

Trend watching of microbiological results in the agro-food processing chain

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Symposium ‘Wat kunnen Nederlanders leren van de Belgen?’

Tuesday 26 February 2019

ILVO



training & control in food safety



Introduction

In agro-food processing chain and in production process trend watching of microbiological and chemical analytical results

→ important tool to optimise internal quality management

detecting and identifying problems

quality and safety improvement

Trend watching



Trend analysis: mathematical analysis of data series to detect statistically significant changes over time

Trend observation: data series are observed to discover visually possible evolutions

(based on EFSA 2010)

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Materials and methods

Visiting a dozen companies in the agro-food processing chain
→ Examples throughout the chain

Trend watching of esp. microbiological analytical results

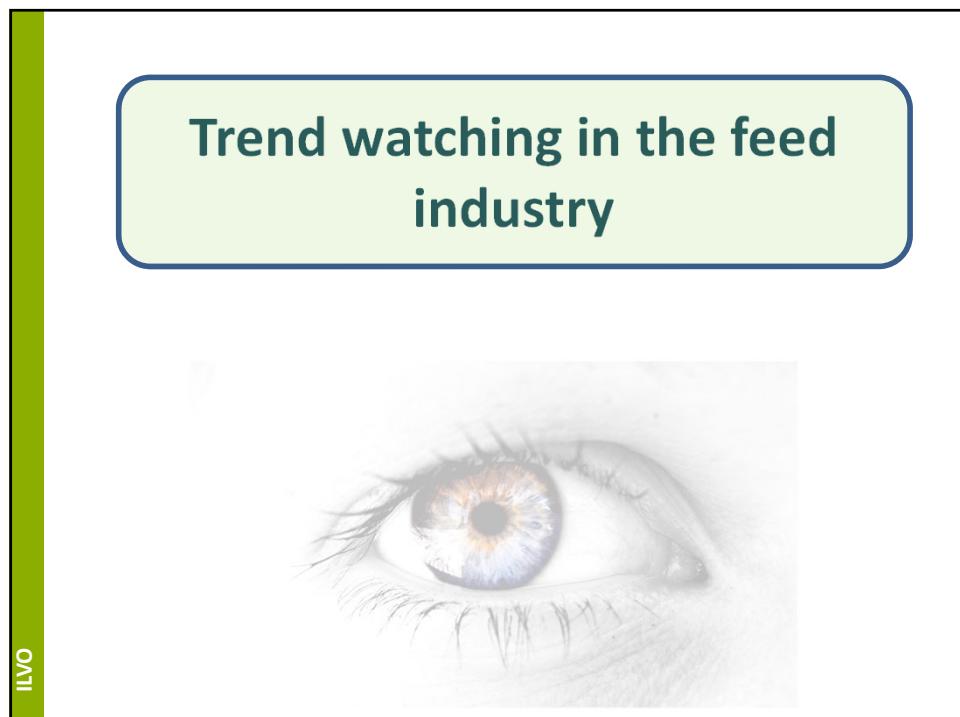
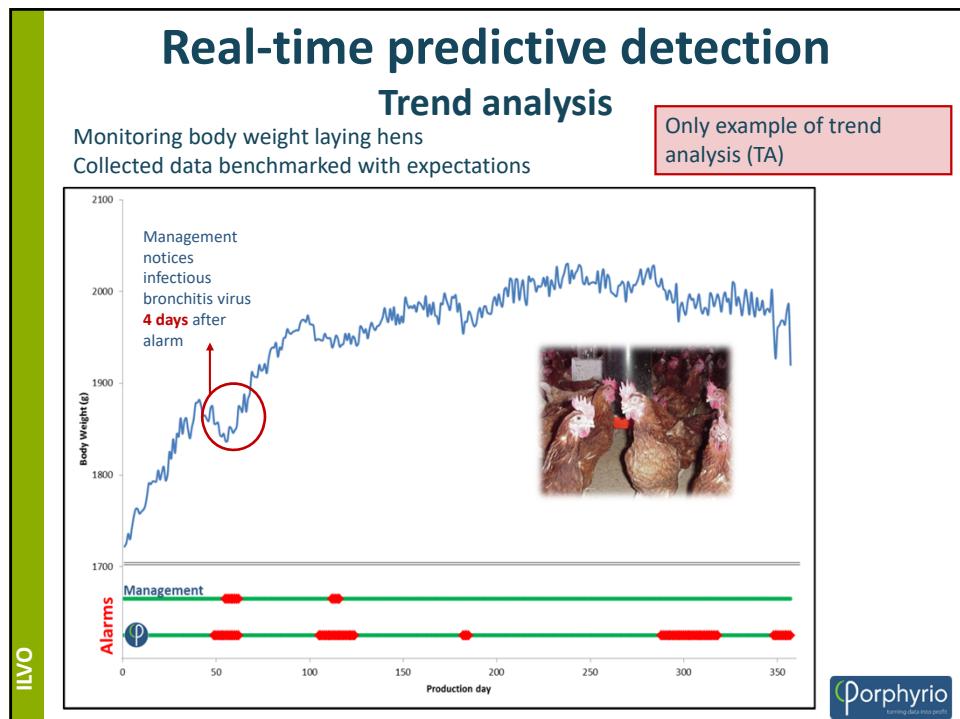
Trend watching examples detecting notable situations

