



# Content

4	The importance of quality
6	What's inside? – common ingredients used in gluten-free foods and their function
8	Safety of gluten-free foods
10	Top quality – reliable and safe
11	Interview with Katie Kennedy – Nutrition Service
12	Commitment to product improvement
16	Nutritional Comparison of gluten-free foods
22	Interview with Research and Development Department, Dr. Schär
24	The Impact of the gluten-free diet on nutritional status and disease risk
27	Interview with Emma Pragnell – Consumer Service

Ulrich Ladurner

President Dr.Schär



## Quality for Quality of Life ●

Our products follow a continuous improvement process. This way we meet the growing expectations of the consumers

Here at Dr. Schär we work for people who at some point in their lives are forced to change to a different diet – a disruptive change, to say the least. Our goal is to help this change be one that also offers them the opportunity to enhance their quality of life. Dr. Schär stands for responsibility, progress and proximity, values that lend our company stability. We do everything in our power to ensure that members of the Dr. Schär community can experience convenience and enjoyment without feeling deprived.

We have developed from our role as a producer for a niche segment to that of a manufacturer for the global market. But the success we have enjoyed in the past is not necessarily guaranteed for the future. We are no longer pioneers but are rather the market leader for gluten-free nutrition. We are expanding and are also using our know-how to develop new and ground-breaking dietary solutions in other segments for special dietary needs. For these developments, we need a clear vision based on two pillars at Dr. Schär: the strength of our expertise and our innovation.

Innovation is what drives our development. Innovation impacts all of our areas and is constantly opening up new paths in medical research, biotechnology, cereal cultivation and product development. Our company's core competence comprises our ability to combine special, complex and individual dietary requirements with high quality of life and enjoyment. The better we know and understand our consumers' needs, the better our products can contribute to enhancing their quality of life. I implore each and every Dr. Schär employee to make the effort to not just deal with our consumers superficially, but instead to engage with them on a deeper level and find out what they really want.

Ulrich Ladurner  
President Dr.Schär



# The importance of quality ●

## Research – the first stop in the long journey between gluten-free product development and our consumers

Dr. Schär's quality standards for gluten-free products are extremely high. First-class raw ingredients are paramount for these products. Dr. Ombretta Polenghi, Head of Corporate Research and Innovation at Dr. Schär explains: "Our responsibility for raw ingredients does not start when our contract farmers cultivate their fields, but rather long before. At Dr. Schär, the 'filiera', the Italian term for the entire chain of events involved

in the production process, from sowing the seeds to delivering the raw materials, starts in our research department. First, basic research must be conducted in order to eventually enable us to offer a gluten-free product that is optimal in every way. This includes selecting the best plant varieties, in collaboration with research institutes, taking in to consideration their nutritional profile, rheological behaviour, baking and sensory properties. The move from the laboratory to the field is not undertaken until these parameters are defined and met."

tural raw ingredients and the manner in which they are cultivated from the time the seeds are sown to the grinding of the grain," explains Eduard Bernhart, the agronomist working within Dr. Schär's Research and Innovation department. After proper cultivation, a clean harvest and contamination free transport, the cereals are dried, stored and ground in mills which have been entrusted by Dr. Schär. Before the flours enter the Dr. Schär bakeries and production plants, additional quality tests in our own laboratories are made.

re-cereal

Interreg  
Italia-Österreich  
European Regional Development Fund



### Maximum safety during every stage

Manufacturing gluten-free products involves a great deal of effort and is extremely complex, since it requires continuous monitoring to ensure that gluten-free production is safe and free of contamination. "At Dr. Schär, our responsibility to produce guaranteed gluten-free products begins with the cultivation of the raw materials. We work closely with the cereal farmers and mills that supply us. We must be able to trace the origin of the agricul-

### New raw ingredients for a variety of tastes

Besides rice and maize, Dr. Schär uses a wide range of alternative grains, cereals and pseudocereals within its product range, which now features over 300 products including flour, bread, cake and snacks and ready meals. Millet, buckwheat and oats are becoming increasingly significant and provide variety to a balanced diet, along with a high-quality nutritional profile and superior flavour and texture to help enhance Schär's newest gluten-free products. Millet, for instance, provides valuable iron and is rich in essential amino acids. The pseudocereal buckwheat offers a wealth of high-quality fatty acids, vitamins, miner-



als, trace elements and amino acids. Oats are high in fibre and thus promote healthy digestion and balanced blood glucose and cholesterol levels. At Dr. Schär, only guaranteed 'gluten-free oats' are used.

### Current research projects for the diet of tomorrow

Dr. Schär's Research and Innovation team work with geneticists, chemists, agronomists and food scientists on an international scale to investigate the innovative cultivation of raw ingredients. The Interreg V-A Cooperation Programme Re-Cereal project aims to restore the cultivation of millet, buckwheat and oats to the Alps and present it to Alpine farmers as a worthwhile alternative to monocultures. The researchers thus intend to

raise interest in nutritious cereals and pseudocereals that are also suitable for special dietary requirements. The research entails the analysis of millet and buckwheat cultivars produced in Europe and the Americas and studying them in various experimental fields. In addition, the project works on manufacturing processes that retain the nutritional value of millet, buckwheat and oats. Finally, the project uses analytical methods and is developing innovative testing methods for grains and flours to enhance their organoleptic and nutritional properties. At the end of the project (spring 2019), millet, buckwheat and oat cultivars will be identified that have high yields, are safe and high-quality, have the same or better nutritional value – and a good taste.



	gluten-containing grains				gluten-free grains							
	wheat	spelt	rye	barley	oat	rice	maize	millet	amaranth	quinoa	buckwheat	
<b>Vitamins/Minerals</b>												
Iron (mg)	3,2	4,4	2,8	2,8	5,8	3,2	1,5	6,9	9	8	3,8	
Zinc (mg)	2,6	3,6	2,9	2,8	3,2	1,6	1,7	2,9	3,7	2,5	2,7	
Vitamine B1 (µg)	455	303	368	430	674	410	360	433	800	170	240	
Vitamine B2 (µg)	94	155	170	180	140	91	200	109	190		150	
Nicotinamide (mg)	5,1	6,6	1,8	4,8	2,4	5,2	1,5	1,8	1,2	450	2,9	
Panthenic acid (µg)	1200		1500	680	710	1700	650	519			1200	
Vitamine B6 (µg)	269		233	560	960	275	400	520	400	440	400	
Biotine (µg)	6,0		5		13	12	6					
Folic acid (µg)	87		143	65	33	16	26				30	
<b>Amino Acids</b>												
Leucine (mg)	920	1234	670	795	870	690	1202	1350	866	930	660	
Isoleucine (mg)	540	683	390	448	468	340	362	550	557	718	490	
Valin (mg)	620	844	530	596	642	500	454	610	633	632	660	
Lysin (mg)	380	449	400	390	495	300	251	280	847	860	580	
Methionine (mg)	220	318	140	242	190	170	186	250	314	188	190	
Phenylalanine (mg)	640	939	470	602	609	420	460	460	641	530	410	
Threonin (mg)	430	609	360	405	424	330	332	420	561	590	470	
Tryptophan (mg)	150		110	150	190	90	77	180	196	165	170	
<b>Fatty Acids</b>												
omega 3	51		65	110	120	30	40	130	81	200	80	
omega 6	762		750	1150	2740	780	1630	1770	4031	2430	530	

**Source:**

Souci Fachmann Kraut Datenbank, 2018 <https://www.sfk.online/#/home>  
 Elmadfa I., Aign W., Muskat E. & Fritzsche D.: Die Große GU-Nährwert-Kalorien-Tabelle. Neuausgabe 2018/19





