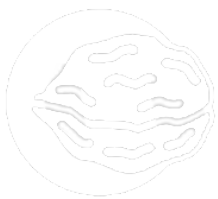


Critical allergens in the dairy sector and how they can be detected



HELLE MADSEN
FOOD DIAGNOSTICS



The Seven Principles of HACCP

- 1) Conduct a hazard analysis
- 2) Determine the Critical Control Points (CCPs)
- 3) Establish critical limits
- 4) Establish a system to monitor control of the CCPs
- 5) Establish corrective actions
- 6) Establish verification procedures
- 7) Establish recordkeeping procedures



Prerequisite Programs

- Sanitary design: equipment/facility
- Personnel hygiene practices
- Sanitation of equipment/facility
- Preventive maintenance
- Training of employees



Have an Allergen management program in place

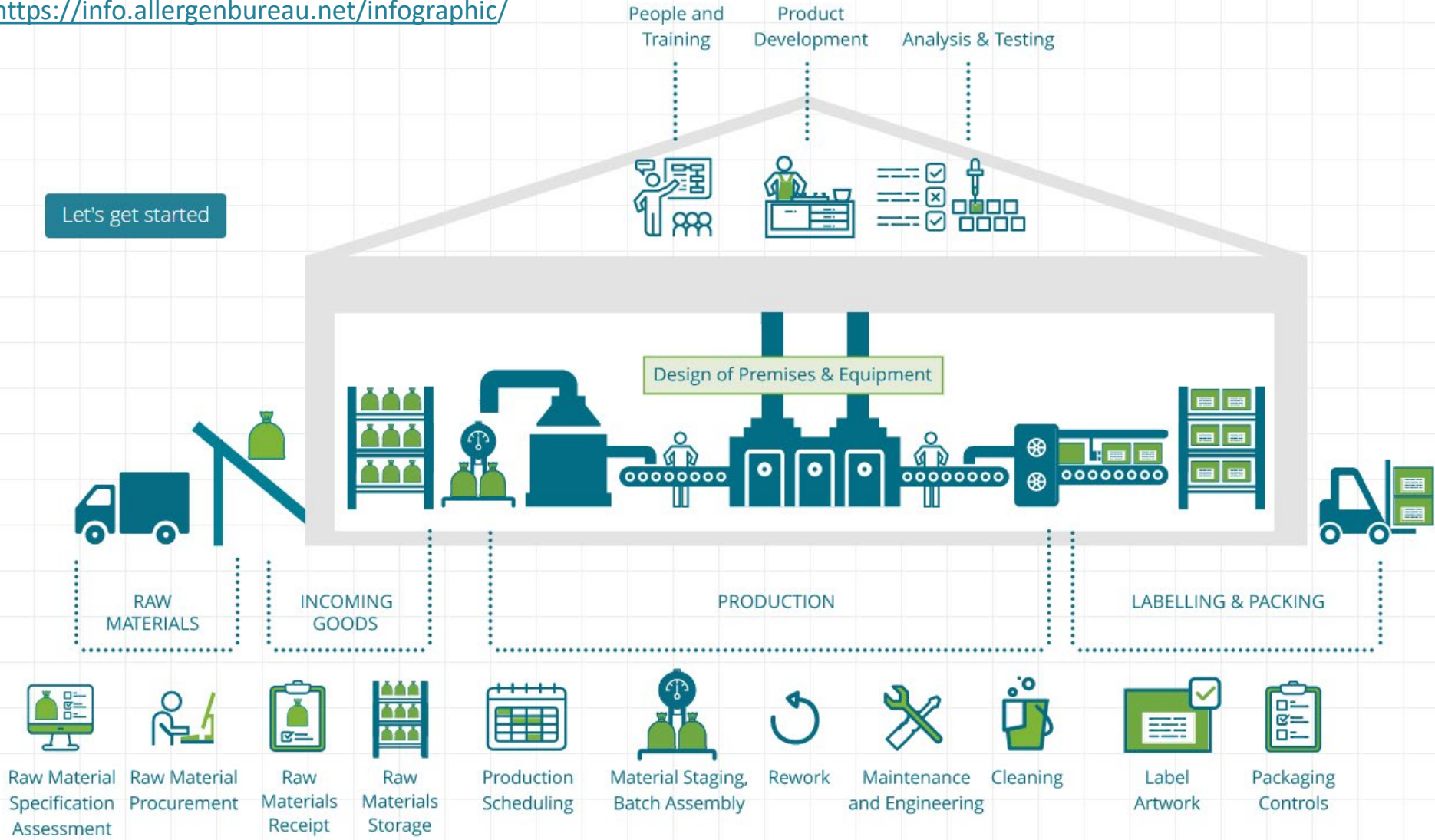
An **Allergen Management Program (AMP)** is a documented systematic approach towards identifying and controlling allergens in a food facility. It is applicable to all levels and all areas of a food company and sets the approach to the control and management of allergens.