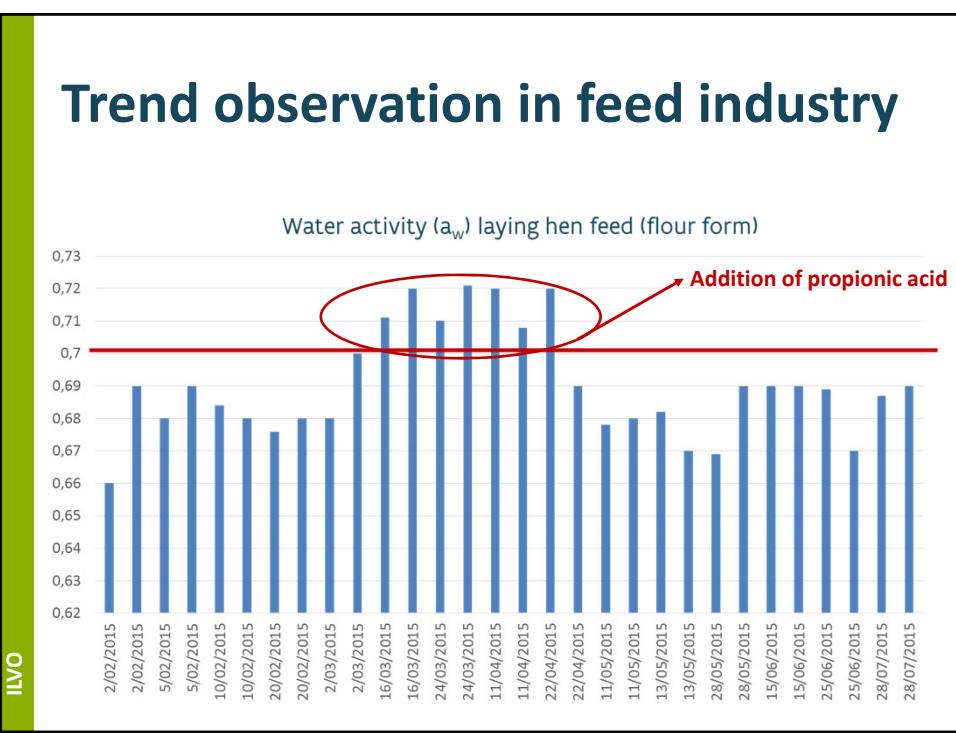
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Trend watching in the primary production



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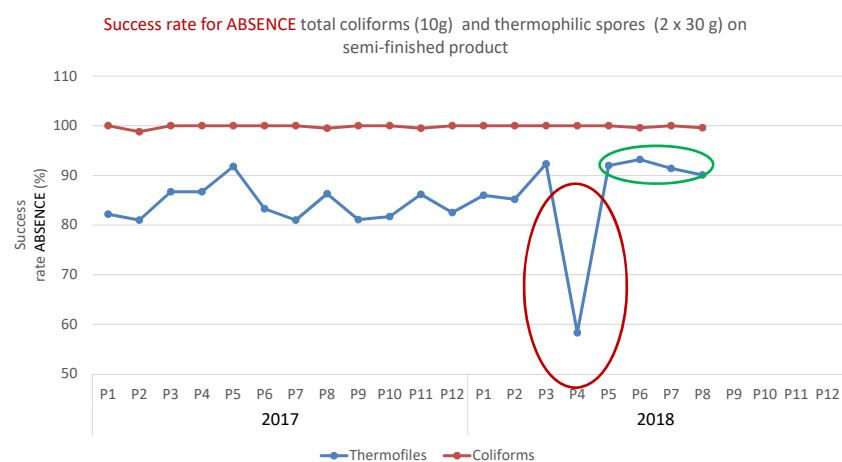




Heat treated semi-finished product in the ingredient industry

- Confectionary applications, stabilizers, emulsifiers, coating agent in dragees, ...
- High heat treatment followed by pumping, concentration, filtration, drying, ... → **semi-finished product**
- After this process, each batch control on **ABSENCE** of:
 - Thermophilic spores (forming bacteria)
 - *Enterobacteriaceae*
 - *E. coli*
 - Coliforms

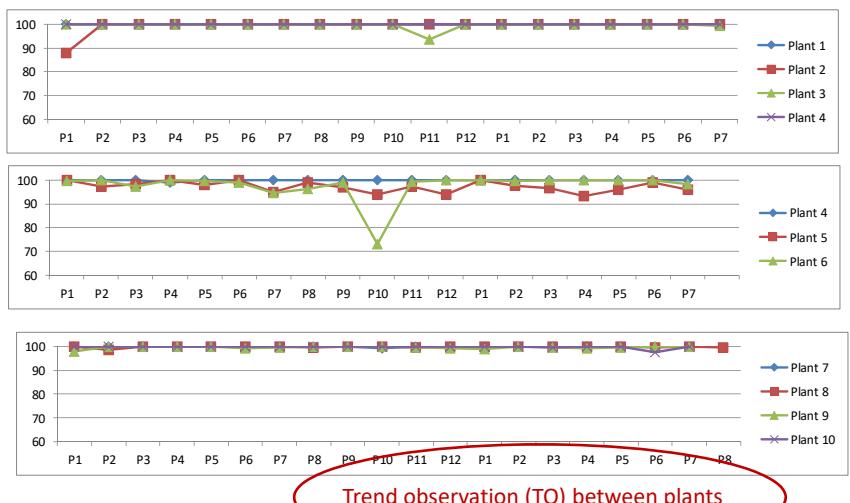
Heat treated semi-finished product in the ingredient industry