# What's inside? – common ingredients used in gluten-free foods and their function ●



**Ombretta Polenghi**

Head of Corporate  
Research & Innovation,  
Dr. Schär

Gluten-free flours do not contain glutenin and gliadin, the two gluten proteins found in wheat (with similar proteins found in rye and barley) that generate viscosity, elasticity, cohesivity and water retention in baked goods.<sup>1</sup> These proteins form a continuous network with starch, which entraps the carbon dioxide produced during fermentation and allows the dough to rise. The glutinous network also impacts on the water absorption capacity, moisture retention and elasticity of the final product.<sup>2</sup> The absence of gluten therefore poses a significant challenge for the sensory quality of gluten-free products, altering both flavour and texture. It is evident that no ingredient alone can replace the structural and sensory benefits of gluten, but a blend of several ingredients is required to optimise palatability<sup>3</sup> and structure. This must be carefully balanced alongside the nutritional profile and ingredient quality in order to produce foods that are both acceptable to the consumer and meet health-related requirements. To help demystify the range of ingredients listed upon gluten-free food

labels, we present an ingredients label from Schär's best-selling bread product in the UK – the Wholesome White Loaf, and explain the function of some of the more unfamiliar ingredients and how they contribute towards maximising the taste, texture and quality of this popular product.

## References

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- 4 Gobetti M, Rizzello CG et al. How sourdough may affect the functional features of leavened baked goods. *Food Microbiol* 2014; 37: 30-40

# Ingredients

## Rice syrup

Added to improve crust colour via caramelisation. The lower amount of protein present within gluten-free doughs prevents the natural browning that would otherwise take place during the Maillard reaction.

## Millet flour

Millet is a nutritious gluten-free cereal grain offering higher protein, fibre and micronutrient content than more commonly used gluten-free grains such as rice and maize. In particular it contains high levels of the essential amino acids methionine and cysteine, and a high quantity of minerals including phosphorus and iron. Millet also provides a naturally sweet flavour that helps to enhance the overall taste of the bread.

## Yeast

## Sour dough (rice flour, water)

The use of sourdough as a natural starter for leavening is one of the oldest biotechnological processes in food fermentation. Sourdough is a mixture of flour and water that is fermented by naturally occurring lactic acid bacteria and yeast. Compared with other leavening agents (e.g. baker's yeast), it provides improved texture, flavour, nutritional values and shelf-life.

## Sunflower oil

The addition of fat provides a softer crumb. Sunflower oil provides a balanced combination of monounsaturated and polyunsaturated fats with low saturated fat levels.

## Honey

Added to enhance the flavour of the loaf and provide natural sweetness, reducing reliance on sugar syrups

## Water

## Maize starch

Cereal-based starches are a main component within gluten-free foods. Starches act as gelling agents due to their ability to absorb water. They become part of the dough matrix and in doing so, support its gas holding capacity. Starches also increase the crumb softness of gluten-free bread and ensure an even texture throughout the loaf.

## Vegetable fibre (psyllium)

Psyllium is a water-soluble isolated fibre which helps to increase the dietary fibre value of gluten-free bread.

## Quinoa flour

Quinoa is a pseudocereal that provides a rich source of protein, fibre and micronutrients. In particular quinoa contains all of the essential amino acids, unsaturated fats, and a high level of minerals such as calcium, iron and phosphorus. Its characteristic flavour also helps to balance the aroma notes of the bread.

## Salt

To enhance flavour and provide a natural preservative, Dr Schar do not use artificial preservatives in any of their products.

## Hydroxypropyl methyl cellulose (HPMC)

HPMC is a fibre, 'hydrocolloid' that acts as a thickener, structuring agent and emulsifier. The interaction between HPMC and other functional ingredients mimics the viscoelastic properties of gluten by trapping carbon dioxide bubbles produced during fermentation and holding them in a gel matrix which is fixed during heating, allowing the dough to rise. This provides a greater volume and firmer, less crumbly texture with a higher moisture content.

## Rice starch (see maize starch)

## Soya protein

Added to improve crust colour via the Maillard reaction. Isolated proteins are also added to gluten-free breads to increase the protein content in the absence of gluten-containing flours. Soya protein has good biological value (due to a high concentration of essential amino acids) and a more neutral taste than soya flour.



# Safety of gluten-free foods ●



**Justine Bold**

Senior Lecturer,  
University of Worcester

The nutritional quality of gluten-free diets (GFD) has been debated recently across mainstream media, with concerns expressed that gluten-free (GF) foods are often high in salt, sugar and fats and some research linking a GFD to health problems such as metabolic syndrome.<sup>1</sup> There are also reports of nutritional deficiencies of protein, fibre and micronutrients<sup>2</sup> in patients with coeliac disease (CD), though on-going absorption problems can in part explain some of these deficiencies. Whilst a GFD is not recommended for the general population without CD or symptoms related to gluten ingestion, it is still the safest treatment for those with CD,<sup>3</sup> particularly if GF whole foods and grains are consumed to support both micronutrient and fibre intake. Media reports about the nutritional quality of GF foods raise important issues but to date have rarely

considered how food safety issues such as contamination with gluten may impact on those with gluten-related disorders, in particular CD where symptoms may be persistent.

Regulation around allergen labelling in food was introduced in the European Union (EU) in 2005.<sup>3</sup> This legislation specified that allergens such as gluten, wheat, rye, barley and oat had to be detailed in the main list of ingredients. EU legislation from 2009 specified GF food had to have  $\leq 20$  parts per million (ppm) of gluten, or  $\leq 20$ mg gluten per kg.<sup>3</sup> Evidence suggests that intakes of just 50mg gluten per day are enough to illicit changes in small bowel histology for patients with CD.<sup>4</sup> Contamination below the level of 20 ppm is generally considered safe and under 10 mg a day of gluten is not thought to cause abnormal histology in most coeliac patients.<sup>5</sup>

A recent study published in the journal *Nutrients* reported on the safety aspects of GF foods and specifically detailed findings relating to gluten contamination risk.<sup>6</sup> Over 3000 GF products were analysed across an eighteen-year period from 1998 to 2016. The analysis undertaken in Spain is one of the largest research projects on GF foods and has some important findings for health professionals working with those with CD.<sup>6</sup>

The data presented showed that in general, grain based foods for people with CD have become better with less contamination through the period of the study.<sup>6</sup> However, there were increases in the number of samples of GF white flour with gluten contamination at 100 mg/kg in the period of 2013–2016.<sup>6</sup> GF white flour is used extensively in home cooking and baking, hence this finding is very concerning, especially as contamination over the 20mg/kg threshold specified in the EU GF foods legislation can be problematic for patients with CD.







The study also showed that more than three quarters of oat samples tested were contaminated with gluten,<sup>6</sup> hence health professionals working with patients with CD should consider highlighting the importance of buying certified GF oats and oats-based products. The study also reported on many foods that are naturally GF such as the wholegrains buckwheat and quinoa.<sup>6</sup> It should be noted that contamination was reported in samples of both buckwheat and lentils.<sup>6</sup> This is particularly interesting for those giving dietary advice to patients with CD, although the primary goal of nutritional counselling with regards to a GFD should be to encourage the consumption of a healthy balanced diet with intake of moderate amounts of sugars, saturated fats and inclusion of healthy fats.

The study also reports that cheaper GF foods have higher levels of gluten contamination,<sup>6</sup> suggesting more control around manufacture has cost implications. Health professionals should be aware that this may be more of an issue for lower income patients, who may opt for cheaper GF options and in doing so may have more risk of gluten exposure.<sup>3</sup> This is particularly an issue as GF

food prescriptions in the UK are now under threat and many patients with CD are having to source and buy GF foods themselves. The ongoing regulation and control of certified GF foods alongside on-going assessment of contamination levels is of paramount importance to ensure the safety of coeliac patients.