An **allergen risk review** can assist in identifying areas that need to be included while developing an AMP or when updating one that is already in place. An allergen risk review requires the support of many parts of the business including management. It should be repeated regularly (such as when HACCP reviews are conducted) as well as after any changes to staff, suppliers, equipment, materials, scheduling, recipes, sites etc. and the AMP should be updated accordingly.



<https://info.allergenbureau.net/infographic/>

Let's get started



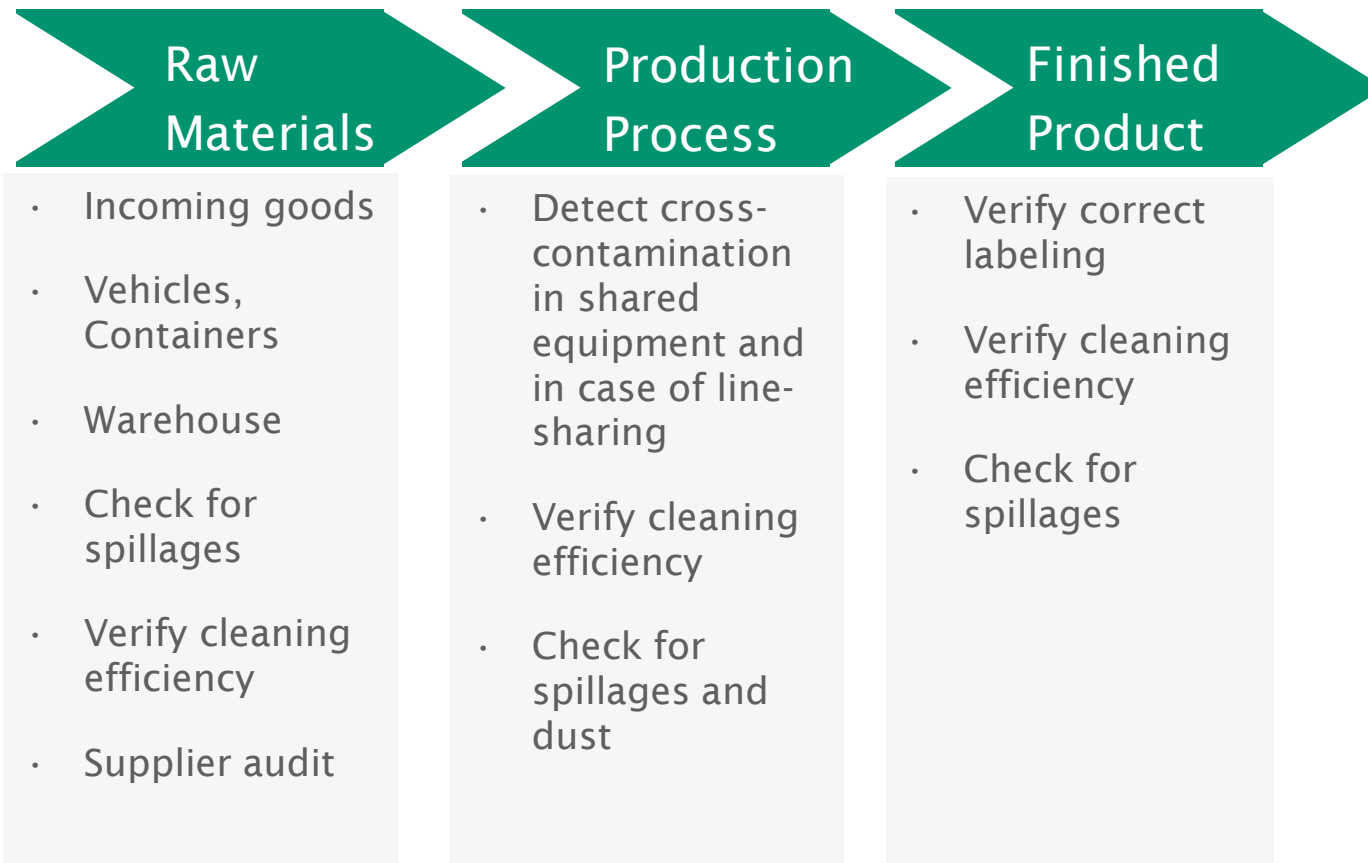
HACCP – Critical control procedures for allergen control

