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The gluten-free beer saga:

How most 'gluten-free' beer in the UK is not fit for consumption by coeliacs

The gluten-free beer industry is worth billions, but new scientific research points to these gluten-free beers containing more than the legal threshold of gluten. James Malvern, a coeliac himself, explores the curious world of gluten-free beer, its labelling limbo land and the health risks coeliacs are being exposed to.

There's an urban myth about McDonald's owning a company called '100% Beef' in order to legally, yet deceptively, declare that their burgers contain 100% beef. The urban myth is not true; those patties are, somehow, pure beef, yet public distrust of large corporations is so high that the story, and many others like it, persists.

But is a similar form of legal description being used today by big corporations? Having delved into the labelling of what is and isn't gluten-free beer, I discovered how far removed a title like 'gluten-free' can be, legally, from what it is describing.

Before I go any further, it's probably necessary to explain what is going on.

Gluten - a protein that is present in barley [see panel] - is big bucks. Or at least a lack of it is. According to a report¹ published on GlobeNewsWire last year, the international gluten-free beer market, which is already worth billions, is forecast to grow to £15 billion by 2025.

According to Coeliac UK², the national charity for coeliacs, the 'free-from' market was valued at £470 million in 2015 and is forecast to grow to £673 million by 2020. But not all of this is powered by demand from coeliacs. A recent report³ from Ireland's food safety watchdog shows that over 90% of people who buy gluten-free products have no medical reason to.

And for the most part, that's been a positive thing for coeliacs, with bountiful 'free-from' sections springing forth in most supermarket chains, replete with faithful gluten-free replicas of old favourites, now half the size, with even more sugar⁴ and twice the price.

But this commercial attention has also created some problems.

What is coeliac disease?

Coeliac disease, thought to affect 1% of the UK population, is caused by an adverse reaction to gluten, which is a dietary protein found in 3 types of cereal: **wheat, barley and rye.**

The NHS describes the disease as a condition where consumption of gluten triggers the immune system to attack the body's own tissues, which in turn leads to damage in the gut (small intestine) which means the body can no longer take in nutrients.

Patients with celiac disease should follow a lifelong, strict gluten-free diet. **There's currently no cure for this disease.**

Coeliac UK (the national UK charity for coeliacs) say: "if someone with coeliac disease repeatedly eats gluten or their condition goes untreated, they will be damaging their gut and putting themselves at **risk of complications including osteoporosis, nutritional deficiencies and even some rare forms of small bowel cancer.**"

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<https://www.globenewswire.com/news-release/2019/11/05/1940816/0/en/Global-Gluten-Free-Beer-Market-is-Expected-to-Reach-USD-18-7-Billion-by-2025-Fior-Markets.html>

2

<https://www.coeliac.org.uk/get-involved/campaign-with-us/improve-gluten-free-provision/join-the-gluten-freeevolution/>

3

<https://www.irishtimes.com/news/ireland/irish-news/health-benefits-of-gluten-free-diet-are-misperceived-report-finds-1.4154272>

4

<https://www.belfasttelegraph.co.uk/life/health/many-gluten-free-healthy-snacks-more-calorific-than-chocolate-bars-38908390.html>

“Although not all coeliacs are aware of this, there are two very different types of gluten-free beer lurking in the wild.”

For years now I've trained myself to check menus online beforehand when going to a bar or a restaurant with friends, in order to avoid making a scene or being 'that person' being 'difficult'. It's not the worst thing in the world. I've come to love tequila, wine and cider. But what about gluten-free beer? It's everywhere now, taunting me, but it makes me ill too.

Although not all coeliacs are aware of this, there are two very different types of gluten-free beer lurking in the wild. And like an ageing British heavy metal rock band that has split, and both camps are touring using the same name, confusion abounds.

To start to understand the problem, we need to divide gluten-free beer into two camps. The first, which I'll call 'gluten-reduced' for the rest of this article, is made with barley (which contains gluten). Barley has been used for brewing for thousands of years. It's been intensely studied and has all kinds of advantages over other grains for brewing. It essentially wants to become beer, as a brewer I spoke to rather wonderfully put it.

