

This section publishes the works presented at the scientific meetings organised by Autonomic or Regional Allergy and Clinical Immunology Societies. In this issue the Section contains the communications to the first two main subjects of the Annual Meeting of the Aragonese Society of Allergology, held in Formigal in February 1999. Papers corresponding to this Section which have been published previous by in other sections of this Journal, as well as those published in other journals, appear only as references.

Meeting Point

ANNUAL MEETING OF THE ARAGONESE SOCIETY OF ALLERGOLOGY

Third Main Subject: Occupational asthma in bakers: role of enzymes

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OCCUPATIONAL ASTHMA IN BAKERS: ROLE OF ENZYMES

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Cereals remain, even today, the main component of the human diet worldwide. From them an enormous variety of foodstuffs are derived that provide carbohydrates, proteins and group B vitamins.

Since Man first began availing himself of these grain varieties, back in the Prehistory, he also became conscious that they might cause disease, and particularly respiratory symptoms. For this reason, in ancient Rome the slaves who were employed in milling and in the bakeries used face masks for their own protection^{1,2}. The first known scientific description of baker's asthma was reported in 1713 by the "Father of Occupational Medicine", Bernardino Ramazzini³. However, the dust of cereals is not the only sensitizing agent in this context. A large number of natural contaminants and of additives that may be present in the grain itself or in the flour derived from it actually also act as sensitizing allergens able to cause disease.

Among the "natural contaminants" the following deserve mention: fungi and yeasts (*Alternaria tenuis*, *Aspergillus fumigatus*), grain weevils (*Sitophilus granarius*), and storage mites (*Acarus siro*, *Lepidoglyphus destructor*, *Glycyphagus domesticus* and *Tyrophagus putrescentiae*). These are the contaminants that are most often present in the grain, and they are the major causes of "silo worker's asthma".

A number of additives are added to wheat flour in order to improve its rheologic properties and thus improve the quality and modify the aspect of breads and pastries, fantasy pastries, etc. Furthermore, with the help of those additives the baking process is shortened and rendered more economical.

Pride of place among these additives corresponds to carbohydrate-hydrolysing enzymes, particularly the fungal α -amylase derived from *Aspergillus oryzae*⁴, but also to other glycolytic enzymes such as the cellulase and hemicellulase from *Aspergillus niger*^{5,6}.

Moreover, patients have also been reported with baker's asthma induced by non-cereal flours, which are added to the former in order to improve or modify the final product. The best-known example is soybean flour, in which the main allergenic determinants are also enzymes: soybean trypsin inhibitor (SBTI) and lipo-oxidase.

Also the flour of buckwheat or "Saracen wheat" (*Fagopyrum sculentum*), which is used in the preparation of crêpes⁸ and the flour of the vetch⁹, occasionally used by man for the preparation of a form of porridge, may induce occupational asthma.

It is quite obvious that there are many substances that are currently components of "cereal" flours that may behave as allergens. A given batch of flour will thus evidence a particular "allergenic profile" that is determined by the duration and conditions of storage of the grain it has been prepared from and also by the later manipulation and processing it will be subjected to.

Among the allergens in flour, enzymes probably represent the most interesting group, for a number of reasons. Firstly, because this group, collectively considered, is the one that most frequently induces sensitization. Secondly, because enzymes represent an allergen group with an extensive distribution and which constitutes a part in most of the known antigens.

For instance, Der p I and Der f I are glycoproteins with a molecular weight of 24,000 Da and with an amino acid sequence that is quite similar to that of papain. Der p III and Der f III are 29 kDa proteases, and group IV of the *Dermatophagoides* antigens is constituted by enzymes from the digestive tract of the mites, with molecular weights about 60 kDa.

The main allergenic fractions from the urine, salivary secretions and sweat of animals contain proteases. Acid phosphatases represent a highly important allergenic component in pollens, and phospholipases are enzymes constituting the major antigenic determinants in *Hymenoptera venoms*¹⁰.

Knowledge of the enzymes as allergens is thus fundamentally important to a better understanding of Allergology; in this context, as in so many others, research on occupational asthma has contributed "a considerable proportion of the material" to the files and archives related to this knowledge.

The decision of the Aragonese Society of Allergy to include this subject as the third Main Subject in its present Annual Meeting is thus more than amply justified.

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IMPORTANCE OF ENZYMES IN OCCUPATIONAL ASTHMA

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Introduction

Among the many known aetiological agents for occupational asthma, enzymes represent one of the most important groups.

Further to their high sensitizing power comes their increasingly striking frequency in the human environment. Further to this, their high molecular weight renders them a perfect model for studying the –IgE-mediated– hypersensitivity mechanisms involved in the pathogenesis of occupational asthma.

The known levels of sensitization prevalence among exposed subjects greatly exceed those accepted for conventional allergens. In parallel, the presence of allergic symptoms –rhinitis or asthma– among exposed and sensitized workers is also strikingly high.

On the other hand, there is at present growing interest in the study and knowledge of the enzymatic activity of common allergens inducing allergic phenomena. Some of the major allergens of mites, pollens