

<b>MEASUREMENT OF OCCUPATIONAL ALLERGEN EXPOSURE (MOCALEX)</b>
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## **Abstract**

Risks of occupational allergy to airborne protein allergens may be significantly diminished by exposure reduction and control measures. Monitoring of exposure however requires well-defined methods for airborne allergen measurement. Appearance of new allergens at the workplace - like new enzymes - and the need for short-time measurements of peak exposures require new and improved methods.

In the MOCALLEX project, methods for the quantitative assessment of occupational bio-allergens in airborne dust samples were compared and improved. Parallel airborne samples (>400 per type of allergen) were taken in bakeries, grain and soy mills, the animal feed industry, and laboratory animal facilities, using newly developed parallel sampling equipment. Samples were distributed over various extraction methods and coded extract aliquots analysed in the various laboratories with specific enzyme immunoassays (EIAs) for enzyme, wheat, soy or rodent allergens - both existing, and new 'amplified' assays with enhanced sensitivity developed during the project. Two laboratories used mono- and polyclonal antibodies from other partners to develop and evaluate alternative methods: nasal samplers for short time measurements, and 'lateral flow immunoassays' (LFIA) for rapid semi-quantitative estimation of allergen levels at the workplace.

EIA results from different laboratories measuring the same allergen showed in general strong correlations ( $r > 0.8-0.9$ ), and if the same standards were used, also high levels of agreement in absolute values. Exceptions were the assays for soy allergens, which revealed major differences between assays measuring mainly either soy hull or soy flour proteins. Presence and concentration (0.05% or 0.5%) of detergent (Tween-20) in the extraction medium was a major determinant causing 2-5-fold differences in measured concentrations, but other variations in extraction methods had little effect.

Nasal sampling was shown to be a feasible approach for short-time measurements in bakeries and rodent workers, and rapid test LFIA were successfully developed and validated for mouse, rat and enzyme (fungal  $\alpha$ -amylase) allergens. The exchange and sharing of know-how, protocols and specific anti-occupational allergen immune reagents by the participating laboratories was a major determinant of the project's achievements: a thorough evaluation of existing extraction and EIA procedures,

allowing a more validated comparison of results reported by different laboratories, and the successful development of new promising tools for highly sensitive and/or rapid allergen exposure assessment at the workplace.