And to transform this beer into something that is then legally 'gluten-free' beer in the UK, brewers only have to add a 'miracle' clearing enzyme at the end of the fermentation process, which *was* thought to break down all the gluten. This is the most common version of gluten-free beer on the market, the one which is on the shelves of our supermarkets and in the fridges of pubs and bars across the country.

The other form of gluten-free beer, which I'll call 'naturally gluten-free' is made with a naturally gluten-free grain such as sorghum or millet or even buckwheat (which has nothing to do with wheat). These beers never had gluten in them and never will. Here in the UK these beers are few and far between, and those beer companies that did make them have mostly turned to making the gluten-reduced kind, because they are vastly cheaper and easier to make. There's a saying in naturally gluten-free brewing: "Twice as hard, four times the cost". It's a labour of love that some companies are not willing - or even able - to embrace.

Beer companies then have to take their beers to be tested at laboratories, such as Campden BRI in Gloucestershire, to make sure the level of gluten in the beer is under 20 parts per million (ppm). Once this has been done, the beer is officially gluten-free, in the UK anyway.

This is all down to a piece of EU regulation (which was put in place in good faith at the time). Among its contents is the setting of the officially recognised test for gluten in 'deglutenised' beer: the R5 Competitive ELISA.

The United States, Canada and Australia all have strict labelling regulations on these barley beers - they must be labelled 'gluten-reduced' or 'crafted to remove gluten'. And naturally gluten-free beers get to have the 'gluten-free' label all to themselves. In the UK the only difference is a small note on the back of the bottle that says 'Contains barley'.

But what is the problem with gluten-reduced beer anyway? Why has such strict regulation come into effect in other countries outside the UK? It's because there are now significant question marks over how safe these beers are for coeliacs. And when you consider that coeliacs continuing to consume gluten run a higher risk of developing bowel cancer [See panel], among many other serious ailments, it's clear why.

Scientific studies in the last few years from both the United States and Australia have shown that the way in which gluten-reduced beer is made, *and* the way in which it is subsequently tested, is both unreliable and inaccurate.

Research using a process called mass spectrometry by Professor Michelle Colgrave and her team at the Commonwealth Scientific and Industrial Research Organisation (CSIRO) - Australia's national science agency - has shown that even after the barley beers have been treated with these enzymes, fragments of gluten remain in the beer..

Colgrave explains that what her study "shows is that even in standard beer, the competitive ELISA gives variable results, because if you have the same amount detected by mass spectrometry, you should get the same amount, give or take, by ELISA. So this data highlights a discrepancy that needs further research."

Colgrave has been conducting back-to-back tests with the R5 Competitive ELISA and mass spectrometry on samples of gluten-free beer from all over the world.

"While we haven't named any brewers," said Colgrave. "We've provided information to them - to raise awareness of the mass spectrometry data, but because our methods aren't validated yet, it remains the brewer's call as to what they do about it."

Hers is not the only research to show this. In a study⁵ from 2019, Professor Katherine Fiedler and her team at the Food and Drug Administration (FDA) - the United States department of health and human services - also showed that the remaining gluten fragments are toxic.

In addition, in a study⁶ in 2017, Dr Laura Allred and her team at the Gluten Intolerance Group (GIG) in the United States tested 31 coeliac patients and 29 non-coeliac control subjects. Reactions to regular beer, gluten-reduced beer, and naturally gluten-free beer were recorded.

"When you look at Laura Allred's work," said Colgrave, "it shows the sera (the fluid component of blood containing white blood cells and plasma, amongst others) from patients reacted to these gluten-reduced beers. Not every patient, but sera from those who were sensitive coeliacs reacted."

⁵ <https://www.tandfonline.com/doi/full/10.1080/19440049.2019.1616830>

⁶ <https://pubmed.ncbi.nlm.nih.gov/28118560/>

So why is this R5 Competitive ELISA still being used if it is not able to accurately tell us how much gluten is in beer?

“The problem is that our methods are research-grade,” explained Colgrave, “in other words not validated, and so brewers must rely on the current approved test which isn’t perfect. That’s the challenge.”

Another factor, as already mentioned, is most consumers of gluten-reduced beers are not coeliacs or gluten intolerant, so they’re unlikely to be complaining about something that is harmless to them. Furthermore, not all coeliacs report feeling any symptoms from consuming these gluten-reduced beers.

But not everybody in the industry believes there is a problem.