## References

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# Top quality – reliable and safe ●



Good taste and safety underpin Dr. Schär's commitment to producing high quality products for people with special dietary requirements. This process requires dedication, effort and experience above that which is required for the production of conventional foods. Above all, we are mindful of our responsibility to protect and maintain the health and wellbeing of our consumers. In this regard we place great emphasis on ensuring that every step of the manufacturing process is carefully monitored for safety and quality. This task is undertaken by Dr. Schär's **Quality Assurance (QA) team**.

## Safety from the raw material to the finished product

Worldwide, a team of over 40 QA employees ensure that quality and safety at all of our production sites meet the highest standards, from the raw material to the finished and packaged product. To this end, Dr. Schär works closely with cereal farmers with whom the company has maintained long-term partnerships. In addition, our suppliers are regularly audited to ensure strict safety and quality standards are upheld.

## Gluten $\leq$ 20ppm is required – Dr. Schär goes beyond.

All of the raw materials for Dr. Schär's range of gluten-free products are naturally gluten-free and their gluten content is well below the required 20 ppm. All of the raw materials are monitored by our internal quality assurance department using methods such as the VITAL (Voluntary Incidental Trace Allergen Labelling) concept, as well as by external partners.

## Officially approved

Additional strict requirements must be adhered to when manufacturing food for special dietary requirements. Therefore, all of our production sites not only comply with the BRC Global Standard for Food Safety and are certified in accordance with the ISO standard; they are also authorised by the national ministries of health for manufacturing of dietetic foods and products for special medical purposes.

## Quality Assurance at Dr. Schär: Facts and figures



more than **100**  
gluten analyses per day



**40**  
dedicated QA employees



more than **300**  
gluten-free products  
continually monitored

Dr. Schär's international interdisciplinary Nutrition Service team is concerned with all aspects of nutritional quality and supports both internal and external stakeholders (including trade partners, consumers, patient organisations and healthcare professionals) with information and training. The team's core task is to strengthen knowledge and awareness, specifically on gluten-related disorders and the gluten-free diet.

## Interview with Katie Kennedy ●

### What is the function of the Nutrition Service team within Dr. Schär and what is the extent of the team's 'reach'?

The Nutrition Service Team operates at the heart of the business, both locally and internationally. We provide day-to-day advice and support for gluten-free consumers and initiate, critically analyse and disseminate the latest scientific information regarding gluten-related disorders to healthcare professionals worldwide. We also provide essential input for our research and development, sales and marketing teams. In doing so, we help to ensure the production of high quality products and accurate, responsible marketing strategies.

### How is the team composed, and what competence does each team member have?

In the UK, the Nutrition Service role is shared between myself and my colleague and fellow dietitian Melissa Wilson. Collectively we have over 30 years of experience within clinical and commercial settings. We both share a specific clinical interest in gastroenterological conditions but are fortunate enough to be allowed time to regularly update our dietetic knowledge across a range of clinical areas. Globally, the Nutrition Service Team includes eleven permanent employees, including a mixture of registered dietitians and nutritionists, in addition to colleagues with research and marketing expertise. Our International Advisory Board, comprising of healthcare professionals working in clinical practice throughout Europe and the USA, provide expert knowledge and opinion to further guide the work programme of the Nutrition Service Team.

### What are your day to day tasks?

Despite focusing on a very specific clinical area, my role within Dr. Schär can be extremely var-

ied! I usually start by answering calls and emails from consumers with specific medical/ nutritional concerns before moving on to write content for our dedicated healthcare professional newsletters, website and twitter account. I am often required to attend internal meetings with our sales and marketing teams and provide opinion regarding advertising campaigns or check consumer communications for accuracy. Providing training and updates for colleagues and agencies with whom we work most closely is also a really important part of my role, it's essential that everyone within the business fully understands the role that gluten-free foods play within the management of serious medical conditions such as coeliac disease.

### How do you support HCPs and consumers and what services do you offer them?

The Nutrition Service Team is tasked with maintaining and promoting Dr. Schär's dedicated online healthcare professional resource - the Dr. Schär Institute. This provides healthcare professionals with access to the latest research in gluten-related disorders, CPD opportunities and resources to use with patients. In 2015 we also launched the Dr. Schär Institute Nutrition Project Award with the aim of providing funding to support nutrition-focused research and service development projects. We are often asked to sponsor local education events and meetings, alongside attendance at coeliac patient meetings, which we try to support as often as possible. Our consumers are able to email/ call or message us via face book or twitter with their dietetic queries, we also offer a live chat facility via our webpage. We produce a range of literature for our consumers, providing evidence-based first line advice for those following a gluten-free diet.



**Katie Kennedy**

MNutr RD – Company Dietitian,  
Nutrition Service Team, Dr. Schär UK





## Commitment to product improvement ●

Standing still means moving backwards – Dr. Schär's product quality is improving all the time



**Kathrin Vantsch**

Dietitian, Lead Corporate Nutrition Service, Dr. Schär

At Dr. Schär's Research and Development (R&D) department, there is an ongoing urge to develop new products and improve existing ones. We aim to continually improve products with respect to their taste, as well as their texture or nutritional value. We evaluate our competitors' and mass market products and take our customers' taste requirements and preferences into account, evaluating our progress by means of regular consumer surveys and tastings. We remain conscious of the specific dietary needs of our core consumers. Removing or avoiding other common allergens within the ingredient profile of our products is important to us.

For example we do not include egg or milk proteins within our staple bread range and now use a lactose free cheese on a number of our frozen pizza products.

Underpinning the research and development process is our commitment to quality and safety. By fulfilling the twelve principles of our quality commitment, we ensure that our gluten-free products are high in quality, safe and natural.

# Dr. Schär's 12 principles of quality commitment

12  
PRINCIPLES.

1	<b>Nutritious raw ingredients</b>	Products that increasingly contain flours instead of starches. High proportion of whole grains. Use of millet, quinoa, buckwheat and sorghum and a lot more. Monitoring all raw ingredients.
2	<b>Taste</b>	Variety of baked goods. Use of sourdough to achieve the authentic natural taste of bread without sacrificing nutritional value.
3	<b>Protein content</b>	Comparable to that of conventional foods.
4	<b>Fibre</b>	A large number of products that are rich in fibre.
5	<b>Fat</b>	Use of high-quality vegetable oils and margarines. Use of hydrogenated fats only if it is a technical requirement to do so.
6	<b>Salt content</b>	Significantly reduced.
7	<b>Sugar</b>	Constantly reduced sugar content. Never use any chemical or artificial sweeteners.
8	<b>Additives</b>	Extremely responsible handling of thickening agents. No flavour enhancers or artificial colourings. Only natural flavourings.
9	<b>Preservatives</b>	Avoid using synthetic preservatives.
10	<b>Allergen management</b>	All raw ingredients and products are gluten-free (well below 20 ppm). Cross-contamination with allergens prevented.
11	<b>GMOs</b>	No raw ingredients derived from genetically modified organisms (GMOs).
12	<b>Eating out</b>	Supply restaurants with products & educational material making it 'safe' to eat out.



### Small changes yield big effects


The goal of Dr. Schär's R&D department is to make good products even better. In many cases, these improvements are just minimal and not directly noticeable for the consumer. For instance, if an ingredient with a negative image, such as palm oil, is replaced, the R&D department endeavours to make sure that no compromises to the product's organoleptic or nutritional properties occur. We continue to refine and optimise the product in order to best serve the customers.