Investigation in April 2018: Possible contamination source after heat treatment?
→ Insufficient cleaning and disinfection (CIP) of a newly and other type of pump

Trend observation between plants

Success rate **ABSENCE** coliforms on a semi-finished product per plant
2017-2018



Trend observation in egg product industry

- Small middle sized enterprise
- Pasteurized liquid egg products (end prod.)
- Containers – Food industry (e.g. 1000l)
Aseptic filling
- Microbiology: E.g. Total aerobic flora
 - Target value < 1000 cfu/g (=spec)

< 1000 cfu/g	From 1000 - 10.000 cfu/g	>10.000 cfu/g
Target	Less than 10% batches per month	Unacceptable

Trend observation in egg product industry

Microbiology							Action undertaken + follow up next months		
		Percentage of samples in each product group above the spec max <10% (from 1.000 – 10.000 cfu/ml)					KPI		
above spec		2017	2018	Dec	Jan	Feb	March	April	May
g Y salt 10%	0	1	0	0				4,58	0,5
g Y salt 11%	0	0,6	0	0				4,43	2,2
g Y salt 9%	0	-	0	0				0	0
g Y salt 7%	0	0	0	0				0	0
g Y	0	0	0	0				0	0
g Y LTHT	0	0	0	0				0	0
g W	0	0,2	0	0				0	0,7
g W LTHT	0	10	0	0				0	0
g W salt 10%	0	0	-	0				0	0
g EW	0	4,1	0	0				0	0
g EW LTHT	0	0	0	0				0	0
g Scrambled eggs	0	0	0	0				0	0
g RM seasoned	0	0	0	0				0	0

Trend watching in the food industry

- a) On ingredients and end products
- b) Environmental sampling after C&D (including equipment)



Trend observation on purchased pasteurized milk by a dairy company

Artikelgroep : Tank samples
Methode : Total aerobic flora @ 37°C



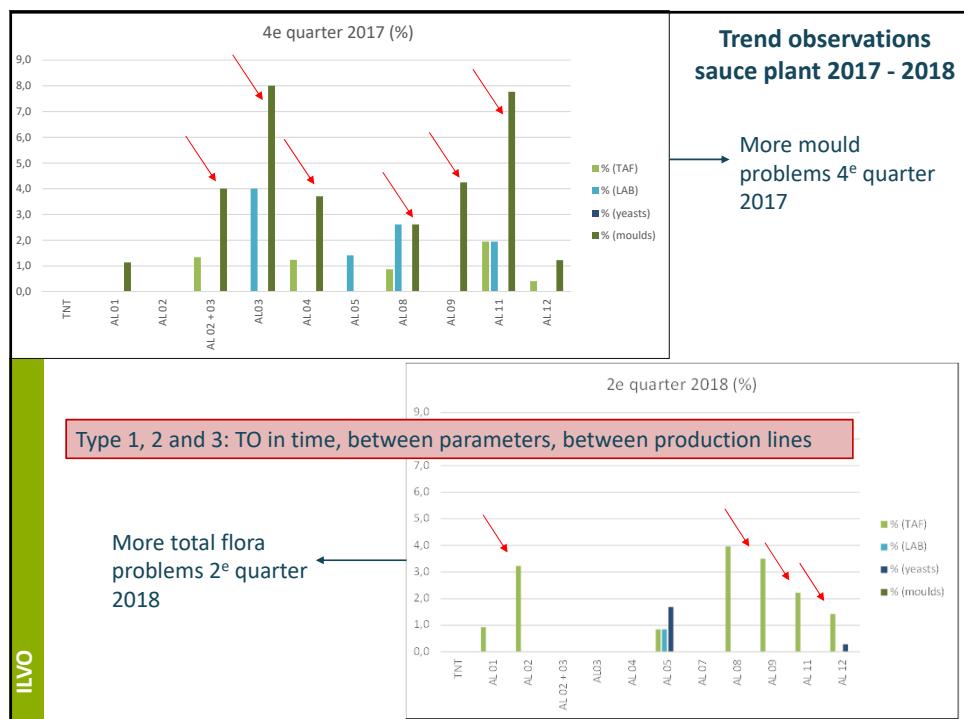
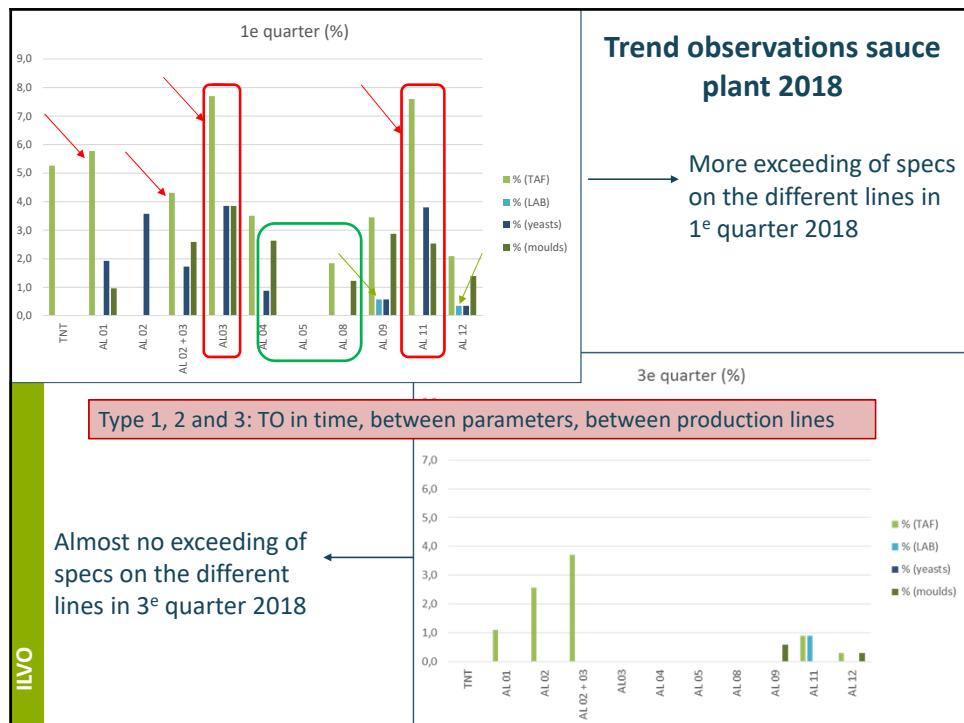
Number of analysis per month:

