

Food Sensitivity

The expression “food hypersensitivity or sensitivity” refers to all types of overreactions that an organism can have against a food component. This includes food allergy, food intolerance and any other minor adverse food reaction. Food allergy is defined as an abnormal immunological reaction in which an individual's immune system overreacts to foods that are ordinarily harmless. The part of a food to which a person reacts is usually a protein and is called an allergen. Reactions may occur minutes or hours after the food is eaten. Because the immune system proliferates in particular areas, one or several organs may be affected, such as skin, lips, tongue, stomach, etc. Symptoms such as: nausea, cramps, sneezing, coughing, chest tightness, shortness of breath, and wheezing may follow. The most dangerous allergic reaction is anaphylaxis (life-threatening respiratory distress). Food intolerance is defined as a non-immune reaction to food or food additives. Examples of food intolerances include reactions to monosodium glutamate (MSG), tyramine in cheese, caffeine in coffee, sulfites in wine, phenylethylamine in chocolate, or milk and its products in the case of genetic lactose intolerance. Food adverse reactions usually involve mainly the digestive system, with symptoms like slow and difficult digestion and swollen and or painful abdomen, sometimes together with somnolence and headache. The dividing lines between food allergy, food intolerance, and adverse food reactions are not always clear, except that food allergy is usually involved with the immune system, while the other two are not immune system mediated.

One of the most common observations about KAMUT® khorasan wheat we receive from the consumers is that people suffering from adverse reactions to durum and soft wheat can eat KAMUT® khorasan wheat products without suffering from the usual symptoms. To evaluate the characteristics of KAMUT® khorasan wheat on this topic, Kamut International is sponsoring one *in vitro* and two *in vivo* studies:

- **Digestibility of KAMUT® khorasan flour versus modern wheat flour in human diet**
- **Allergenic characteristics of KAMUT® khorasan wheat**
- **Assessment of a KAMUT® khorasan wheat based diet on children suffering from wheat allergy with chronic atopic dermatitis and/or gastrointestinal disorders**

The aim of the first study is to compare gastric emptying times of a standard meal consisting of modern wheat versus KAMUT® khorasan wheat. This is to understand if the observation of consumers is due to a difference in the gastric emptying time. Recently, Kamut International sponsored an *in vitro* study regarding digestibility of KAMUT® khorasan wheat pasta versus durum pasta. This research was carried out by the Institute of Food Research of Norwich (UK), using the model gut that simulates the digestive process of the human body. Unfortunately, by simply following the digestion process of these two types of pasta, there was no conclusive data. However, samples of different steps of digestion have been frozen for further analysis or research.

The other two studies focus on the still mostly unknown field of food sensitivity. In particular, the second study listed above, is an *in vitro* study that plans to: 1. Investigate the gliadin of KAMUT® khorasan wheat by two complementary approaches (to examine the nucleotide sequence of the gene and assess the immunogenic characteristics of the

protein itself). 2. Evaluate the allergenic properties of KAMUT[®] khorasan wheat with reference to wheat food allergies. The last of the three studies listed above, is a pilot study which aims to study the role that KAMUT[®] khorasan wheat could have for a particular category of patient, children suffering from wheat allergy together with chronic atopic dermatitis and/or gastrointestinal disorders.

KAMUT[®] khorasan wheat, as well as other species of durum wheat, contains gliadin, a very well known protein that has the ability to promote hypersensitivity. However, research conducted in 1991 by the International Food Allergy Association of Illinois (Assessment of allergenic reactivity of KAMUT[®] khorasan wheat versus common wheat) concluded: "It appears that a majority of patients with IgG delayed reactions to common wheat can tolerate KAMUT[®] khorasan wheat better than patients who have IgE immediate reactions to wheat. Since most patients have delayed IgG reactions to all foods, it appears that KAMUT[®] khorasan wheat can be an excellent substitution for common wheat if eaten on a rotational basis. However, everyone with a serious food allergy to wheat should be evaluated carefully by their physician before trying any new grains".

Recent research (Laurière M. et al, Allergy 2007;62 890-96), has demonstrated that even little differences in the structure of the protein usually involved in the allergic reaction, can be of clinical relevance. So it's possible to suppose that epytopes of the gliadin of KAMUT[®] khorasan wheat, which are different from those of wheat, can give different results in term of reactivity. It's even possible that the presence of different gliadin epitopes in KAMUT[®] khorasan wheat can have a protective role in the promotion of tolerance to wheat. Sampson et al, in fact, demonstrated on JACI (Pons L et al., J Allergy Clin Immunol 2004;114:915-21) that using a vaccination towards minor determinants of soy, similar to the mayor epytopes of peanut, it's possible to achieve full tolerance to peanuts in previous peanut-allergic patients. This means that the presence of minor different gliadin epytopes in the KAMUT[®] khorasan wheat gliadin structure could take relevant part in maintaining wheat tolerance. Of course, only careful and thorough research can help us understand these vast topics.