### Successful product improvements

The greatest challenge associated with developing and optimising products entails offsetting the missing binding capacity of gluten as perfectly as possible by using other ingredients. At the same time, factors such as taste, appearance and nutritional value must not suffer as a result of the substitution. Below, we present a few examples to demonstrate the achievements made by Dr. Schär in terms of product improvement over recent years.

## From DS gluten-free White Loaf to Schär Wholesome White Loaf

1




### Recipe 2000/2001

Water, rice flour, maize starch, potato starch, partially skimmed milk powder, vegetable fat (margarine), thickener: guar gum and E 464, dextrose, raising agent: monopotassium tartrate and sodium bicarbonate, lemon fibre, salt, acidulant: citric acid


- Energy value: 241 kcal/100 g
- Fat: 4.4 g/100 g
- Sat Fat: not available\*
- Sugar: not available\*
- Fibre: not available\*
- Salt: not available\*

Improvement



- Margarine is replaced by a sunflower oil with a lower amount of saturated fatty acids
- Milk powder is eliminated
- New recipe with higher fibre content

2



### Recipe 2004/2005

Water, maize starch, rice flour, vegetable oil (sunflower oil), sugar, thickener: guar gum and E-464, lupine protein, yeast, salt, vegetable fibre, flavour, emulsifier: E-472e


- Energy value: 215 kcal/100 g
- Fat: 5 g/100 g
- Sat Fat: 0.7 g/100 g
- Sugar: 3.8 g/100 g
- Fibre: 6.3 g/100 g
- Salt: 2.3 g/100 g

Improvement



- Salt reduced
- Emulsifiers eliminated
- New recipe with new raw ingredients (millet, sunflower seeds, quinoa), greater cereal variety and thus higher micronutrient and fibre content

3



### Current recipe Wholesome White Loaf

Maize starch, water, sourdough 14% (rice flour, water), rice starch, rice syrup, vegetable fibre (psyllium), sunflower oil, millet flour 2,6%, soya protein, quinoa flour 1,7%, thickener: hydroxypropyl methyl cellulose; yeast, salt, honey

- Energy value: 239 kcal/100 g
- Fat: 3.4 g/100 g
- Sat Fat: 0.5 g/100 g
- Sugar: 3.3 g/100 g
- Fibre: 7.3 g/100 g
- Salt: 1 g/100 g

\* Historical data relating to nutrient content is unavailable due to contemporary labelling legislation

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## Salti cracker Improvement

1



### Recipe 2007

Rice flour, maize starch, vegetable fat (non-hydrogenated palm fat) glucose syrup, modified maize starch, yeast, vegetable protein, eggs, sugar, raising agent: monopotassium tartrate and ammonium and sodium hydrogen carbonate, salt, emulsifier: E-472e, flavour

Energy value: 446 kcal/100 g  
Fat: 13.4 g/100 g  
Sat Fat: 6.4 g/100 g  
Sugar: 11.9 g/100 g  
Fibre: 1.3 g/100 g  
Salt: 2.3 g/100 g

Improvement



- Artificial flavours replaced with natural flavours
- Eggs eliminated
- Saturated fat and sugar reduced

2



### Current Recipe

Maize starch, palm fat, maize flour, sugar, soy flour, dextrose, modified maize starch, raising, agents: ammonium hydrogen carbonate, monopotassium tartrate, sodium hydrogen carbonate; sea salt 2,3%, emulsifier: soy lecitin; thickener: guar gum; acid: citric acid, natural rosemary flavouring

Energy value: 442 kcal/100 g  
Fat: 13 g/100 g  
Sat Fat: 5.9 g/100 g  
Sugar: 7.4 g/100 g  
Fibre: 1.9 g/100 g  
Salt: 2.3 g/100 g

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## Breakfast Bakes Improvement

1



### Recipe 2015

Gluten-free wholegrain oat 55% (flakes, flour, bran), brown sugar, palm fat, butter (milk), rice syrup, rice germ, rice bran, modified maize starch, rice starch, raising agents: ammonium hydrogen carbonate, sodium hydrogen carbonate, natural vanilla flavour, salt

Energy value: 500 kcal/100g  
Fat: 20 g/100 g  
Sat Fat: 11 g/100 g  
Sugar: 19 g/100 g  
Fibre: 6.9 g/100 g  
Salt: 1 g/100 g

Improvement



- Palm oil replaced with sunflower oil
- Decreased saturated fat content
- Decreased salt content
- Increased fibre content

2



### Recipe 2018 (recipe available 10/18)

Gluten-free wholegrain oat 55% (flakes, flour, bran), brown sugar, butter (milk), rice bran, sunflower oil, rice syrup, modified maize starch, rice starch, raising agents: ammonium hydrogen carbonate, sodium hydrogen carbonate, natural vanilla flavour, salt

Energy value: 462 kcal/100 g  
Fat: 20 g/100 g  
Sat Fat: 9.2 g/100 g  
Sugar: 19 g/100 g  
Fibre: 8.7 g/100 g  
Salt: 0.8 g/100 g

# Nutritional Comparison of gluten-free foods ●



**Katie Kennedy**

MNutr RD Company Dietitian,  
Dr. Schär UK

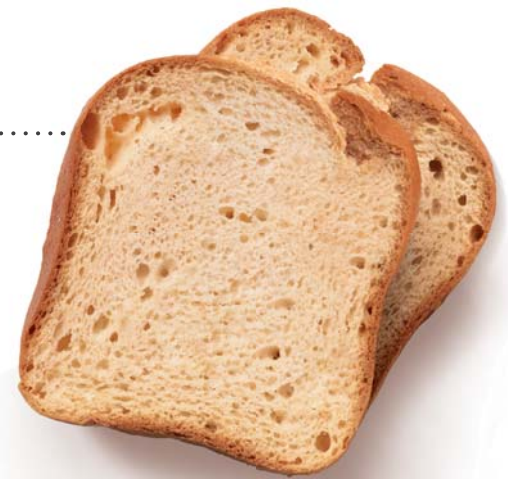
Over recent years, the growing interest in gluten-free (GF) diets has coincided with the publication of several medical and consumer press reports raising concerns over the nutritional quality of GF foods, and the GF diet overall. However, closer examination of the research in this field suggests that the truth behind the headlines may be less straight forward than previously thought. Fry et al recently reported that more GF foods sold in the UK can be classified as having high and medium fat, saturated fat, sugar and salt compared to regular foods, however the lack of a consistent pattern when comparing overall nutritional quality of GF versus wheat-containing (WC) foods was noted by the authors.<sup>1</sup> In the same study, the median sugar content of GF foods was shown to be lower than WC equivalents in 7 out of 10 product categories investigated, reaching significance in 6 of these (including breakfast cereals and biscuits). Moreover, despite the higher number of WC product samples used in the analysis, a consistently higher interquartile range was evident amongst GF samples, particularly with regards to total fat content of staple products such as breads, breakfast

cereals and flours. This demonstrates the greater variation in nutrient content between individual GF samples versus WC samples used within the analysis. Similar observations relating to wide variation in nutrient content across different samples of GF foods have also been reported in other European countries.<sup>2</sup>

As discussed in an earlier article, the nutritional quality of GF foods has greatly improved over time, coinciding with the development of new baking techniques and investment in research and development using a variety of more nutritious base ingredients. As outlined above, fundamental to the discussion regarding nutritional adequacy of GF foods is the understanding that there is considerable variation between brands, both in terms of type of raw ingredients used and the nutritional profile of the end product. In this article we present nutritional data relating to Schär's bestselling products across 3 main product categories, and compare these against the UK's leading brands for both GF and WC equivalents. Comparisons are also made against UK Traffic Light Labelling guidelines for total and saturated fat, sugar and salt.<sup>3</sup> In presenting information in this format we are able to more closely investigate the strengths and weaknesses of GF foods and better understand the position of Schär products and their potential contribution to the nutritional intake of GF consumers, as Europe's number one brand in this expanding category.