“..we are not hearing lots of people are having these beers and becoming poorly from them. And if they were, I'm sure we would hear about it.”

“We have this huge following on social media and our membership database,” says Heidi Urwin, Coeliac UK’s director of evidence and policy. “We are not hearing lots of people are having these beers and becoming poorly from them. And if they were I’m sure we would hear about it. Members tell us all the time about everything. We have a great communication with our community.”

Coeliac UK themselves have been surprisingly quiet on the risks that gluten-reduced beer represents to coeliacs, despite the health implications involved. But they did admit they can improve the messaging.

“We have a response and explanation about gluten-free beers and how they are made,” explains Urwin, “but I think highlighting better about the labelling legislation and how to identify those in the current environment is something that can be made clearer.”

Coeliac UK work with the beer companies to advise them how to get the crossed-grain trademark symbol on their beer bottles. They stipulate that the companies must get their beers tested with the R5 Competitive ELISA at laboratories such as Campden BRI in Gloucestershire.

Leighton Jones, head of marketing and communications at Campden BRI, correctly argues that it is AO ECS (Association of European Coeliac Societies) that recommends the R5 competitive ELISA for hydrolysed food. And this is due to the existing EU regulation. They are merely adhering to the regulations that are in place.

It’s worth noting, however, that some laboratories in the US have refused to test gluten-free beers, because they know the R5 Competitive ELISA cannot accurately detect how much gluten is in hydrolysed products such as beer.

This 20ppm gluten threshold is generally assigned to the work of Dr Alessio Fasano⁷, professor of paediatrics at Harvard Medical School in Boston, Massachusetts.

Dr Fasano is also a director of the Centre for Coeliac Research and Treatment. When I spoke to Susie Flaherty, their communications director, about the gluten-reduced beers made from barley she told me Dr Fasano was “well familiar with the unacceptable situation with the so-called ‘gluten-free’ beers.”

Flaherty put me in contact with other scientific researchers who also believe there is a problem.

Professor Stephen Taylor, from the University of Lincoln-Nebraska and former head of the Food Allergy Research and Resource Program (FARRP) in the US has been researching these gluten-free beers for many years. He explained: “The R5 Gluten ELISA kit is widely recognised as an excellent method for the detection of intact gluten residues. The method is sensitive and highly specific. However this method is not nearly as reliable for detection of gluten residues in some ‘gluten-free’ beers.”

Taylor told me that the FARRP Lab no longer agrees to test gluten-reduced beers made from gluten source grains.

Coeliac UK's equivalent over in Canada, the Canadian Coeliac Association (CCA) has been proactive regarding this issue, lobbying the Canadian government to make labelling clearer. And this hard work paid off. Referring to the R5 Competitive ELISA test, the CCA's website⁸ states: “The ELISA test, which is the common test used during manufacturing to test for gluten, cannot accurately measure the gluten content in beer. This means that “gluten-removed” or “gluten-reduced” beers made from barley, wheat or rye are problematic. Because of this issue, Health Canada does not allow these products to be labelled “gluten free” and the CCA recommends that individuals with coeliac disease avoid these beers.”

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They go on to warn their fellow Canadians about us Europeans: “It is important to note that other countries have different regulations. For example, some European countries allow gluten-removed beers to be called gluten-free, which causes confusion with consumers.”

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https://www.beyondceliac.org/SiteData/docs/InDefenseof/7a4890bd693bc562/In%20Defense%20of%2020%20ppm_Alessio%20Fasano%20Letter.pdf

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<https://www.celiac.ca/living-gluten-free/diet-nutrition/?fbclid=IwAR3rHx5viKVzfYoKPb7e6Uo4HN-1hwQdyNx4dyyGgMUSdWY5rW73k15XkKg>

In one country on the European continent, there's a Facebook group for coeliacs that has over 100,000 members. The person who runs this group asked for the group to remain anonymous as they wish to retain good relations with advertisers. They often run adverts for gluten-free products on the group: discounts for the members, access to a big audience for the companies, and a bit of money for the admin.

But last year they were approached by a large beer company looking to advertise their gluten-reduced beers on the Facebook group. Based on what the group admin had learnt about these beers, the beer company was told it could only advertise if it also provided information in the advert on how its beers were made and to let people know that there is some risk for coeliacs. It seemed like a reasonable condition. The beer company refused and the adverts did not run.

