Title: Dairy Nasal Lavage and Exposure Data

Abstract: Livestock workers experience an increased burden of bioaerosol-induced respiratory disease including high prevalence of rhinosinusitis. Dairy operations generate bioaerosols spanning the inhalable size fraction (0-100 µm) containing bacterial constituents such as endotoxin. Particles with an aerodynamic diameter between 10-100 µm are known to deposit in the nasopharyngeal region and likely affect the upper respiratory tract. We evaluated the effectiveness of a hypertonic saline nasal lavage in reducing inflammatory responses in dairy workers from a high-volume dairy operation. Inhalable personal breathing zone samples and pre-/post-shift nasal lavage samples from each participant over five consecutive days were collected. The treatment group (n=5) received hypertonic saline while the control group (n=5) received normotonic saline. Personal breathing zone samples were analyzed for particulate concentrations and endotoxin using gravimetric and enzymatic methods, respectively. Pro- and anti-inflammatory cytokines (i.e., IL-8, IL-10, and TNF-α) were measured from nasal lavage samples using a multiplex assay. Inhalable dust concentrations ranged from 0.15 to 1.9 mg/m3. Concentrations of both pro- and anti-inflammatory cytokines, specifically IL-6, IL-8, and IL-10, were significantly higher in the treatment group compared to the control group ($p < 0.02$, $p < 0.04$, and $p < 0.01$ respectively). Further analysis of IL-10 anti-inflammatory indicates a positive association between hypertonic saline administration and IL-10 production. This pilot study demonstrates that hypertonic saline nasal lavages were successful in upregulating anti-inflammatory cytokines to support larger interventional studies.

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Format of data file: CSV

Location where data were collected – A north Texas dairy

Time period during which data were collected - 2017-05-22 through 2017-05-29

File Information – Repository data.csv (Raw unanalyzed data)

- This data is Dairy worker nasal inflammatory cytokine concentrations and dust/endotoxin exposure concentrations.
    - IL stands for interleukin
    - Cytokine units are pico grams per milliliter.
- Variable definitions:
    - Treatment (1=received hypertonic nasal saline rinse/2=received control normotonic nasal saline rinse)
    - Date – Month- day- year

- mg/m3 - Dust units (milligrams per meter cubed)
- EU/m3 - Endotoxin units (endotoxin units per meter cubed)
- IFNG – Interferon Gamma
- IL10 – Interleukin 10
- L12A – Interleukin 12A
- IL13 – Interleukin 13
- IL1B – Interleukin 1B
- IL2 – Interleukin 2
- IL4 – Interleukin 4
- IL6 – Interleukin 6
- IL8 – Interleukin 8
- TNF – Tumor necrosis factor alpha

Methods

Data was collected by catching nasal rinses in container and analyzing for inflammatory markers. Exposure data was collected by gravimetric analysis and fluorescent endotoxin assay.

Endotoxin and cytokines of known concentration used for standards.

Gen5 spectrophotometer software and multiplex software was used for endotoxin and cytokine analysis respectively.

Double data entry and lab and field blanks used for QC/QA

Date dataset was last modified - 2021