Food industry → areas to test for allergens

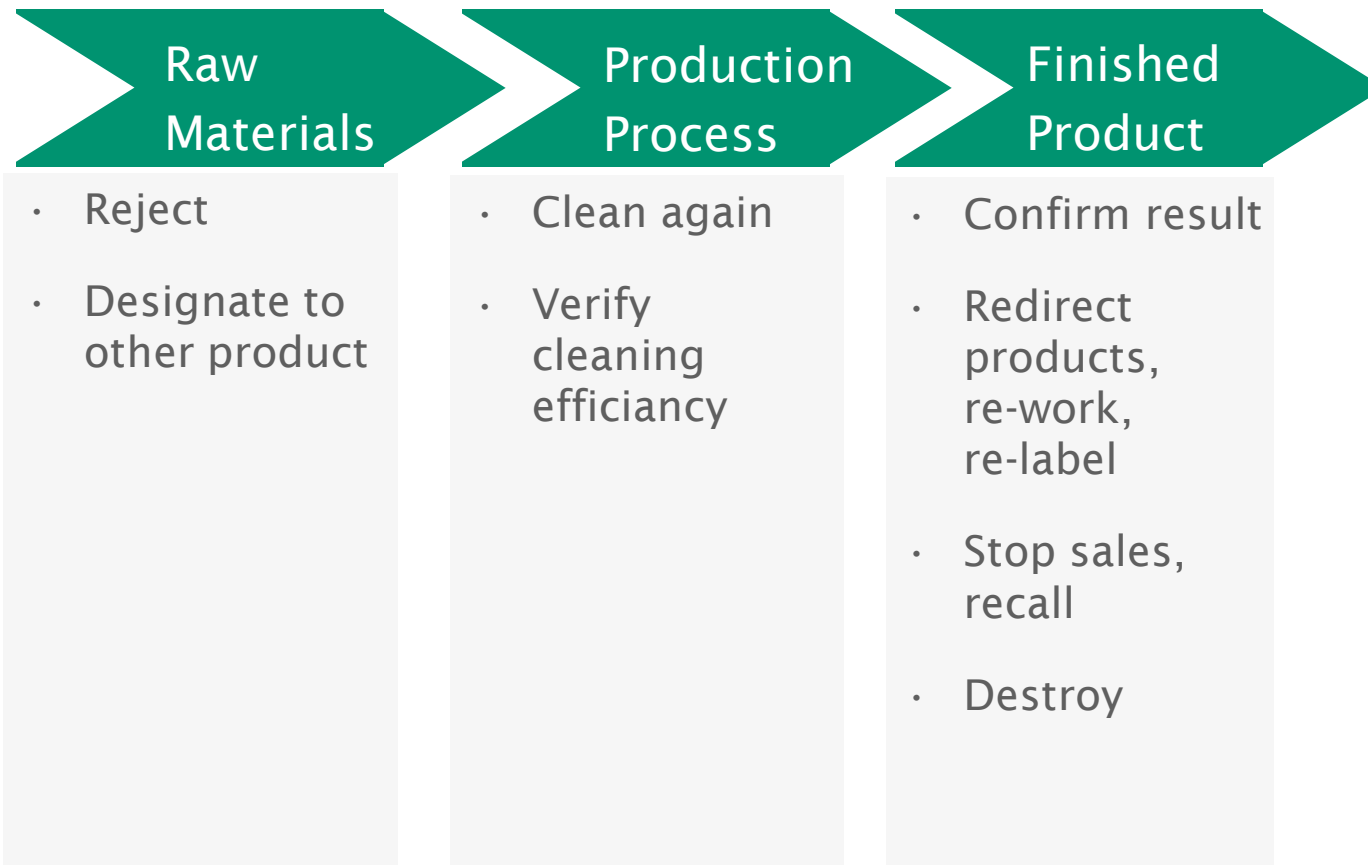


HACCP – Critical control procedures for allergen control

Food industry → areas to test for allergens



What to do with a positive result? (From an industry perspective)



How to test

- Audit/Certificates: suppliers
- Cleaning control: production and storage, equipment, instruments, tools, transport
- (Allergen) swab test: production and storage, equipment, instruments, tools, transport
- ELISA: ingredients, semi-finished products, finished products
- PCR: ingredients, semi-finished products, finished products
- Enzymatic: ingredients, semi-finished products, finished products
- Certified lab.: ingredients, finished products