01/14	02/14	03/14	04/14	05/14	06/14	07/14	08/14	09/14	10/14	11/14	12/14
26	22	24	22	20	22	22	17	27	25	17	24

(example delivered by Lavetan)

Microbiological quality parameters in a sauce producing plant

- 14 sauce types randomly produced on 11 different production lines
- Self-checking system: each batch microbiology
- Specifications (specs) on end products:
 - Total aerobic flora (TAF): $\leq 1000 \text{ cfu/g}$
 - Lactic acid bacteria (LAB): $\leq 10 \text{ cfu/g}$
 - Yeast: $\leq 100 \text{ cfu/g}$
 - Moulds: $\leq 100 \text{ cfu/g}$
- The trend observations in % batches exceeding specifications using graphical representations



Microbiological trend observation per product (=sauce) type

Trend watching per product type

Filling line	Recipe		Exceeding of specs				
	75	76	141	182	208	211	212
TNT							
AL 01			4				
AL 02							
AL 02 + 03	1		5				
AL03		1			1		
AL 04			3				
AL 05							
AL 08							
AL 09							
AL 11					3	2	2
AL 12							
totaal		1	12	1	3	2	2

Type 4: TO on product type
(cause: ingredient)

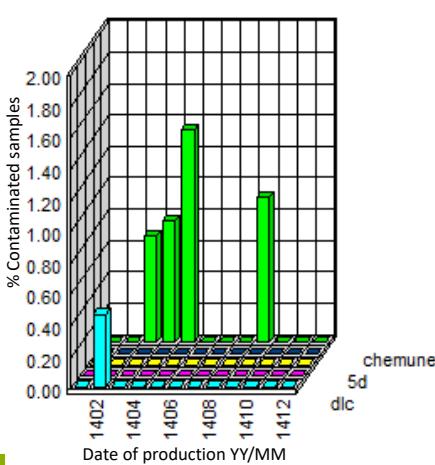
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Trend observations in dairy industry

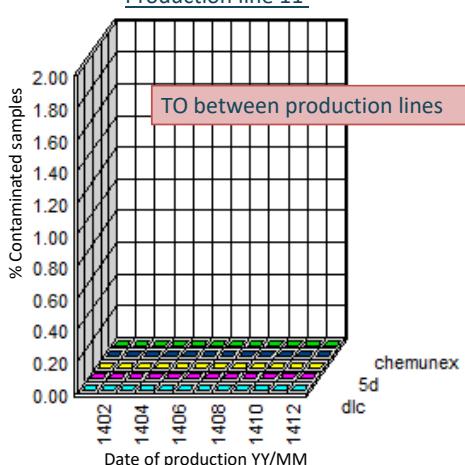
Yeast contamination of dairy end products per prod. line

