

Processing aids

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Definition of processing aids

According to **The Food Labelling Regulations 1996** [http://www.opsi.gov.uk/si/si1996/Uksi_19961499_en_1.htm], a processing aid ‘...means any substance not consumed as a food by itself, intentionally used in the processing of raw materials, foods or their ingredients, to fulfill a certain technological purpose during treatment or processing, and which may result in the unintentional but technically unavoidable presence of residues of the substance or its derivatives in the final product, provided that these residues do not present any health risk and do not have any technological effect on the finished product.’

The contradictions

If processing aids ‘do not have any technological effect on the finished product,’ does that not beg the question ‘why are they being used at all?’

Whilst it is true that some are used to bend natural products to the unnatural demands of modern baking process (eg one function of the enzyme hemicellulase is to ease mechanical handling) many are used specifically to have an effect on the end product, commonly to prolong crumb softness in an artificial simulation of a characteristic of fresh bread.

As for not presenting any health risk, as can be seen below, recent studies have thrown the possible effects of certain baking enzymes into question.

Label friendly

What do the following quotes taken from the websites of certain producers and suppliers of baking enzymes suggest to you? Are they marketing to manufacturers who have the intention of fully open and honest labelling?

“Baking Enzymes are used as flour additives and in dough conditioners to replace chemical ingredients and to perform other functions in a label-friendly way.” **Lallemand**, distributor of enzyme concentrate Novamyl [<http://www.lallemand.com/BakerYeastNA/eng/bakingenzymes.shtm>]

“...today’s modern baker looks to enzymes to effectively modify his dough with label-friendly enzymes rather than dough conditioners with long chemical names.” **BIO-CAT**, supplier of food enzymes [http://www.bio-cat.com/applicationDetails.php?application_id=5]

“Bakels offer a range of ingredients which are clean label. They are free from emulsifiers and Hydrogenated fats, allowing bakers to produce quality products with as clean a label as possible.” **Bakels**, suppliers of ingredients to the baking industry [<http://www.britishbakels.co.uk/products.cfm?section=healthyeatingandcleanlabel>]

Examples of processing aids

Here are just some of the bread processing aids that are legally used and legally not disclosed on the label, along with a note or two about each.

Name: **Phospholipase A₂**

Function: Increase volume and prolong softness

Issue: Can be of porcine (pig) or transgenic (GM) origin

References: **Application A1004 phospholipase A₂ as a processing aid (enzyme) approval report, Food Standards Australia New Zealand, 25 February 2009**

http://www.foodstandards.gov.au/_srcfiles/A1004%20Phospholipase%20as%20a%20PA%20AppR%20FINAL.pdf

Name: **Fungal α-amylase**

Function: Increase volume, give darker crust and prolong softness

Issue: A known allergen by inhalation, evidence of persistence in crust after baking and causing allergic response by ingestion. Up to 20% still present after baking.

References: 'Allergic reaction after eating α -amylase (Asp o 2)-containing bread' *Allergy*, Volume 50 Issue 1, pp 85-87, X. Baur, A. B. Czuppon, January 1995

<http://www3.interscience.wiley.com/journal/119243078/abstract?CRETRY=1&SRETRY=0>

'Bread eating induced oral angioedema due to α amylase allergy' *Journal of Investigational Allergology and Clinical Immunology* 2004, Volume 14 Issue 4 pp 346-347, A. Moreno-Ancillo, C. Domínguez-Noche, A. C. Gil-Adrados, P. M. Cosmes

<http://www.jiaci.org/issues/vol14issue04/346-347.pdf>

'Is fungal α -amylase in bread an allergen?' *Clinical & Experimental Allergy*, Volume 30 Issue 4, Pages 560 – 565, April 2000, Sander, Raulf-Heimsoth, Van Kampen & Baur

<http://www3.interscience.wiley.com/journal/119046999/abstract>

'Heating inactivates the enzymatic activity and partially inactivates the allergenic activity of Asp o 2' *Clinical & Experimental Allergy*, Volume 26 Issue 2, Pages 232 – 234, February 1996, X. BAUR, A. B. CZUPPON I. SANDER

<http://www3.interscience.wiley.com/journal/119220873/abstract>

Name: **L-cysteine**

Function: To delay staling effects

Issue: Although L-cysteine of animal or human origin banned by the EU, there is a claim that users can be unaware of/ unable to test if it is of synthetic or natural origin.

