

Topic: Vital Wheat Gluten

Relevance to GFF

Given the increased awareness of and reported rise in the incidence of celiac disease (CD) and non-celiac gluten sensitivity (NCGS), the marketplace is being disrupted and there is a strong demand for gluten-free products. Many consumers, health professionals and media are seeking the root cause for the increased in CD/NCGS, including the role of gluten in these conditions and other health ailments.

Related concerns for GFF include:

- A rise in celiac disease diagnosis and gluten sensitivity awareness (real or imagined)
- Gluten being a suspected cause of health ailments, including inflammation
- The assertion that modern wheat is different from ancient or traditional wheat varieties

Issue at Hand: Rise in CD & NCGS

Currently there are several theories being espoused for the underlying cause of the rise in CD and NCGS.

To date, here's what we know:

- Theory: Wheat is different now
 - o Wheat breeding has not changed the average protein content of U.S. bread wheats, when the first half of the 20th century is compared with the second half.
- Theory: Wheat gluten may be a cause of CD
 - o The consumption of wheat products shows a small increase during the latter half of the 20th century, which correlates with the reported increase in the incidence of CD, but causation is questionable.
- Theory: Increased gluten in the food system is a potential cause of CD and other health ailments
 - o Vital gluten consumption increased dramatically toward the end of the 20th century and into the 21st century, which again correlates approximately with the reported increase in CD. However, per capita intake of vital gluten is still relatively small (15 percent) in comparison with the intake of gluten from eating wheat products themselves.

Why GFF Should Be Concerned

Consumers and the media are highly sensitive to the issue of food ingredients and have exhibited strong negative reactions to food additives that do not occur in nature (e.g., azodicarbonamide).

Medical and nutrition researchers with an interest in CD and NCGS are beginning to investigate the correlation between the use of vital wheat gluten and the rise in the incidence of these conditions. While direct correlation between disease/sensitivity incidence and vital wheat gluten may never be established, there exists a coincidental relationship between increased consumption of vital wheat gluten and increased incidence of CD and NCGS.

Even in the absence of scientific evidence or conclusive proof, this casual or coincidental relationship can be exploited by anti-wheat/anti-gluten proponents, especially at a time when gluten and wheat are already under attack. Steps must be taken now to anticipate needs and align resources and positive messages supporting the safe use of vital wheat gluten in the bread baking process — diffusing the issue before it can take hold.

Articles of Interest

Vital Gluten and Increased Gluten Content in Wheat

Mayo Clinic Celiac Blog, 4/1/13

In this short video, Dr. Joseph Murray, a Mayo Clinic gastroenterologist and celiac disease expert discusses Dr. Kasarda's work published in the *Journal of Agricultural and Food Chemistry*. At the 1:20

timestamp, he touches on the role of vital gluten in the increased rates of celiac disease, stating that while research on this is still preliminary, it is an interesting idea and warrants further study.

Can an Increase in Celiac Disease Be Attributed to an Increase in the Gluten Content of Wheat as a Consequence of Wheat Breeding?

Journal of Agricultural and Food Chemistry, January 2013

This research was conducted in response to the increasing number of accusations that wheat breeding has increased the gluten content of today's wheat and is to blame for the increase incidence of celiac disease and gluten sensitivity in the U.S. This perspective piece gives a nice overview of the 10,000-year history of wheat domestication. Various studies conclude that when grown under similar conditions there is no difference between the protein content of today's wheat and that of the early 20th century. There is no data to support the likelihood that fertilizer is contributing to the protein content of wheat.

Protein content by wheat variety:

- Hard Wheat (bread): 12–14 percent
- Soft Wheat (pastries): 7–11 percent

This piece also confirms that per capita wheat consumption has also declined over the past 100 or so years. Based on Economic Research Service statistics, the consumption of wheat decline from 200 lbs. per person per year in 1900 to 134 lbs. per person per year in 2008. However, gluten consumption has increased over time.

Vital gluten is gluten that is fractioned from wheat flour by removing the starch. Almost 80 percent of vital gluten is imported from Australia, Europe, Canada and China. Kasarda reports there is no accurate way to determine exactly how much gluten is being consumed by the American population from wheat grain and vital wheat gluten because of the lack of accessible information about gluten production. Based on his own crude estimations, he believes that vital gluten consumption has tripled since 1977, which he parallels with the increase of celiac incidence during the same time. He concludes that the quantity of gluten that Americans are consuming overall might be driving this increase in intolerance, but the wheat plant protein content has remained stable.