% of yeast contaminations = green bars

Production line 1

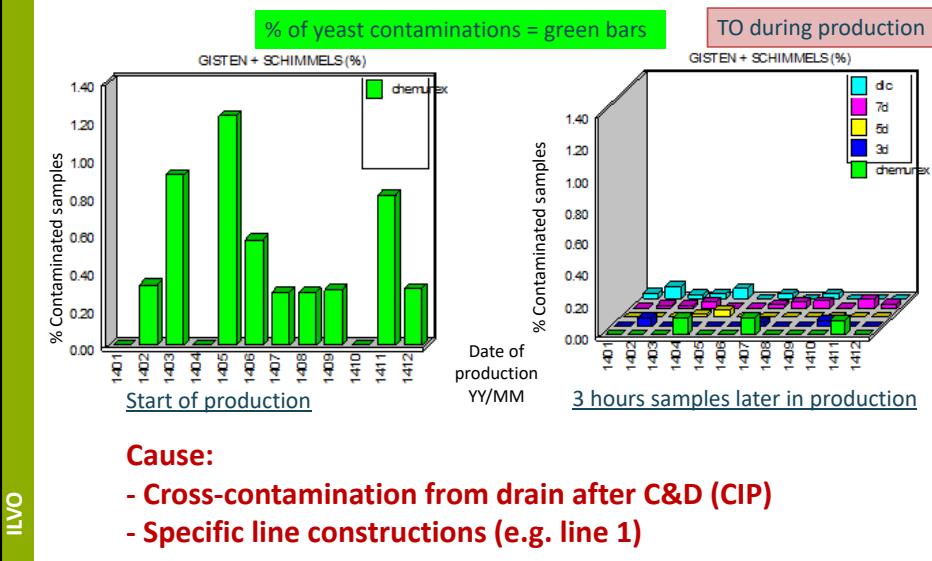


Production line 11

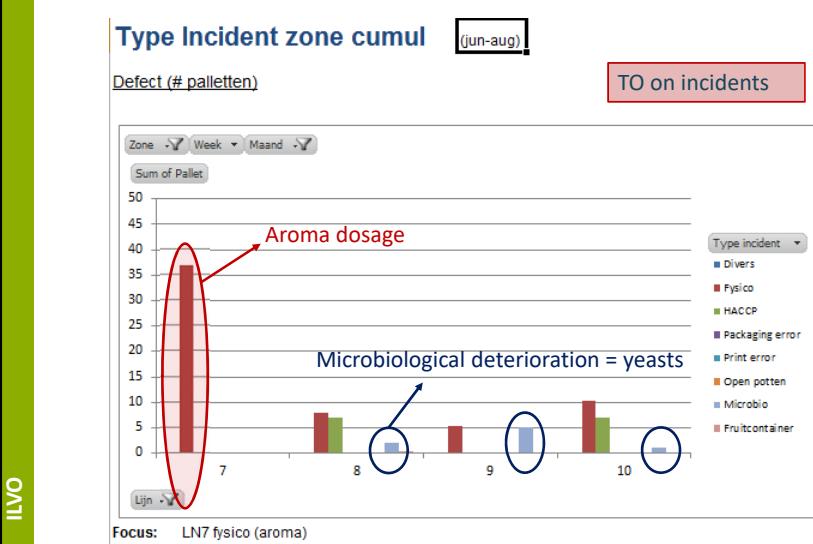


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Trend observation of yeast contamination in dairy on production line 1