References: **CBH Qingdao** [<http://www.cbhcn.com/product-ny.asp?id=47>], **Food Navigator 7 March 2002** [<http://www.foodnavigator.com/Science-Nutrition/New-technology-for-cysteine-food-ingredient>]

Name: **Maltogenic amylase**

Function: Helps to prolong crumb softness and elasticity.

Issue: Can be of transgenic (GM) origin.

References: **Transgenic plant expressing maltogenic alpha-amylase, United States Patent 7348470**

<http://www.freepatentsonline.com/7348470.html>

Name: **Hemicellulase**

Function: Increases loaf volume, prolongs crumb softness and eases mechanical handling.

Issue: Can be of fungal, soil bacteria or transgenic (GM) origin. Fungal allergens can be expressed in enzymes of fungal origin. Possibly not entirely destroyed by high temperatures.

References: **Hemicellulase active at PH and temperature extremes, United States Patent 5476775**, [<http://www.freepatentsonline.com/5476775.html>], 'Molecular biology and immunology of fungal allergens' *Indian Journal of Clinical Biochemistry*, Volume 15, Supplement 1 / August, 2000, pp 31-42, Viswanath P. Kurup, Banani Banerjee, Kevin J. Kelly and Jordan N. Fink

[<http://www.springerlink.com/content/b2g658478tt6t7h6/fulltext.pdf>]

Neogen material safety data sheet [http://www.neogen.com/FoodSafety/pdf/msds/6854E_MSDS.pdf]

Name: **Transglutaminase**

Function: Increases elasticity of dough, reducing energy required for mixing, increasing strength of crumb structure and absorption of water.

Issue: Linked to triggering the coeliac response

References: 'Microbial transglutaminases generate T cell stimulatory epitopes involved in celiac disease' *Journal of Cereal Science* Volume 47, Issue 2, March 2008, Pages 339-346 E.H.A. Dekking, P.A. Van Veelen, A. de Ru, E.M.C. Kooy-Winkelaar, T. Gröneveld, W.F. Nieuwenhuizen and F. Koning [doi:10.1016/j.jcs.2007.05.004]

'Addition of transglutaminase to cereal products may generate the epitope responsible for coeliac disease' *Trends in Food Science & Technology* Volume 16, Issue 11, November 2005, Pages 510-512, J.A. Gerrard and K.H. Sutton [http://www.agronavigator.cz/attachments/Trends_11-2005_510%E2%80%93512.pdf]

Name: **Xylanase**

Function: Makes dough more flexible, improving its machinability and giving better oven spring during baking, which results in a greater volume.

Issue: Shown to be an allergen

References: 'Allergy to Aspergillus-derived enzymes in the baking industry: identification of beta-xylosidase from *Aspergillus niger* as a new allergen (Asp n 14)' *The Journal of allergy and clinical immunology* 1998 Aug;102(2):256-64, Sander I, Raulf-Heimsoth M, Siethoff C, Lohaus C, Meyer HE, Baur X [<http://www.ncbi.nlm.nih.gov/pubmed/9723670>]

'Prevalence of sensitisation to cellulase and xylanase in bakery workers' *Occupational and Environmental Medicine* 2003; 0:802-804; J Elms, D Fishwick, J Walker, R Rawbone, P Jeffrey, P Griffin, M Gibson and A D Curran [<http://oem.bmj.com/cgi/content/abstract/60/10/802>]