2030 Environmental Survey of Occupational Exposure to Aerosolized Egg Allergens in the Egg Processing Industry. *ZL Lummus, M Boeniger,* R Biagini,* M Massoudi* and DI Bernstein.* University of Cincinnati College of Medicine and *The National Institute for Occupational Safety and Health, Centers for Disease Control, Cincinnati, Ohio.

Inhaled proteins are occupational allergens that cause IgE-mediated occupational asthma (OA) in egg production workers (Ws). Raw and processed egg particles become airborne during processing. To evaluate occupational ambient exposure to aerosolized egg, we analyzed the quantity and worksite distribution of total protein and specific egg white allergens; ovalbumin (OVA), ovomucoid (OVOM), & egg lyzozyme (LYS), at a facility with 95 exposed Ws. Aerosol exposures were monitored using 37-mm closed-face cassettes with polycthylene-supported Teflon™ filters and personal sampling pumps, with air flow of 2 l/min., for an 8-hour shift.

Filter protein was eluted in PBS, .05% Tween 20, pH 7.4. BCA tests (Pierce) were used to measure total protein; specific allergens were measured by competitive inhibition and sandwich EIAs.

	Mean Exposure (μg/m³)			
Job/Department	Total Protein	OVA	OVOM	LYS
transfer	644	774	96	8
breaking	255	307	26	26
pasteurization	32	47	8	26
dryer	91	102	8	8
egg white packaging	426	213	12	0.4

In stationary paired samples, the mean respirable/total protein ratio was 322/607 μg/m³. A control referent plant showed a maximum of 41 μg/m³ protein with no detectable specific egg protein. The results indicate that OVA, which comprises 54% of egg protein was the predominant airborne antigen. Air sampling for egg protein can be useful to identify those locations where workers are exposed to high concentrations and where additional controls might be implemented.

2031 Characterization of Psyllium Allergens. *MS Morgan, LG Arlian, TN Asquith*, J Deyo*, AM Fieno*, RA Grant*.* Wright State Univ, Dayton, OH and the *Proctor & Gamble Co, Cincinnati, OH.

Previous studies demonstrated that allergens present in psyllium husk preparations were due to contaminating proteins in psyllium seed components. Pure husk (>99%) has little or no detectable protein. The purpose of this study was to biochemically characterize allergens present in psyllium.

SDS-PAGE/immunoblot analysis of husk extract (95%) revealed 6 allergen bands of 10 to 40 kD all of which were also visible in extracts of psyllium seed embryo and/or endosperm. Treatment of these extracts with various glycosidases did not alter the binding pattern of antisera to the proteins. 2-D PAGE/blots revealed 2 strings of allergens of similar MW (at 20 and 30 kD) but differing pI. Most allergens had pIs >7 and there were no allergens present in husk that were not also present in psyllium seed components.

A particularly prominent allergen of about 32 kD and an apparent pI of 8.0 was isolated for analysis using preparative IEF followed by SDS-PAGE and electrophoretic transfer to fluorotrans PVDF membrane. The protein was blocked at the N-terminal amino acid. Its amino acid composition was aligned to seed storage proteins via database searches on the ExPASy site on the world wide web. Based on amino acid composition, MW, pI and tissue localization, the 32 kD psyllium allergen was tentatively identified as a seed storage protein.

The results of this study indicate that a major allergen in psyllium is a contaminating protein from the seed with biochemical similarity to other known plant seed proteins.

2032 Protease Enzymes Enhance Allergic Responses to Other Proteins in a Guinea Pig Model of Allergy: Effect of Kinetics and Route of Exposure. *K Sarlo and ER Fletcher* The Procter and Gamble Company, Cincinnati, Ohio USA

A guinea pig intratracheal (IT) test was developed to assess the relative allergenic potential of enzymes used in the detergent industry. Mixtures of different enzymes were evaluated to determine if allergic responses to the mixture were different than responses to single enzymes. We previously showed that allergic antibody (AB) titers to non-proteolytic enzymes were enhanced by protease enzyme. In the current studies, animals were IT exposed to a lipase with active and inactive protease. AB titers to the lipase were enhanced in the presence of the active enzyme but not affected by the inactive enzyme. Animals were IT exposed to protease enzyme followed by a non-protease enzyme at 0, 0.5, 2 and 24 hours post-protease exposure 1x/week for 10 weeks. Sera were collected and AB to the non-protease measured by ELISA. AB titers to the non-protease were enhanced in animals exposed at time = 0 and 0.5 hours post-protease exposure; little or no enhancement was obtained in animals exposed at time = 2 and 24 hours post-protease exposure. Route of exposure was examined by using intradermal (ID) or intraperitoneal (IP) injection of a protease + non-protease mixture over a period of 4 weeks followed by serology after the last injection. There was no enhancement of AB response to the non-protease in the mixture following IP injection. There was marginal enhancement of AB titer to the non-protease following ID injection. Unlike IT exposure, these responses were difficult to reproduce. The data show that enhancement of AB responses to non-protease were dependent upon protease activity, near simultaneous exposure with the protease and was optimal for the respiratory tract. Proteases may enhance AB responses to proteins by 1) affecting permeability of the mucosal surface allowing greater access to immune tissue or 2) partial digestion of the protein to create antigenic peptides which may lead to a more robust immune response.