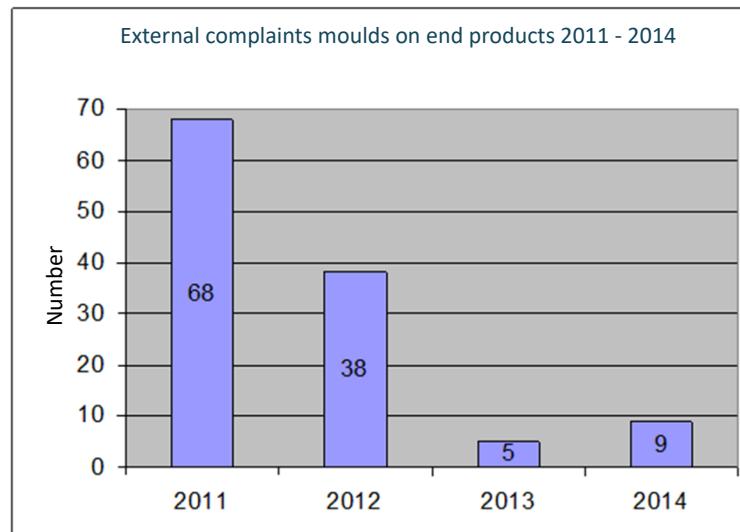


Trend of incidents for one dairy production zone (Lines 7-8-9-10) over 3 months



Trend observations on moulds in cheese industry

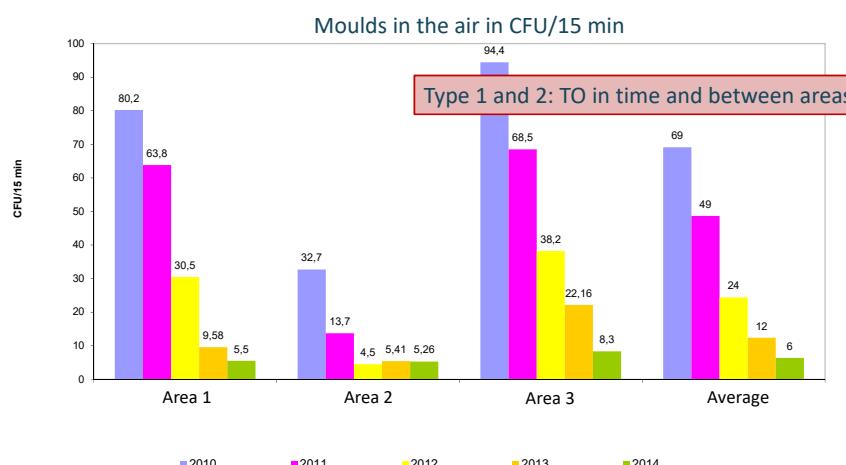
a) Trend in complaints



Trend observations on moulds in cheese industry

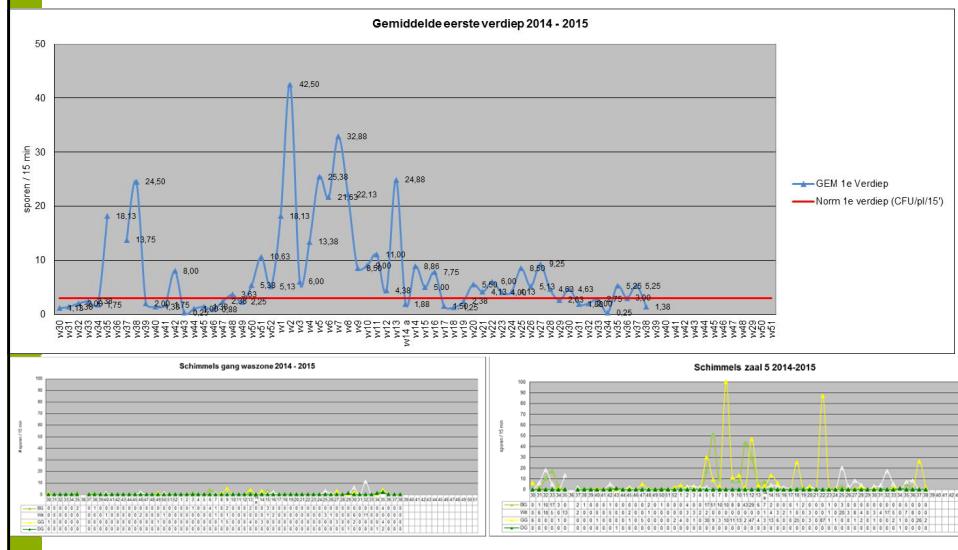
b) Trend in air contaminations

Corrective actions: 1) Correct air flow, 2) Fresh air cabins, 3) Intensive monitoring, ...