## Bread Category

For the UK population, bread provides one of the largest contributions towards daily energy intake.<sup>4</sup> National Diet and Nutrition Survey data indicates that cereals and cereal products, of which bread is a main contributor, are the main source of energy for all age groups, contributing 31% for adults aged 19 to 64 years.<sup>4</sup> Table 1 provides evidence that the total fat content of both GF brands is above that of WC bread, however the saturated fat content remains equivalent across all three loaves. The data presented also demonstrates considerable between-brand variation for total fat, the best-selling GF white loaf containing 79% more total fat than the Schär

Wholesome White Loaf with a subsequent 14% increase in calorie content. The sugar content of the GF breads listed is also higher than the mainstream equivalent, however in the context of daily nutritional requirements this represents a less significant increase, with an average 72 g portion of bread (2 large slices) providing 2.7% of the guideline daily amount (GDA) for sugar (Schär), 3.1% (GF market leader) and 1.8% (WC sample). Of particular note amongst the GF breads listed, is their fibre content. The GF loaves providing over 3 times more fibre than the WC loaf. This difference has the potential to make a significant contribution to the fibre intake of gluten-free

consumers, particularly in light of recent government guidelines to increase general adult population fibre intakes to 30 g per day<sup>4</sup> (current intakes approximately 18 g). As demonstrated in table 1, it should also be noted that some GF breads are fortified with additional nutrients of particular relevance to the coeliac population, including calcium, iron and B vitamins.

Table 1

## Bread comparison

(correct at time of going to print)

	Schär Wholesome White Loaf		Competitor product from leading GF bread brand: Genius Soft White Farmhouse Loaf		Competitor product from leading WC bread brand: Warburtons White Sliced Loaf	
	per 100g	traffic light*	per 100g	traffic light*	per 100g	traffic light*
Energy	239	N/a	272	N/a	244	N/a
Fat	3.4	●	6.1	●	2	●
of which saturates	0.5	●	0.4	●	0.5	●
Carbohydrate	45	N/a	47	N/a	45.4	N/a
of which sugars	3.3	●	3.9	●	2.2	●
Fibre	7.3	N/a	9.3	N/a	2.1	N/a
Protein	3.5	N/a	2.4	N/a	9.1	N/a
Salt	1	●	0.9	●	0.98	●
	Maize starch, water, sourdough 14% 18% (rice flour, water), rice starch, rice syrup, vegetable fibre (psyllium), sunflower oil, millet flour 2,6%, soya protein, quinoa flour 1,7%, thickener: hydroxypropyl methyl cellulose; yeast, salt, honey		Water, Maize Starch, Potato Starch, Tapioca Starch, Vegetable Oil: Rapeseed Oil, Sunflower Oil; Humectant: Vegetable Glycerol; Psyllium Husk Powder, Yeast, Stabilisers: Hydroxypropyl Methyl Cellulose, Xanthan Gum; Ground Golden Flaxseed, Free Range Dried Egg White, Rice Flour, Dextrose, Iodised Salt: Salt, Potassium Iodate; Fermented Maize Starch, Partially Inverted Sugar Syrup, Calcium Carbonate, Niacin, Iron, Riboflavin, Thiamine, Folic Acid		Wheat Flour [with Calcium, Iron, Niacin (B <sub>3</sub> ) and Thiamin (B <sub>1</sub> )], Water, Yeast, Salt, Vegetable Oil (Rapeseed, Sustainable Palm), Soya Flour, Preservative: Calcium Propionate; Emulsifiers: E481, E472e; Flour Treatment Agent: Ascorbic Acid (Vitamin C)	



\* Comparison against traffic light labelling thresholds

## Snack Category

On average, the UK population consumes snack foods 2.2 times each day,<sup>6</sup> thus providing a significant contribution towards daily nutrient intake. Whilst biscuits account for just 6% of snacking occasions in the UK,<sup>6</sup> there appears to be significant generational differences in consumption with National Diet and Nutrition Survey data indicating that over 70% of children under 10 and adults over 65 consume this popular snack regularly.<sup>4</sup> Table 2 compares the nutritional content of Schär's best-selling biscuit product (Schär Digestive), sold in 3 major supermarket retailers with UK wide distribution. The saturated fat content of the GF products present-

ed here is lower than the WC equivalent biscuit (particularly for the supermarket own-label GF product), it is also encouraging to note that both GF samples provide considerably more fibre and less than half the salt content of their WC counterpart. However the sugar content of both GF samples is higher than the WC product. Once again, considerable between-brand variation can be observed. Amongst the various product categories that the Schär brand operates within, it's largest range lies within the biscuit category. In 2017, as part of British Government's plan to tackle childhood obesity,<sup>7</sup> Public Health England (PHE) set out it's strategy to reduce the

amount of sugar in the foods that contribute the most to children's sugar intakes by 20% by 2020, with the aim of achieving a 5% reduction in the first year.<sup>8</sup> Nine out of the 15 Schär biscuit products sold in the UK already meet the 5% sugar reduction target levels set out by PHE. In line with PHE recommendations for manufacturers to focus on reducing their sales weighted average for sugar content, Schär's future reformulation work will focus specifically on their highest selling biscuit lines.

Table 2

### Biscuit comparison

(correct at time of going to print)

	Schär Digestive Biscuits		Best-selling gluten-free competitor product: Tesco Free From Digestive Biscuits		Best-selling branded wheat-containing product: McVities Digestives	
	per 100g	traffic light*	per 100g	traffic light*	per 100g	traffic light*
Energy	483	N/a	476	N/a	481	N/a
Fat	22	●	19.4	●	21.3	●
of which saturates	9.9	●	7.6	●	10.1	●
Carbohydrate	62	N/a	66.9	N/a	62.9	N/a
of which sugars	21	●	24.8	●	16.6	●
Fibre	6.2	N/a	4.3	N/a	3.6	N/a
Protein	6.1	N/a	6.4	N/a	7.2	N/a
Salt	0.63	●	0.4	●	1.3	●
	Maize starch, palm fat, cane sugar 16%, maize flour, soy flour, soya bran 7%, buckwheat flour 4%, sugar beet syrup, modified tapioca starch, salt, raising agents: ammonium hydrogen carbonate, sodium hydrogen carbonate		Gluten-free Oat Flour (Oat Flour), Vegetable Margarine, Muscovado Sugar, Cornflour, Partially Inverted Sugar Syrup, Raising Agent (Sodium Bicarbonate), Flavouring.  Vegetable Margarine contains: Palm Oil, Rapeseed Oil, Water, Salt, Emulsifier (Mono- and Di-Glycerides of Fatty Acids)  Muscovado Sugar contains: Sugar, Molasses, Colour (Plain Caramel)		Wheat Flour (54%) (with Calcium, Iron, Niacin, Thiamin), Vegetable Oil (Palm), Wholemeal Wheat Flour (16%), Sugar, Partially Inverted Sugar Syrup, Raising Agents (Sodium Bicarbonate, Malic Acid, Ammonium Bicarbonate), Salt, Dried Skimmed Milk	



## Ready Meal Category

With ever-increasing pressure on time, families are spending less time in the kitchen preparing and cooking meals. According to official statistics, the time spent by UK families preparing an evening meal has reduced from 60 minutes in 1980 to just 30 minutes in 2016.<sup>9</sup> Over the same period, the proportion of meals cooked from raw ingredients fell from 64 to 51%.<sup>9</sup> Given this context, the increasing demand for ready meals is unsurprising, with GF consumers expecting similar access to convenient meal solutions. Table 3 examines and compares the nutritional content of Schär's bestselling product within this category (frozen Margherita Pizza). An en-

couraging picture emerges with lower levels of both total and saturated fat for both GF pizzas referenced. In particular, Schär Margherita pizza provides almost 30% less total fat and 17% less saturated fat compared to the bestselling branded WC margherita pizza. It is reassuring to note that this reduction in fat content does not coincide with any compromise in terms of raw ingredient quality, the Schär pizza containing similar quantities of cheese and tomato (by weight) compared to the WC equivalent sample, in addition to olive oil and oregano, ingredients traditionally associated with this product.