Back in the UK, London's first Coeliac UK accredited 100% gluten-free restaurant Niche, in Angel of Islington, made the decision in April 2019 to remove these gluten-reduced beers from their menus.

Owner Marc Warde explained: "We had some American customers who'd come in and said: "Oh, we had a wonderful time with you, but one of the things we've noticed was you had this beer." So we started to look more into it. And the American classification is different to the UK classification, and we decided we shouldn't include it, because it's a barley-based process. And we got ones that have no gluten at all - and never had, in fact. And we think that's the best way to go.

But it's not all doom and gloom. From the darkness comes light in the form of the naturally gluten-free beer brewers. These have been popping up all over the world in recent years, often started by people like me who are fed up of not being able to drink beer *and* 'gluten-free' beer. California, Oregon and Washington state seem to be the hot spots on the other side of the Atlantic.

"This is an industry that's only been around for 5-10 years tops," explained Stuart Cole, a naturally gluten-free beer brewer in Vancouver, Canada. "I hate to say it, but I think we're a little ahead of Europe and the UK on that one, which is sometimes surprising. I think we often look to the continent, to the UK for guidance on some of these areas...but on the beer front it's a different story."

Probably the biggest naturally gluten-free beer brewer in Europe is Green's, although half of their beer range is gluten-reduced⁹. And they export most of their beers to mainland Europe, and North America, where there is greater demand for a naturally gluten-free beer - and better-informed coeliac communities.

⁹ <https://www.glutenfreebeers.co.uk/shop/>

“In the US they were telling me that people came in who hadn’t had a beer in 20 years and started crying on the barstool because they were so overjoyed with happiness.”

But naturally gluten-free microbreweries do exist in the UK as well, although nowhere near the scale of the North American scene. One such brewer is Matt Marriott in Edinburgh, a coeliac too, who launched his company just as coronavirus hit. Asked why he decided to brew gluten-free beers without barley, he explained that he wanted to taste the beer at each stage of the process, something he would not have been able to do with the barley gluten-reduced beers.

Marriott was inspired by the gluten-free microbrewery movement that has sprung up across the United States and Canada.

“In the US they were telling me that people came in who hadn’t had a beer in 20 years and started crying on the barstool because they were so overjoyed with happiness,” he said, laughing. “And I think that’s what you want to tap into. It’s personal. Gluten-free brewing is personal. Barley beer isn’t that personal. It’s just beer, and I think that’s something people should tap into.”

Even Coeliac UK admit there has been a rise in naturally gluten-free brewers in the UK.

“I do know that there’s quite a passion in this,” said Michael Brown, Coeliac UK director of commercial services, “because enquiries that we’ve been having recently, particularly from those who are coming in without gluten-containing ingredients are very proud of the fact that they are doing that. And we’re probably seeing more of that of late.”

Michelle Colgrave would love to have her team’s mass spectrometry technique being used in gluten-free beer testing labs now, but funding is an issue.

“We’re still seeking funding,” she explained. “We’ve got a bid in right now to try to further the research. We would like to reach the point where it’s the gold standard method.”

“Not every coeliac patient will have an adverse, acute response, but what we need to understand is whether they will have a potentially chronic issue where they don’t have mucosal healing.”

Regarding labelling, she believes greater transparency is needed, but also for the consumers to be able to choose.

“Allow people to make the decisions themselves,” she said. “My preference would be - as they have done in the US - to say that they’ve been crafted to remove gluten. And that’s what the change in 2012 (FDA regulation) was about. It was about making consumers aware of the process by which those products have been made. In Australia, we’re much more conservative. None of these beers can be called gluten-free at all! But we still see some of these products entering Australia and sitting on the shelves and people not being fully aware of the potential harm.”

“The take home from me,” she continued, “is that we and others have detected gluten in beer after this gluten-reduction treatment, even at six times the enzyme dose. Not every coeliac patient will have an adverse, acute response, but what we need to understand is whether they will have a potentially chronic issue where they don’t have mucosal healing.”

Colgrave advises that consumers of these gluten-reduced beers should do so under the guidance of their doctors who can monitor potential damage to the intestine that isn’t necessarily noticeable from acute symptoms alone.

“You can still have damage,” she warned, “even if you’re not feeling sick.”

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