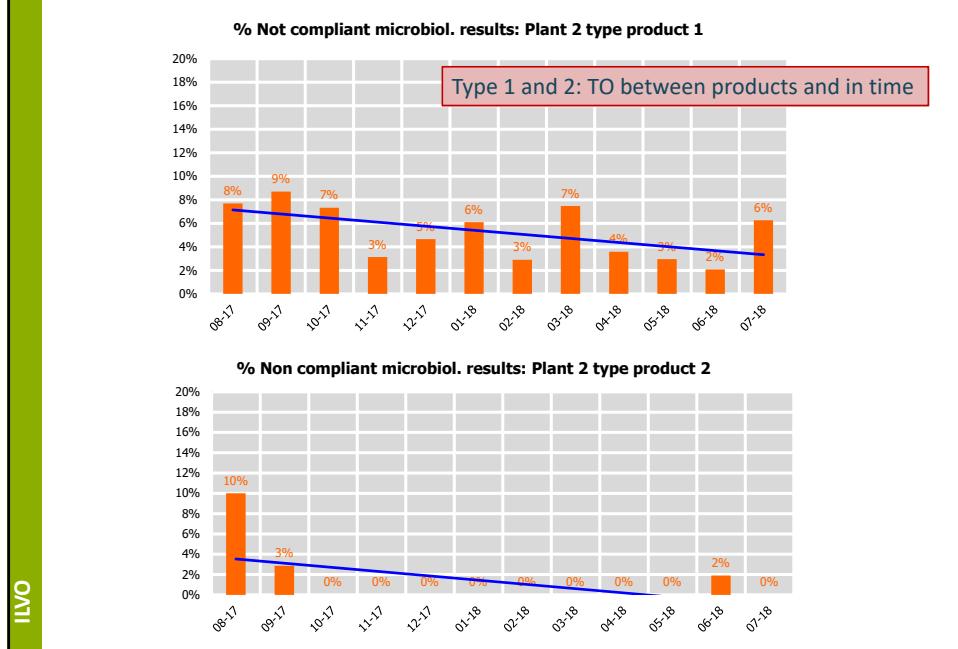


Trend observations on moulds in cheese industry

c) Trend in air contaminations first floor



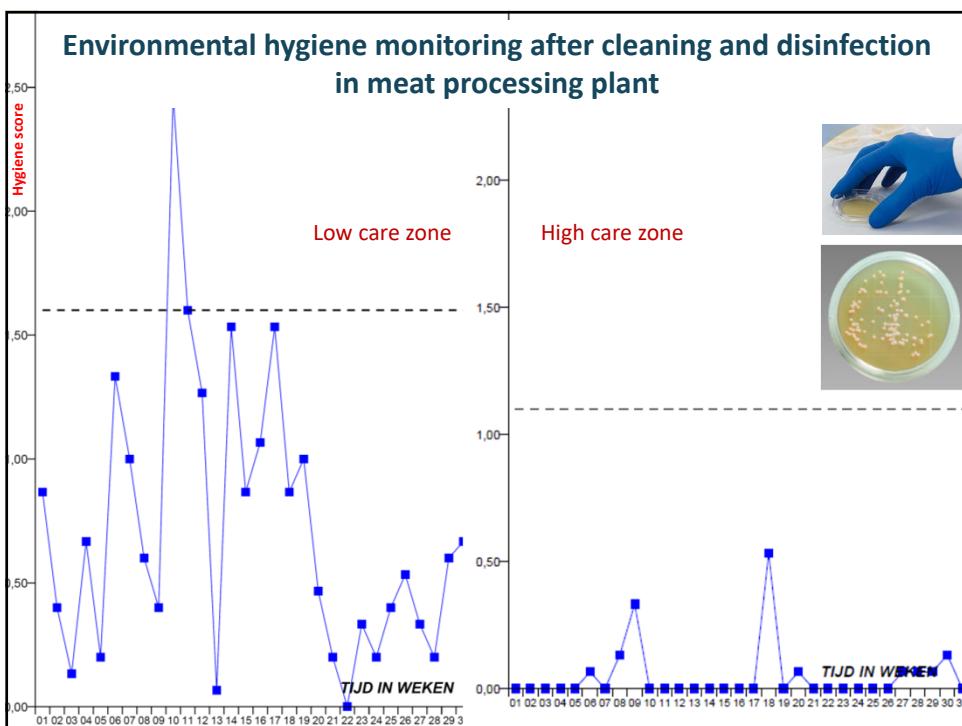
Trend observations in meat industry

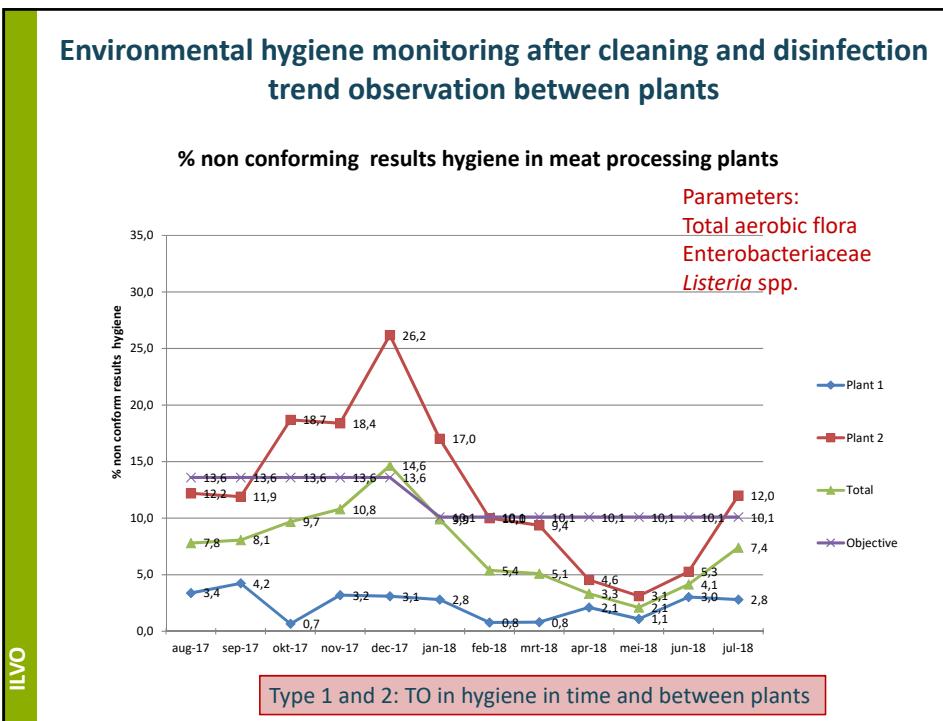


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Trend watching on environmental sampling in the food industry (after cleaning and disinfection)

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Date sampling	Samp le nr	ID place	Area	Sampling place	Tot. flora (cfu plate)
29-07-14	1	6	Snijzaal	Snijplank konijn	2
29-07-14	2	14	Snijzaal	Handvat deur met gang	49
29-07-14	3	21	Fleerlijn	Band bocht	0
29-07-14	4	29	Fleerlijn	Pekeltank	0
29-07-14	5	38	Bereidingen	Kapmachine	0
29-07-14	6	45	Bereidingen	Worstendraaier	0
29-07-14	7	51	Algemeen	Mes bereidingen	0
29-07-14	8	66	Algemeen	Inpakmachine Yang groot	26
29-07-14	9	71	Algemeen	Inoxen tafel verpakkingsruimte	0
29-07-14	10	75	Algemeen	Scherper plastiek	0
07-08-14	1	9	Snijzaal	Snijmachine	2
13-08-14	2	13	Snijzaal	Prikblok	9
13-08-14	3	22	Fleerlijn	Band flipper	163
13-08-14	4	32	Fleerlijn	Richtmessen aan band	3
13-08-14	5	39	Bereidingen	Snijtafel	0
13-08-14	6	41	Bereidingen	Kruidenveegschaal	44
13-08-14	7	49	Algemeen	Mes rood vlees	0
13-08-14	8	54	Algemeen	Grijz bakje	3
13-08-14	9	58	Algemeen	Handvat deur frigo gecal. filet	94
13-08-14	10	63	Algemeen	Hangrekken carré's	66
19-08-14	1		Fleerlijn	Borstkap	>>
19-08-14	2		Fleerlijn	Band boven plankjes	>>
19-08-14	3		Snijzaal	Snijtafel gevogelte	0
20-08-14	4		Fleerlijn	Borstkap	162
20-08-14	5		Fleerlijn	Band boven plankjes	19
21-08-14	6		Fleerlijn	Borstkap	59
21-08-14	7		Fleerlijn	Band boven plankjes	0
22-08-14	8		Fleerlijn	Borstkap	>>
22-08-14	9		Fleerlijn	Band boven plankjes	0
29-09-14	1		Bereidingen	Gehaktmolen	1
11-09-14	2		Bereidingen	Gehaktmolen	2
12-09-14	3		Snijzaal	Kotelettekapper	0
12-09-14	4		Fleerlijn	Borstkap	5
16-09-14	5		Bereidingen	Cutter	0
16-09-14	6		Bereidingen	Menger	0
17-09-14	7		Snijzaal	Limamachine	2
18-09-14	8		Bereidingen	Kapmachine	0
19-09-14	9		Bereidingen	Gehaktmolen	4