Table 3

### Pizza comparison

(correct at time of going to print)

	Schär Pizza Margherita		Best-selling gluten-free competitor product: Goodfellas Gluten Free Margherita Pizza		Best-selling branded wheat-containing product: Goodfellas Stonebaked Thin Margherita Pizza	
	per 100g	traffic light*	per 100g	traffic light*	per 100g	traffic light*
Energy	230	N/a	273	N/a	298	N/a
Fat	9.2	●	11	●	13	●
of which saturates	5.0	●	4.8	●	6	●
Carbohydrate	27	N/a	32	N/a	32	N/a
of which sugars	1.4	●	2.4	●	3.5	●
Fibre	3.8	N/a	Not available	N/a	Not available	N/a
Protein	7.5	N/a	11	N/a	14	N/a
Salt	1.1	●	1.1	●	1	●
	Dough 53%: maize starch, water, rice flour, sour dough 12% (rice flour, water), thickeners: cellulose, hydroxypropyl methyl cellulose; rice starch, extra virgin olive oil 3.5%, yeast, maize flour, sunflower oil, iodised salt (salt, potassium iodide), fruit extract (carob, apple), sugar, dextrose, raising agents: sodium bicarbonate, glucono delta-lactone; acids: tartaric acid, citric acid. Topping 47%: Mozzarella cheese 50% (pasteurised lactose-free milk, salt, microbial rennet, acidity regulator: citric acid), tomato puree 41%, iodised salt (salt, potassium iodide), oregano		Pizza Base Blend (Rice Flour, Tapioca Starch, Maize Starch, Psyllium Husk Powder, Sugar, Wholegrain Rice Flour, Salt, Hydroxypropyl Methylcellulose, Maize Flour, Rice Starch), Water, Semi Hard Ripened Cheese (Milk) (29%), Tomatoes, Rapeseed Oil, Yeast, Maize Starch, Garlic Purée, Salt, Basil, Oregano, Sugar, Black Pepper		Wheat Flour, Water, Mozzarella Cheese with Starch (20%) (Milk), (Milk, Skimmed Milk Powder, Starch, Salt, Whey Protein Concentrate (Milk)), Tomatoes (9%), Cheddar Cheese (8%) (Milk), Vegetable Oil: Rapeseed, Yeast, Salt, Sugar, Garlic Puree, Starch, Oregano, Basil, Black Pepper	



\* Comparison against traffic light labelling thresholds 1 portion = 1/2 pizza

### Nutritive characteristics of gluten-free grains, contribution towards nutritional profile.

As demonstrated in the data presented here, GF foods consistently contain lower amounts of protein compared to their WC equivalents. The obvious explanation for this observation is the absence of the naturally occurring storage proteins (prolamins and glutelins) that are collectively known as gluten. The alternative grains and flours used to form the basis of GF foods are often lower in protein compared to wheat (see table 4 below). A number of GF food manufacturers have attempted to address the short falls in the protein content of their products through great-

er use of higher protein GF grains (such as millet and gluten-free oats) and pseudocereals (including buckwheat and quinoa), combined with reduced reliance on simple starches. This approach has the added advantage of also improving micronutrient content. However, whilst often rich in protein, such grains may be higher in unsaturated fat, their usage thus serving to elevate the total fat content of GF products. Currently in the UK, protein requirements are predominantly met through the consumption of meat and milk-based products.<sup>4</sup> National Diet and Nutrition Survey data confirms that mean protein intakes in the UK are well above recommended levels for all ages and genders, with cereal-based foods

providing just 22-23% of protein requirements.<sup>4</sup> Moreover, there is little evidence of suboptimal protein amongst coeliac patients following a strict long term gluten-free diet.<sup>10,11</sup>

### Conclusions

The macronutrient content of GF foods has been the subject of considerable press attention over recent years, however the snap-shot of data presented here would suggest that closer consideration is required before making judgment regarding the overall healthfulness of specialist GF products. It is evident that significant between-brand variation exists. Schär products are able to offer a favourable nutritional profile, not only when compared against the market-leading GF brands, but also when compared against mainstream WC equivalent foods. The higher quantities of total fat (in the case of bread products) and sugar (in the case of biscuit products) may be accompanied by more desirable nutritional characteristics including higher quantities of fibre and/ or lower salt content, and for those who are conscious of overall calorie intake, there may be little or no difference between GF and WC foods. Continued progress with regards to ingredient quality and nutritional profile of GF foods is essential across all brands, particularly in view of the increasing number of consumers embarking on the GF diet. Dietitians should be aware of the difference in ingredient and nutritional quality between GF brands and feel confident to advise patients accordingly. Where possible, GF consumers should be encouraged to compare the nutritional content per 100g for products across a number of different brands, and consume the highest quality and most suitable products they can afford.

Table 4

### Fat and protein content of cereals and pseudocereals<sup>12,13</sup>

	Protein (g/100g dry weight)	Fat (g/100g dry weight)
Wheat	13.4	1.4
Oats	11	8.7
Brown rice	7.2	2.4
White rice	6.3	0.5
Millet	11.1	4.2
Maize	6.9	3.4
Barley	9.2	1.7
Rye	11.0	2.1
Quinoa	13.2	6.1
Amaranth	13.6	7.0
Buckwheat	13.3	3.4
Sorghum	11.1	3.2
Chia	16.5	30.7



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# Interview with Research and Development Department, Dr. Schär ●

## Virna Cerne

Executive Director  
Research & Development,  
Dr.Schär



### How long have you been working at the Research and Development (R&D) department of Dr. Schär and what is your role within the company?

I have worked in the R&D department of Dr. Schär since 1996: I began working for the company at its head office in Burgstall, Italy, as Head of the Quality Assurance and Product Development departments. In 2003 I moved to Trieste where the Dr. Schär R&D Centre was created inside AREA Science Park, one of the first Scientific Parks in Italy, and I became its Director. Since 2015 I have been a member of Dr. Schär's Executive Board in addition to Director of the Dr. Schär R&D Centre.

### The R&D department of Dr. Schär has been researching gluten-free solutions for more than 30 years. What were the biggest milestones of this research? How have the products evolved since then?

We have carried out several research projects and studies over the past 20 years which have allowed us to completely change the quality of gluten-free products. Among these milestones was the development of a new generation in bread quality, for example ciabatta and wholesome loaves which, thanks to the ingredients and technologies used, are fresher, softer and similar to traditional bread. Another huge achievement was the creation of a controlled supply chain of raw materials used in our gluten-free products. The development of a diverse gluten-free frozen assortment has also been a career highlight, including everything from frozen bread rolls to cannelloni, different ranges of pizza and many other convenience foods. These are just a few examples of the important steps which have allowed us to improve the quality and range of gluten-free products for our consumers.

