

# Allergen Environmental Dust Cross Contamination Test Method



## Background

In the food processing environment with multiple lines and formulations present in the same facility, there is potential for allergen cross contamination into food products not formulated with or labeled for allergens. In the past this has been an area left to the interpretation and opinions of the observer based on visual assessments rather than using science based data. The available allergen test methodology offers the industry the ability to use test methods to collect science based data for environmental allergen dust risk assessments as defined in this document.

## Method

The approach used in the risk assessment test method is to scientifically measure the allergen dust generated by a process and the impact to an adjacent open process, exposed contact surface, or tools which if exposed, could allow allergens to be incorporated into a product not formulated with that allergen.

## Tools needed

Disposable Polystyrene Petri Dish 3.5 inches.  
Paper towels  
Digital Camera  
Whirlpak bag  
A watch to measure time

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## Procedure

### Preparation:

Once an area or a process is identified as a possible area where cross contamination could occur, create a diagram of the area. This should identify items and details which could impact or influence movement of dust to an at risk area. List items such as:

- Source of dust (dough mixer)
- Height of source from floor (3 feet)
- Allergen of concern (flour - wheat)
- Distance to at risk area (16 feet)
- Air flows (infeed or exhaust) (exhaust)
- At risk area (open conveyor)
- Exposure time (conveyor moving at 20 feet / minute full of product) or only when equipment is open)
- Others if appropriate.

### Procedure:

- Given conditions identified, select an area or areas with potential for allergen dust to be generated. (Photograph area for risk assessment file)
- In a normal situation identify areas of concern where a sample collection petri dish can be placed. For example – directly adjacent to a line considered to be the allergen receiving line. The line or area generating the potential allergen dust would be considered the allergen generating line.
- Once the collection spot is identified petri dish should be placed at the height as the exposed product on the allergen receiving line. Place the collection dishes on a dust free surface or on a paper towel.
- Label (time, allergen of concern, line) the petri dish and place it using aseptic like techniques and remove cover of the dish. Place the cover of the dish in a whirlpak bag to eliminate possibility of it collecting dust.
- The dish should be left in place for 90 minutes.
- Take a photograph of the dish.
- When the 90 minutes has elapsed, place the lid of the dish from the whirlpak bag on the collection dish and insert into a whirlpak bag.
- If there is any visible dust residue, the bag should be sent to a lab for analysis to determine if the dust collected contained the allergen of concern.
- If the petri dish is free of dust, capture a picture of the dish to document results.

If no dust was obvious in the petri dishes place the documentation in HACCP file as a risk assessment. In this case the results from the risk assessment indicate that product or the area in question (adjacent to an allergen producing line) is not a risk for cross contamination from the adjacent line or process during normal operation.

If dust is present send the sample to the FARRP lab for analysis. If a positive test result is received from the lab, insert the information into the formulas within this document to complete the mathematical calculation to product as reported in PPM. .

*Note: This is not a measurement for dust that collects on overheads. These need to be cleaned to assure that they will not become a contamination point.*

## Calculations

Actual in plant testing was completed and these formulas developed based on the situation. The first was a continuous process on a production line with multiple contamination points. In this case each point was measured. The second situation was a batch process where dust was measured in a mixing environment.

### Scenario: Continuous Processing

- A petri dish is placed near the non-allergen conveyor belt
- Allergen dust is collected for 't' 90 minutes
- Enumerated in ppm/mL
- Incorporate dilution factor to get allergens in the petridish as 'A' mg
- Fill a container, which has the same cross sectional area as petri dish, with the food product in the conveyor belt to the same depth that was in the conveyor belt.
- Weigh the product in the container as , 'm' in grams.
- Determine the residence time of the product in the open area of the conveyor belt, 'Rt' in minutes
- Allergen conc. in the product, C, ppm

$$C = \frac{AR_t}{mt}$$

### Scenario: Batch Scale Processing

- A petri dish is placed near the non-allergen bin
- Allergen dust is collected for 't' 90 minutes
- Enumerated in ppm/mL
- Incorporate dilution factor to get allergens in the petri dish as 'A' mg
- Area of petri dish in sq inches, PArea that is exposed to allergens = Ea, in sq. inches
- Time of Exposure = Et in minutes
- Amount of non-allergen food in the bin that is exposed to allergens in grams, 'm'
- Allergen conc. in the product, C, ppm

$$C = \frac{AE_t E_A}{tmP_A}$$