



GLUTEN INTOLERANCE



Gluten is probably one of the most ubiquitous proteins in food manufacturing and production. It may be found in cereals, baked products, wines and some condiments.

The formation of gluten from milled products of wheat during dough formation makes wheat an irreplaceable raw material in the production of many food items, the most important of which is in baking. When dough made with wheat flour is kneaded, gluten forms, which contributes to the viscosity and ability of the mixture to extend, stretch, or rise (swell), once a

leavening agent is present. In many baked products gluten forms a film that retains gas which contributes to the raising of the dough and cooking of the product. The application of heat, such as in baking, coagulates the protein – gluten, giving the product, e.g. bread, its final shape. Hence the development of gluten affects the texture and “chewiness” of baked products as well as the elasticity of the kneaded dough, which allows it to be leavened.

The more developed the gluten, the chewier the product such as pizza and bagels, while less developed gluten gives

tender baked goods – such as cookies. Since kneading promotes the formation of gluten, the chewiness of the product is in proportion to how much the dough is worked. Water (wetness) enhances the development of gluten while fats and oils inhibit its development.

Gluten is a protein commonly found in grains such as wheat, barley and rye. Although oats contain chemically similar proteins, there are some slight differences. Gluten constitutes about 80% of the proteins contained in wheat.

Gluten is available commercially dried and milled to

powder that may be added to various items to improve the structural capability of the mix, and because it is a protein, it also improves the protein quality of the product. Wheat Gluten is also available as *wheat meat*, *gluten meat* also called *seitan*. *Seitan* or *gluten meat* is used in vegetarian meals especially among vegans as meat substitutes.

While *gluten meat* or *Sietan* is available commercially, it can also be prepared at home. It is made by mixing wheat flour with water and kneading it into a dough. This dough is then washed with water until all the starch dissolves (most of the white colour), leaving an insoluble translucent, unified, gummy, thick and sticky, stretchy (cohesive viscoelastic) mass. This mass is called gluten. This mass, gluten, may then be subjected to further processing.

There are many industrial uses and benefits to gluten. It adds protein; increases volume; provides higher rising baked goods; improves shape, enhances flavour, and may extend freshness of the product. Even some winemakers have evaluated the use of gluten in the wine making process by comparing gluten treatments to other fining agents currently used. Gluten may be used as a food additive in many products. It may be used as a stabilizing agent or thickener in products such as ice-cream and ketchup.

Gluten is a dairy-free, sodium-free, cholesterol-free, fat-free protein alternative that may be

used by vegetarians. Some types of wheat gluten have a texture more like that of meat than most other substitutes, because of their chewy and/or stringy texture. Wheat gluten is an alternative to soybean-based meat substitutes such as tofu especially for persons with sensitivity or allergies to soy and nuts.

As useful as gluten may be to the food industry, there is a health concern as some persons suffer from gluten intolerance.

What is Gluten Intolerance?

Gluten intolerance is a broad term that describes a disorder in which some persons may suffer from abdominal pain, bloating or diarrhea when they eat certain specific foods. This occurs when

persons who are extremely sensitive to gluten eat even small amounts and the immune system responds inappropriately, as if it is fighting a harmful foreign body, triggering an inflammation in the small intestine. The immune system detects gluten as a threat and puts its defensive mechanism into action by producing antibodies to get rid of the foreign element. The antibodies that are produced attack the lining of the small intestines.

Gluten intolerance is similar in effect to celiac disease or celiac sprue. It is a chronic disorder which develops in persons with the gene for this condition. This means that persons with family members with Gluten Intolerance are also likely to develop the condition. When these

Age	Symptoms
Infants	Diarrhoea (common) Steatorrhea (common) Abdominal cramps Muscle wasting Decreased growth
Older Children	Diarrhoea (common) Nausea Mouth sores Rash Irritability Increased dependence upon parents Late puberty Shortened puberty Steatorrhea (common) Weight loss Behavioral problems Short stature
Adults	Diarrhoea Steatorrhea

persons are exposed to an unknown trigger in the immune system it results in an abnormal immune response when the system is then exposed to gluten. Some of the suspected triggers for this condition that have been identified so far include stress, trauma and viral infections.

Symptoms of celiac disease vary and can include weakness, appetite loss, weight loss, chronic diarrhoea, abdominal cramps and bloating. The sign and symptom of gluten intolerant individuals vary in type and severity depending on many factors among which age is very significant. The Table on page 2 shows the usual/common symptom of gluten intolerance associated with various stages of development.

Effects of Gluten Intolerance

The inflammatory response to gluten results in a flattening of or reduction in the size of the villi or small air-like projections in the surface of the small intestines which play an important role in absorbing the nutrients from the foods we eat into the blood stream. This inability to efficiently absorb the nutrients from our digested foods is called malabsorption and may lead to malnutrition. This malabsorption can also contribute to other nutritional deficiencies and related consequences such as anemia caused by inadequate iron or folic acid absorption; osteomalacia, osteopenia, fractures due to inadequate absorption of

vitamin D and calcium; problems with the clotting of blood due to vitamin K malabsorption. Other consequences include incomplete development of the dental enamel; failure to thrive, delayed puberty, underweight and deficiency of the enzyme lactase which is important for the digestion of milk.