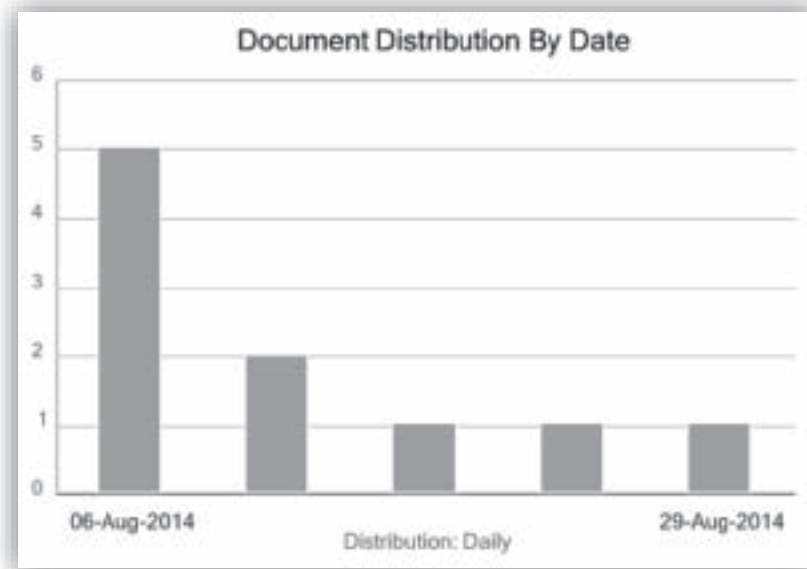
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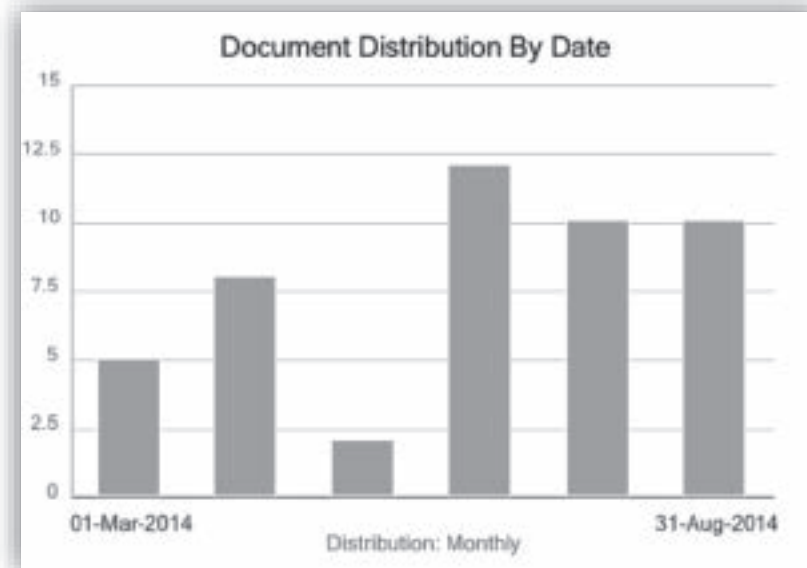
Media Charts

Vital wheat gluten is not a topic that was extensively covered by the media in the 2014 fiscal year. The consumer-facing publications that have mentioned the topic have done so in relation to meatless meal options, like in this round up of vegan recipes shared by *The Post-Standard*.

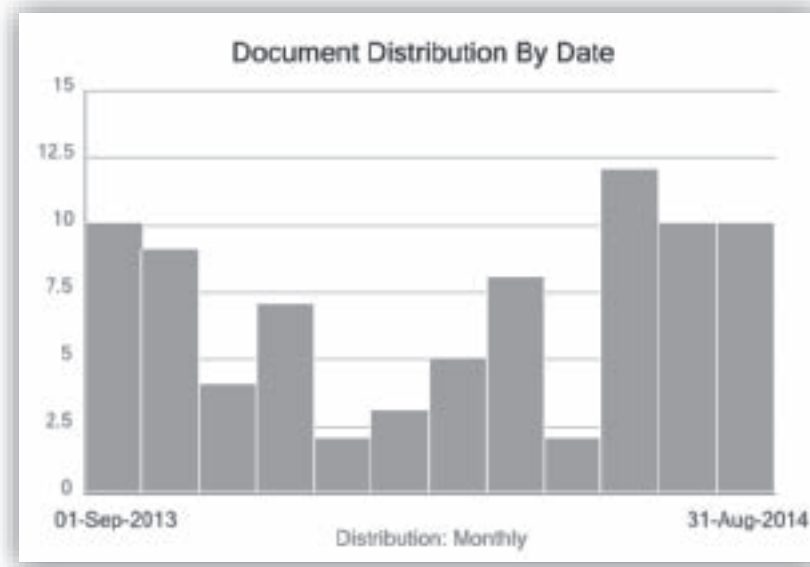
Vital Wheat Gluten Mentions (Past Month)



Vital Wheat Gluten Mentions (Past Six Months)



Vital Wheat Gluten Mentions (Past Year)



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GFF Holding Statement: Vital Wheat Gluten

GFF's mission and programming are built on communicating the positive attributes of grain products. Given that more research still needs to be conducted on the vital wheat gluten front, it is difficult to make blanket recommendations on the nutritional impacts this ingredient might have on celiac disease and overall health. That said, GFF will continue to stay abreast of the nutrition science, working with our Scientific Advisory Board members, investor companies like Manildra and other organizations that work in the grain foods space to help influencers better understand the complex issue.

Questions & Answers

As an investor, should I be concerned about vital wheat gluten?

Yes, vital wheat gluten has the potential to impact the overall grain product business. We've seen that consumers and the media are highly sensitive to the issue of food ingredients and have exhibited strong negative reactions to food additives that do not occur in nature (e.g., azodicarbonamide).



While this topic is still nascent, there has been increased interest in celiac disease and non-celiac gluten sensitivity in the medical and nutrition research communities, which are beginning to investigate the correlation between the use of vital wheat gluten and the rise in the incidence of these conditions.

It is important to note that even in the absence of scientific evidence or conclusive proof, this casual or coincidental relationship can be exploited by anti-wheat/anti-gluten proponents, especially at a time when gluten and wheat are already under attack.

What is the reason for the increased incidence of celiac disease?

Many consumers, health professionals and media are seeking the root cause for the increased incidence of CD/NCGS, including the role of gluten in these conditions and other health ailments. Some potential theories about the increase in celiac disease include:

- A rise in celiac disease diagnosis and gluten sensitivity awareness (real or imagined)
- Gluten being a suspected cause of health ailments, including inflammation; vital wheat gluten use increase
- The assertion that modern wheat is different from ancient or traditional wheat varieties





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