Test Systems

- **Lateral Flow Device** (dip stick)
Qualitative, detects proteins
- **ELISA**
Quantitative, detects proteins
- **PCR**
Qualitative/quantitative, detects DNA
- **Enzymatic**
Quantitative, detects sugars, acids and others



PRØVEUDTAGNING

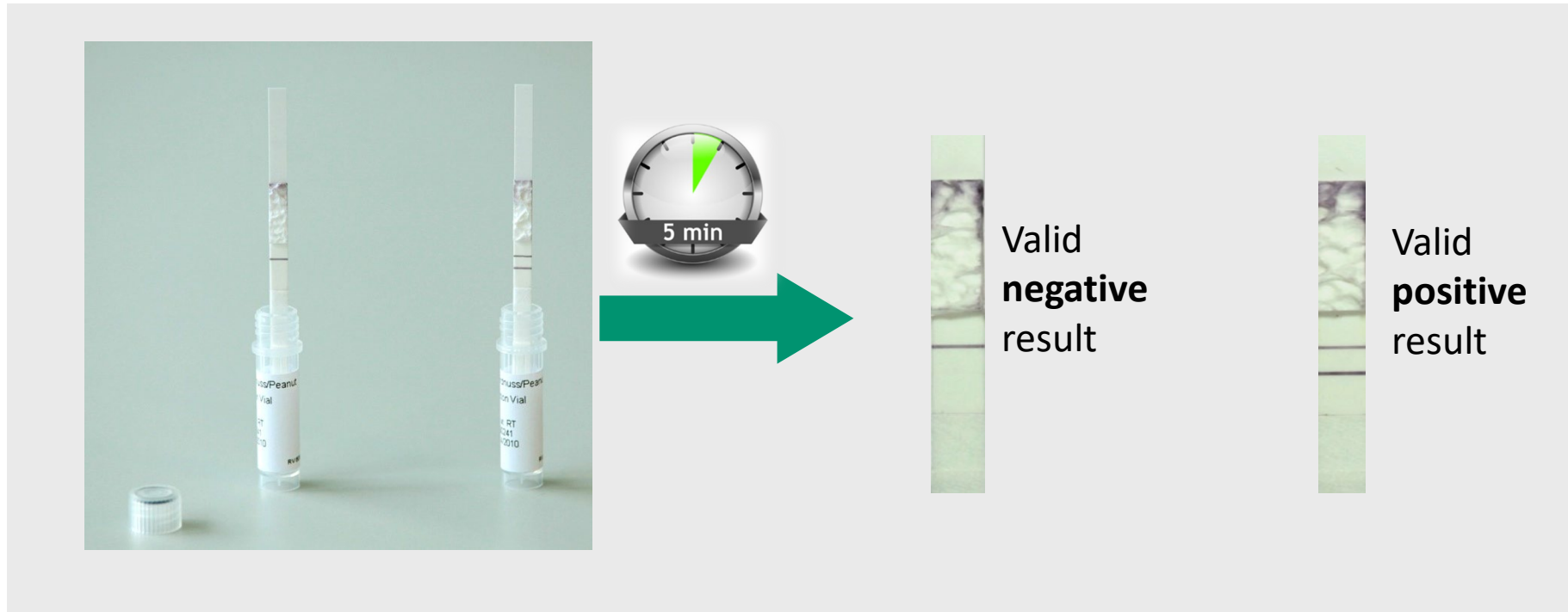
Garbage in, Garbage out!



Lateral Flow Device



Lateral Flow Device - Results



Lateral Flow Device



- Detects proteins, e.g. allergens, by means of specific antibodies
- On site use possible
- Swabbing procedures available