Intolerance versus Allergy

Gluten intolerance is not a food allergy. An intolerance is different from an allergy; although both may result from changes in the immune system's response triggered by outside influences of irritants on the body such as food intake, the air we breathe and direct skin contact. Allergies tend to have a more generalized reaction as histamines travel through the blood stream and can therefore be more readily diagnosed, but intolerances are less demonstrable. In an allergy, if the offending substance is injected directly under the skin there is a clear skin response such as a welt, redness and possible itching. Demonstrating an intolerance is more difficult because it takes much longer for symptoms and subsequent complaints to develop thereby masking the link between the offensive substance and the symptoms/complaints. Therefore an intolerance may be manifested through a series of signs and symptoms and the link to the offensive item is often detected over time and with diligence.

Gluten intolerance results in specific damages to the small

intestines. Once Gluten intolerance is suspected, a biopsy of the small intestines may be done and or a blood test for specific antibodies to confirm this diagnosis.

Treatment

Gluten intolerance is more prevalent worldwide than once thought and is sometimes diagnosed in the Caribbean. Once someone has the disease, it is virtually incurable, but it can be controlled. However, every time a person who is gluten intolerant consumes gluten products they put themselves at risk of damaging their small intestines even if there is no manifested sign or symptom.

The treatment for gluten intolerance is to completely remove gluten from the diet; that is, a lifelong, gluten-free eating plan. Once gluten is eliminated, the small intestine can heal. This healing process can take months or years. Once the intestine heals, nutrient absorption improves, symptoms disappear and those with celiac disease can live a long, healthy life.

Sources of Gluten

As previously mentioned, wheat, oats, rye and barley are the main food sources although oats may not be harmful to some persons with gluten intolerance. The offending compounds are gliadins and glutenins in wheat that exist in conjunction with starch in the endosperm of grass-related grains; in rye, secalins and in barley, horedeins.

Wheat, oats, rye and barley may be present in a variety of foods including:

- Crackers, cookies, cakes, pies, pizza crust.
- Pastas such as spaghetti and macaroni.
- Prepared products such as frozen potatoes or packaged rice mixes.
- Prepared meats e.g. frankfurters, sausages, canned meats, egg substitutes.
- Canned soups, broths and soup mixes.
- Beverages such as malted milk, cocoa mixes, chocolate milk, nondairy creamers, flavoured coffee and some herbal teas.
- Flavoured yogurts, frozen yogurts and commercial ice creams.
- Processed cheeses.
- Some flavourings, seasonings, and salad dressings.

Gluten is also found in the hosts (communion bread or wafer) used by some religions as well as some medications, vitamins and herbal supplements that use gluten as a binding agent, some lipsticks and postage stamps.

Reading food labels and paying specific attention to the ingredient list is important for persons with gluten intolerance in order to ensure that they are eliminating gluten from the diet. Some ingredients to look for that may indicate the presence of gluten in a food include:

- Emulsifiers
- Stabilizers
- Thickeners
- Barley
- Wheat, rye, triticale, kamut and oat
- Flour, self-rising flour, enriched flour, graham flour, durum flour, gluten flour.
- Food starch and modified food starch.
- Hydrolyzed vegetable protein (HVP).
- Malt or malt flavourings.

The international standards for food labelling has a standard relating to the labelling of products as "gluten free", however this standard does not apply to "foods which in their normal form do not contain gluten".

Alternatives to Gluten-containing Products

Even with gluten intolerance, it is still possible to eat a nutritious well balanced diet including a wide variety of foods from the six Caribbean Food Groups. Choosing foods from the Staples Food group will require the most diligence. Food items in that group that do not contain gluten include:

- Provisions such as Irish and sweet potatoes, green banana/fig, plantain, breadfruit, eddoe/taro, cassava;
- Rice; corn and cornmeal;
- Tapioca/sago,
- Arrowroot and other flours

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can be used for baking. However these flours have different characteristics from wheat flour may give different results in the baked products. It is best to seek out and use recipes that are designed for these flours.

Food items from other groups that may also be included in your diet are:

- Peas, beans and nuts from the legumes food group.
- Meats and milk products from the foods from animals (except those listed above).
- All fruits,
- All vegetables,
- Fats and oils.

Remember to read labels carefully if you are using processed or packaged food items from these groups. When eating out in restaurants, cafeterias, other outlets, and at social gatherings and even at friends' homes questions need to be asked about the ingredients to ensure that you are still avoiding dishes that may contain gluten.

Gluten Free, A Way of Life

For people with gluten intolerance, living Gluten-free must become a way of life that requires care and diligence in your dietary choices for daily living and for relief of symptoms. This may prove to be challenging but not insurmountable and you can still enjoy an array of foods and have an optimal quality of life.

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