether the induced microbial changes persist over time and have adverse effects on long-term colon health.

In contrast, a high-FODMAP diet can improve blood glucose responses and insulin sensitivity by increasing the abundance of short-chain fatty acid-producing bacteria (such as *Akkermansia muciniphila* and *Bifidobacterium*). It can also decrease intestinal permeability, leading to the release of peptide tyrosine tyrosine (PYY) and glucagon-like peptide 1 (GLP-1), which help stimulate insulin secretion. In a study published in *Clinical Nutrition*,¹⁶ researchers summarise the available knowledge on FODMAP and note that fermentable short-chain carbohydrates play a role in the prevention and treatment of diabetes by altering certain metabolic and microbiota problems.

It is important to note that the low FODMAP diet is not suitable for everyone and should be implemented under the supervision of a nutrition professional, to ensure a balanced approach and avoid nutritional deficiencies. Additionally, it is essential to perform a proper evaluation to rule out other medical conditions with similar symptoms before starting this diet model.

There are complex interactions between diet, humans and the gut microbiota. The symbiosis between the ecosystem, the host and the intestinal microbiota is important for prevention of the development of chronic diseases, such as diabetes. Given the potential effects of FODMAP on gut and metabolic health, a long-term low-FODMAP diet could have adverse metabolic consequences. Therefore, the indication of this dietary plan should be limited to diseases in which evidence has been demonstrated, with the aim of detecting FODMAP that cause symptoms, in order to eliminate them from the diet, but preferably on a temporary basis.

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Conflicts of interest

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