

## 247 Reduction of Indoor Aeroallergen and Overall Particle Count Using AHPCO and Plasma Hybrid Technology for Air Purification



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**RATIONALE:** The allergy and asthma cases have doubled since 2007. We have analyzed the aeroallergen data of the Texas Panhandle using a Burkard Spore Trap for 17 years that showed a steady increase in aeroallergen counts. We developed an air purification system implementing a hybrid AHPCO or Advanced Hydrated Photocatalytic Oxidation and Plasma Nanotechnology that can reduce the indoor aeroallergens efficiently.

**METHODS:** Using the Burkard Spore Trap, Digital, Fluorescence and Scanning Electron Microscopy we analyzed the aeroallergen data for 17 years. We developed and assessed AHPCO and Plasma Nanotechnology to improve the filter-less air purification system further for net reduction of indoor aeroallergens. Particle counts were recorded to assess the capacity of sterilization. In a fiberglass chamber we used a Dyllos Air Quality Monitor to detect and compare the particle counts on running the air purifier for 24, 48, 72 and 120 hours of exposures.

**RESULTS:** A shift in flowering seasons and increased aeroallergen indices in Texas Panhandle, all resulted in increased allergy and asthma cases. The air purification system with novel AHPCO and Plasma technology reduced the indoor particulate matters gradually with varied time interval.

**CONCLUSIONS:** The incidence of allergy among the residents of Texas Panhandle is just doubled to the rate of the State of Texas. Strong wind current, local feedlots, a gradual shift in flowering season contributed to a high incidence of allergy and asthma. We implemented an air purification system using a hybrid AHPCO and Plasma Nanotechnology that reduced the indoor particulate matters including all forms of aeroallergen.

## 248 Is There a Time-Dependent Association Between Cat Dander Sampling Time and Feld1 Levels?



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**RATIONALE:** Live cats in a challenge chamber generate Feld1 levels that cause symptoms in allergic subjects. However, Feld1 levels can vary over time and the delay in completing the Feld1 ELISA assay means that actual allergen levels are only known after the fact. Our purpose is to determine whether it is possible to assess cat dander levels using light microscopy and correlate these levels to Feld1 measured by ELISA. This would allow more rapid measurements and tighter control on allergen levels.

**METHODS:** Cat dander was collected using three sampling pumps with Millipore glass fiber filters. Two filters were stained with 1:1 Parker's ink / saline and examined at 20x magnification using a light microscope. Filters were divided into 4 virtual quadrants and 1, 2, or 3 random fields per quadrant were counted. To differentiate from other particulate matter, translucent irregularly shaped particles between 5-20  $\mu$ m were considered as dander and counted. Feld1 on the third filter was measured by ELISA. Samples were obtained after 15, 30, 45 and 60 minutes.

**RESULTS:** There was no time dependent or spacial relationship observed between sampling time (15 vs 60 min) and Feld1 (2.38ng, 1.05ng, respectively) or dander levels counting 1 field per quadrant (5425, 9657 particles/filter, respectively) or 3 fields per quadrant (8491, 9928 particles/filter, respectively).

**CONCLUSIONS:** Staining with Parker's ink did not prove to be a successful method to accurately count regardless of the number of fields

counted. Further testing will be conducted in hopes to improve dander staining and counting.

## 249 Tree Pollen Levels during Two "Very Strong" El Niño Events



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**RATIONALE:** We anticipated that the very strong el Niño of 2016 would be a factor in boosting local tree pollen levels as recorded during el Niño1998.

**METHODS:** Daily 24 hour Burkard spore trap samples from mid-March to mid-June of 1998 to 2016 were analyzed for tree pollen content. Meteorological factors were examined to explain the large difference between the 1998 & 2016 tree pollen counts.

**RESULTS:** (1) Total tree pollen levels in 1998 were the highest recorded in SW Ontario, while the 2016 levels were the lowest. (2) We did not find a correlation between weather factors (rainfall & growing degree days) and the two "very strong" El Niño events. (3) Local tree pollen levels have dropped substantially after a peak in 2010.

**CONCLUSIONS:** El Niño is a recurring global climatic phenomenon resulting from changes in oceanic surface temperatures that affect weather. Very strong El Niño events occur approximately every 15-20 years. In 1998, local pollen production was elevated for almost all the deciduous trees with very high levels of Juniper/Cedar. The literature indicates that annual pollen production is primed by precipitation in the previous year and the season is initiated by temperature (growing degree days). We found such relationships inconsistent and did not explain the two El Niño "seasons" or the recent drop-off in recorded tree pollen production.

## 250 Pneumococcal Vaccination Coverage Among Adults with Work-Related Asthma, Asthma Call-Back Survey, 29 States, 2012-2013



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**RATIONALE:** Pneumococcal vaccination is recommended for all adults with asthma and a Healthy People 2020 goal aims to increase coverage among adults with asthma to 60%. Adults with work-related asthma (WRA) have more severe disease than those with non-WRA and would likely benefit from receiving a pneumococcal vaccine. This study aimed to assess pneumococcal vaccination coverage and identify groups who were less likely to have received a pneumococcal vaccine among ever-employed adults with WRA.

**METHODS:** Data from 2012-2013 Behavioral Risk Factor Surveillance System Asthma Call-back Survey for ever-employed adults (18-64 years) with current asthma from 29 states were assessed. Adults with WRA had ever been told by a physician their asthma was work-related. Pneumococcal vaccine recipients had ever received a pneumococcal vaccine. Logistic regression was used to calculate adjusted prevalence ratios (PR) and associated 95% confidence intervals (CIs).

**RESULTS:** Among an estimated 12 million ever-employed adults with current asthma in 29 states, 42.0% received a pneumococcal vaccine. Pneumococcal vaccination coverage among adults with WRA was 53.7% compared with 35.0% for adults with non-WRA (PR=1.36, 95% CI=1.17-1.58). Among adults with WRA, coverage was <45% for those 18-44 years (41.8%), Hispanics (36.2%), uninsured (38.5%) and differed significantly across age, employment status, health insurance status, asthma control, and a history of routine checkup for asthma in the last year.

**CONCLUSIONS:** Pneumococcal vaccination coverage among adults with WRA and non-WRA is below the Healthy People 2020 target level. These results can help target successful vaccination interventions to certain adults with asthma to improve coverage.