- For easy matrices only
- No quantification

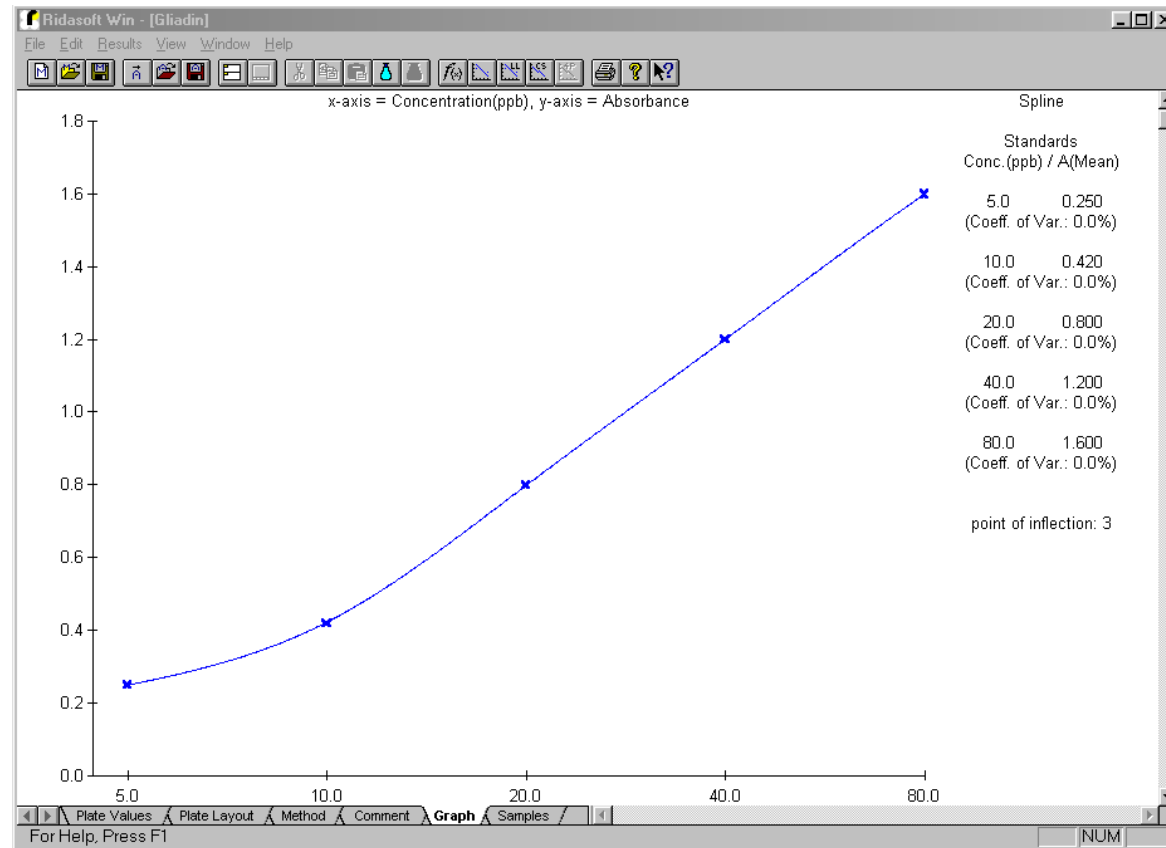
ELISA – Sample Extraction



ELISA – TEST Implementation



ELISA – Calculate Results



ELISA



- Detects proteins, e.g. allergens, by means of specific antibodies
- Established technology
- Quantitative method



- Sensitive to matrix interference
- Comparison (calibration) difficult

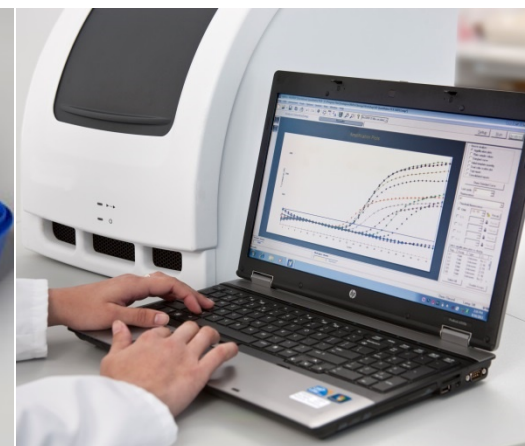
Real-Time PCR



PREP kit



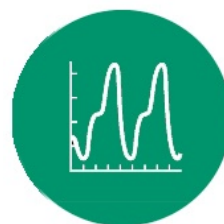
Allergen kit



PCR Cycler



1. DNA-Preparation



2. Amplification + Detection



3. Results

PCR



- Amplification by method
- DNA is very stable
- More than one allergen at a time



- No allergen detection
- Less sensitive in certain cases

Enzymatic – RIDA Cube

For non-protein allergens:
Lactose and sulfite



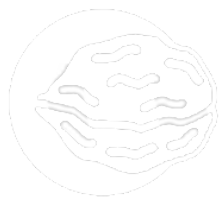
Enzymatic



- Detects sugars, acids and other
- On site use possible
- Quantitative method



- Mostly for easy matrices
- Comparison (calibration) difficult



Thank you!

HELLE MADSEN

FOOD DIAGNOSTICS

helle@fooddiagnostics.dk

