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Let's Yeet This Wheat: Removing Gluten From Fryer Oil

One in every twenty-five people have a negative reaction to gluten due to celiac disease, an allergy, or a sensitivity to gluten. Celiac disease can be life-threatening, and at the very least, damaging to the digestive tract if gluten is consumed. As of today, there is no cure or treatment besides a strict gluten-free diet. Many establishments simply do not understand the ramifications of ingesting gluten and may not take the proper precautions; this results in the contamination of food that should otherwise be gluten-free. By creating an easy filter that employees can use to make gluten-free fried food safe, the risk of cross-contamination in this area is lessened. Currently, there is no device or procedure that focuses on decreasing the risk of gluten contamination in restaurants. By creating a procedure to defy the dangerous gluten contamination that can occur in restaurants and different establishments that serve food, there can also be an increase in profit by marketing to those who follow gluten-free diets. By widening the demographics of what kind of food they serve, restaurants will be able to make a profit by selling food to people who have celiac disease when needed.

Gluten is a protein that cannot be denatured at a heat found in typical kitchens as it can withstand far more heat than most other proteins. A fryer in a commercial kitchen produces heat of between 350 and 400 degrees Fahrenheit, which is considered higher than a normal kitchen temperature. When a restaurant kitchen cooks food with gluten and then cooks food that is gluten-free in the same space, the gluten-free food is contaminated with gluten particles. This can happen on a grill, in a fryer, in a pot of water, or on a cutting board. The food that may have been gluten-free prior to preparation becomes no longer safe for gluten-free people to eat. Since gluten is a protein, it does not bond with lipids such as oil.

We used this information to create an efficient procedure to allow restaurants a simple option to filter gluten out of their fryer oil and allow people who otherwise would find it risky to

eat fried food, eat this food safely. The procedure involved straining contaminated oil through strainers with different size holes to find the size that would leave less than 20 parts per million (FDA certified gluten level for gluten-free foods) of gluten in the oil. Using tater tots as a gluten-free constant and contaminated canola oil with breadcrumbs as the gluten representation, the procedure mirrored a restaurant kitchen frying gluten-free food in contaminated oil. First, the fryer oil was contaminated with breadcrumbs and then strained through different sized strainers. Multiple trials of tater tots were fried in the strained oil, and the outside layer of the tater tot was tested to find how much gluten was present in the oil after straining.

Our research lead us to find that the food cooked in oil, filtered with strainers with holes between 149 and 420 microns wide, registered as being below 20ppm. After performing tests with lateral flow devices, the samples were sent to a food testing facility, Bia Diagnostics, for the collection of numerical data to solidify the results. This numerical data proved that using the aforementioned pore sizes would result in straining the gluten particles from the oil to well under 20ppm. In conclusion, straining the oil of gluten particles using specific uniform hole sizes can be successful in removing gluten from contaminated oil to under 20ppm, making it safer to eat for people with a gluten restrictive diet.

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