### How has the taste of the products changed over time? Why?

The taste of gluten-free products has changed completely in the last 20 years. In the past gluten-free food products such as bread or pasta had poor sensory quality, consequently it was even more difficult for coeliacs to be compliant to a lifelong gluten-free diet. Huge steps forward have been made in this respect and Dr. Schär has contributed significantly to this progress. Nowadays you can hardly tell the difference between a gluten-free pizza, fresh bread or pasta and wheat-containing foods! Also, the range of gluten-free products is now very large, coeliacs and gluten-intolerant people have a choice and can vary their diet according to their preferences.

### Which ingredients and technology have been the winning factors for Dr. Schär products?

The study of new raw materials is a key priority for Dr. Schär. We are focused on the diversification of raw materials and on the controlled supply chain, so called "filiera", to constantly improve the quality of our products. We try to use several different ingredients in our products in order to meet the needs of our consumers, not least from a safety point of view but also at a nutritional, sensory and technological level. This is why diversification of raw materials is very important to us and therefore, beside corn and rice, we use other ingredients such as millet, quinoa, buckwheat sorghum and oats, many of which come from our own controlled supply chain. The use of these cereals and pseudo-cereals is also very important, not only because of the differentiation at sensory level but also from a nutritional point of view as they are very rich in essential amino acids, minerals, vitamins and fibres. Technologies also play an important role within our success and we have invested a lot in this field. We are one of the first companies to use self-made sourdoughs in our products. We have worked hard to optimise the working techniques in our plants, to find the best possible technologies which are suitable for gluten-free doughs. Furthermore, we use innovative packaging technologies which let us offer easier solutions for the consumers and guarantee the shelf life of the product.

## Ombretta Polenghi

Head of Corporate Research & Innovation, Dr. Schär



### What are your day to day tasks and responsibilities?

I'm responsible for the Research and Innovation department. My main objective is to improve Dr. Schär products and create innovative, tasty foods. To achieve this, I work with my team on long term research projects, we study new technologies, packaging and raw material solutions. We integrate all results from these projects in to the development of new products. Scientific research is the basis for the development of products, and, from its deep foundations, it brings innovation, rigor and creativity to the process. We also collaborate with Italian and international Universities and Research Institutes and this collaboration, combined with our own competencies, allows us to develop new ideas and creative input for our products.

### What challenges do you encounter in the research of gluten-free products? Which ingredients are best for producing gluten-free products? How has this changed over recent years?

For us, every development is a new challenge and an opportunity to improve the quality of life of gluten-free consumers. Recently, we have worked hard on the new generation of our Deli Style breads. It wasn't easy, because it's a popular product amongst our consumers. Besides other actions we studied how to improve its aroma. It was a 3 year research project, where we first identified 12 main aroma compounds responsible for crust and crumb aroma in traditional wheat bread, then we quantified them in order to identify what is missing and what is exceeding in our gluten-free Wholesome breads. Finally, we studied the precursors and synthesis pathway for each aroma to improve the formulation and the production process of the Wholesome breads.

### What is the biggest challenge in the production of gluten-free products? Taste? Consistency? Flavour?

In the past the biggest challenge was the development of the bread texture, nowadays we have very good results in this respect, so I believe that the research should focus on the improvement of flavour. We have already taken big steps forward with regards to this goal, but still improve-

ment needs to be done. This is why we have invested in a new laboratory and aroma lab, for the extraction, evaluation and improvement of the aroma of our products.

### What is more important: the ingredients or the manufacturing process? In which areas should more research be done in the future?

Ingredients, technologies and manufacturing processes are all interlinked: all of them are crucial for the improvement of our products. Over recent years we have invested heavily in innovative equipment and we will continue to do so. Since 2016, our pilot plant in Klagenfurt, Austria, has enabled us to test new technologies and processes in close collaboration with machinery manufacturers. Regarding the ingredients, all of them are important and give a contribution to the final product in terms of development, nutrition and sensory aspects. Also ingredient sustainability is an important aspect to be considered. We have a dedicated and closely monitored supply chain for our main ingredients. We cultivate more than 1800 hectares of crops in our supply chain and collaborate with more than 70 farmers.

### Virna Cerne and you were nominated for the European Inventor Award for your innovative process to produce gluten-free corn products. How long did it take to develop this procedure?

This was one of our long-term projects, it took 6 years to complete. Some of our projects can be even longer, we stay motivated during such long and intensive projects as we know that what we are exploring opens the way for new products and helps us to understand what's next.

### How long does it take from the idea of a new product until market launch? Which steps does a new product undergo?

Times can be very different depending on the level of difficulty involved in the production process, from 6 months to 3-5 years for the most strategic products. Basic formulation projects often support the most important developments. Our Product Development Managers bring new products to reality in all of our production sites: Italy, Germany, Spain, USA, Brazil and Austria, or at one of our trusted industrial partners.



# The Impact of the gluten-free diet on nutritional status and disease risk ●



**Katie Kennedy**

MNutr RD Company Dietitian,  
Dr. Schär UK

A strict, lifelong gluten-free diet (GFD) remains the cornerstone of treatment for the management of coeliac disease (CD). Furthermore, the GFD also has application in the management of non-coeliac gluten sensitivity<sup>1</sup> and, more recently, diarrhoea predominant IBS<sup>2</sup>. However, the GFD is not recommended for the general population and there is no evidence that it may be beneficial in individuals without symptoms attributable to gluten. A great many foods are naturally free from gluten and therefore can and do contribute the most significant part of energy intake for those requiring a GFD. Dietary staples including meat, fish, eggs, dairy foods, fruits, vegetables, nuts, pulses and non-gluten-containing grains such as rice, buckwheat and quinoa, alongside more processed foods such as salted snacks and confectionery products may all be freely included in a GFD depending on individual preference. To supplement energy intake from these foods, an increasing number of specialist gluten-free foods are now widely available in the UK, providing gluten-free versions of almost every type of wheat-containing product, from breads and crackers to luxury snacks and ready meals.

Over recent years the growing popularity and awareness of the possible application of the GFD beyond the management of CD has led to deeper probing of the nutritional and health benefits or consequences of following the diet. This has in turn given rise to significant press interest, most commonly with a negative slant. It has been widely reported in the literature that those following a strict GFD (for example, in the case of CD), may have a distorted nutrient intake and consumption of key micronutrients including fibre, calcium and iron may be suboptimal.<sup>3,4</sup> However it has also been noted that the lack of available nutritional data for specialist gluten-free products may hinder accurate analysis amongst this population, particularly for micronutrient intake.<sup>5</sup> In part, these findings would appear to be at odds with recent comparative nutritional analysis research regarding gluten-free versus wheat-containing foods. Fry et al considered the nutritional content of almost 700 gluten-free foods and found the median fibre content of gluten-free breads to be significantly higher for both white and brown samples versus wheat-containing equivalents.<sup>6</sup> It could be suggested that the nutritional inadequacies associated with a GFD may also relate more to habitual poor food choice rather than nutritional profile of certain specialist gluten-free foods that make up an undefined proportion of energy intake amongst gluten-free consumers. A recent review of dietary nutritional adequacy amongst children following a GFD found that whilst intakes of fat, fibre, iron, calcium and vitamin D failed to meet agreed requirements, few studies were able to demonstrate a significant difference between the intakes of children consuming a GFD and those who were not,<sup>7</sup> thus highlighting the need for strategies to improve the nutritional adequacy of children's diets across the board, rather than placing specific focus on those following a GFD.

Drilling down in to the contribution made towards nutrient intake by specific foods provides greater clarity when assessing potential dietary imbalance amongst those avoiding gluten. A study of food and



nutrient intake amongst 98 children with CD and age, sex and BMI matched controls showed similar intakes of total carbohydrate between both groups but significantly greater intakes of non-milk extrinsic sugars (NMES) and lower intakes of starch and fibre amongst coeliac children.<sup>8</sup> Intakes of meat, fish and egg products were also significantly higher amongst coeliac children, with a non-significant trend towards higher consumption of sweetened drinks.<sup>8</sup> The individual motivations behind these observations are unclear but may be related to poor nutritional education and a desire to provide satiety from energy rich foods whilst avoiding obvious sources of gluten. The poorer palatability or perceived palatability and availability of suitable starchy gluten-free substitute foods may also contribute towards such inappropriate dietary balance.

Although fewer recent studies have considered the nutritional intake of adults following a strict gluten-free diet, available evidence may indicate a similar trend. A study of nutritional intake amongst adult coeliac patients in the UK revealed higher intakes of energy and macronutrients, but lower intakes of fibre and a higher proportion of carbohydrate obtained from NMES when compared to National Diet and Nutrition Survey Data for the gluten-consuming population living in the same region.<sup>9</sup> The same study also demonstrated lower intakes of magnesium, iron, zinc, manganese, selenium and folate in women with CD versus those without.<sup>9</sup> Authors concluded that, taken in combination, these findings indicate the more regular consumption of less nutrient dense foods such as sugary snacks amongst coeliac subjects.<sup>9</sup> Given these findings, there is a clear requirement for all patients with CD to have access to regular dietary advice, with a focus on achieving healthy eating targets set for the general population. The need to consider fortification of staple gluten-free foods, in a similar way to the mandatory fortification of wheat flour is also worthy of attention.<sup>10</sup>

The relationship between gluten intakes and disease risk has also been reported on in British and International media. Much of the headlines regarding this area have focused on the work of **Benjamin Lebwohl (Columbia University)** and colleagues and their analysis of data from the Nurses Health Study and Health Professionals Follow-up Study.<sup>11,12</sup> This data set collectively reports on the nutritional intake of almost 200,000 American healthcare professionals via semi-quantitative food frequency questionnaires administered every 4 years between 1986



## Benjamin Lebwohl

MD, MS, Director of Clinical Research,  
The Celiac Disease Center at Columbia University,  
Director of Quality Improvement,  
Division of Digestive and Liver Diseases

### Comment on studies that relate to long-term gluten consumption and health risk<sup>11, 12</sup>

"We performed this study with the aim of measuring the effect of gluten on the health of the general public, beyond the approximately 1% of the population that has coeliac disease. This stemmed from the widespread interest in gluten arising in part from the unproven notion that gluten is something that is harmful, and that gluten-free items are somehow intrinsically healthy. We analysed two large cohorts of health professionals that have been followed for decades via regularly administered questionnaires regarding participants' diet and health. We estimated participants' daily consumption of gluten based on their self-reported diet going back to 1986 and updated every four years.

We divided participants into five groups according to their degree of gluten consumption, and found that overall there were no differences in rates of heart attacks among the groups, after taking into account other dietary and lifestyle factors. Though gluten by itself did not have an impact on heart attack risk, we did find that low gluten consumption correlated with low whole grain intake, and a diet high in whole grains is protective against heart attacks. This means that reducing your gluten intake purely as a preventative measure for heart health may backfire if this results in a decrease in whole grain consumption. While this study was restricted to individuals without a diagnosis of coeliac disease, it may also be of interest to the coeliac disease community as it suggests that the optimal gluten-free diet should include gluten-free whole grains."

and 2010. Analysis of this data revealed that gluten intake correlated inversely with alcohol consumption, smoking, total fat intake and unprocessed red meat intake. Gluten intake correlated positively with whole grain and refined grain intake. An adjusted rate difference of 75 fewer cases of coronary heart disease (CHD) per 100,000 person years for participants within the highest fifth of estimated gluten intake compared to those within the lowest fifth of gluten intake was calculated. However, after adjustment of known risk factors, participants in the highest fifth of estimated gluten intake had a multivariable hazard ratio for CHD of 0.95 (95% CI 0.88-1.02; P=0.29), representing a non-significant relationship between gluten intake and CHD risk. After additional adjustment for intake of whole grains (leaving the remaining variance of gluten corresponding to refined grain intake), the multivariate hazard ratio was 1.00 (95% CI 0.92-1.09; P=0.77). In contrast, after adjustment for intake of refined grains (leaving variance of gluten intake correlating with whole grain intake), higher estimated gluten consumption was associated with a

significantly lower risk of CHD (multivariate hazard ratio 0.85, 0.77-0.93; P=0.002). Authors of this study concluded that **long term dietary intake of gluten was not associated with risk of CHD, however avoidance of gluten may result in reduced consumption of beneficial wholegrains, which may in turn affect cardiovascular disease risk.**<sup>11</sup> Whilst this evidence supports the fact that gluten-free diets should not be widely advocated amongst the general population without evidence of symptoms attributed to gluten consumption, it should be noted that participants within the lowest fifth of gluten consumption in this study were not consuming gluten-free diets, simply less gluten overall (not least because the consumption of gluten-free diets was relatively rare for much of the study period). Dr. Lebwohl and colleagues have subsequently reported on the relationship between gluten consumption and risk of type 2 diabetes<sup>12</sup> demonstrating similar findings to those described above and concluding that reduced gluten intake may lead to lower consumption of cereal fibre or whole grains that would otherwise help reduce diabetes risk.

This work further highlights the importance of regular access to high quality dietetic support when implementing a restricted diet in order to maintain nutritional adequacy via the inclusion of higher fibre gluten-free foods and wholegrains and adherence to general healthy eating principles. These considerations are particularly poignant at a time when coeliac patients are receiving low levels of follow up from specialist dietitians and increasingly less access to staple gluten-free prescription foods.<sup>13</sup> A recent industry-funded survey of the British Dietetic workforce indicated that 45% of dietitians are either unable to offer annual reviews for patients, or only able to do so if particular concerns are raised.<sup>13</sup>

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Proximity is one of our company's core values, we live it daily through close contact with our consumers. Our Consumer Service Teams can be contacted via a variety of channels including free phone, email, our website, social media and live chat. We are here to answer every kind of enquiry and to provide support for our consumers in a competent, timely way, providing a high level of consumer satisfaction. Our five Consumer Service Teams are situated in Italy, Spain, United Kingdom, USA and Brazil. The teams are comprised of knowledgeable, experienced and dedicated staff members who are confident in providing the support our consumers deserve.

## Interview with Emma Pragnell ●



### **Through which channels are you in contact with consumers?**

Consumers can contact us via our freephone careline and email. We also have live chat services on our website and we are available to answer queries across the social media platforms, Facebook, Twitter and Instagram.

### **Which questions are asked most frequently? What are the main topics? Products? Diagnosis? Treatment?**

Our most common questions are about where consumers can purchase the products and the ingredients used in the products. A lot of consumers have multiple allergies so they need a bit of extra support and reassurance. We also get a lot of requests to speak to our in-house dietitians. Many of our consumers don't have regular access to NHS dietitians so it's great to be able to provide support in this way.

### **What do you find most rewarding about your role within Dr. Schär?**

The most rewarding part of working for the Dr. Schär team is being able to talk to consumers and hear how we help make their lives easier. We receive lots of positive feedback about the quality of the products and services we provide and it's great to be able to share this feedback with the whole of the UK team. The belief that we are making a genuine difference to people's lives is incredibly motivating.



**Emma Pragnell**

Consumer Services Manager,  
Dr. Schär UK

We improve the lives  
of people with special  
nutritional needs ●