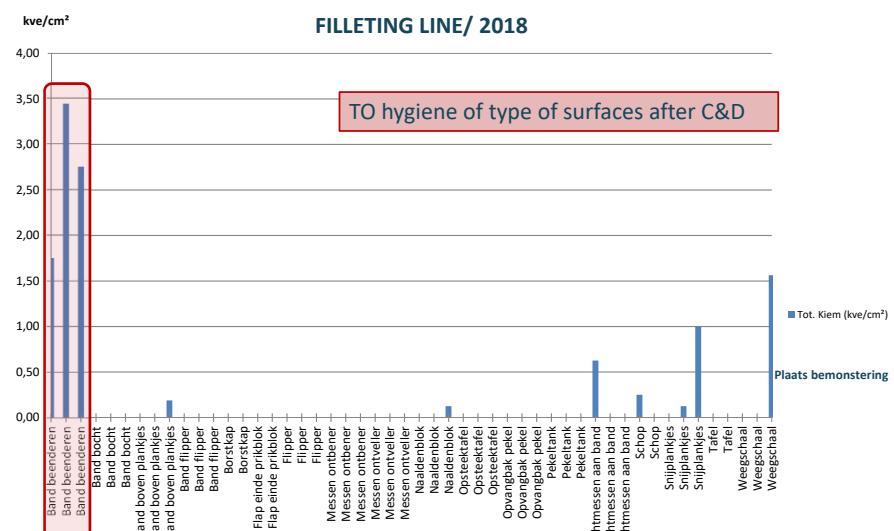
Wholesale and cutting of meat SME

Hygiene monitoring after C&D

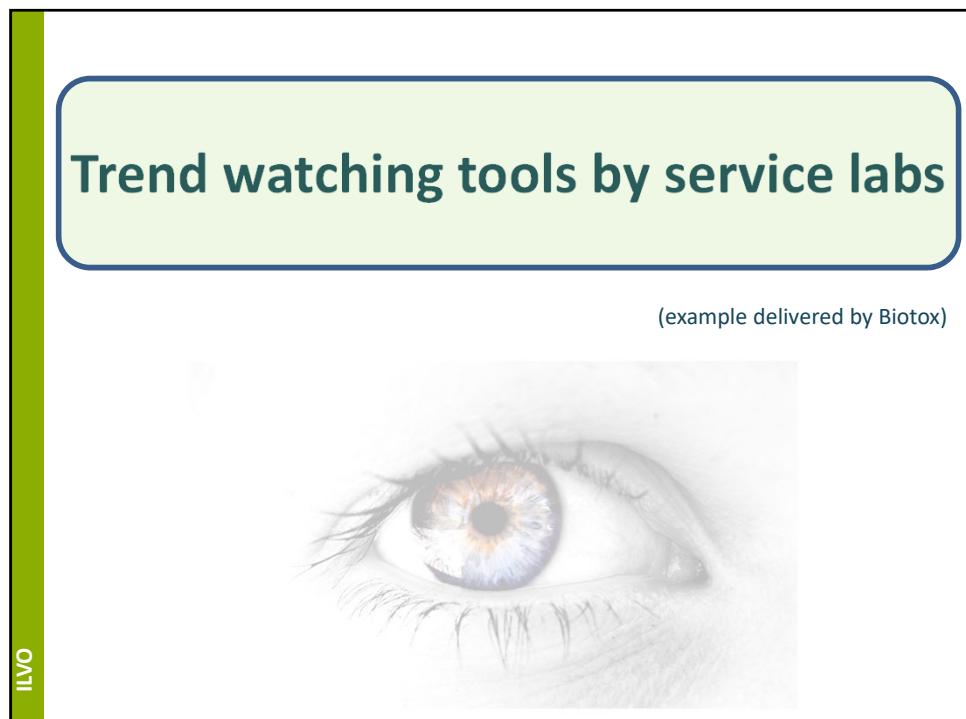
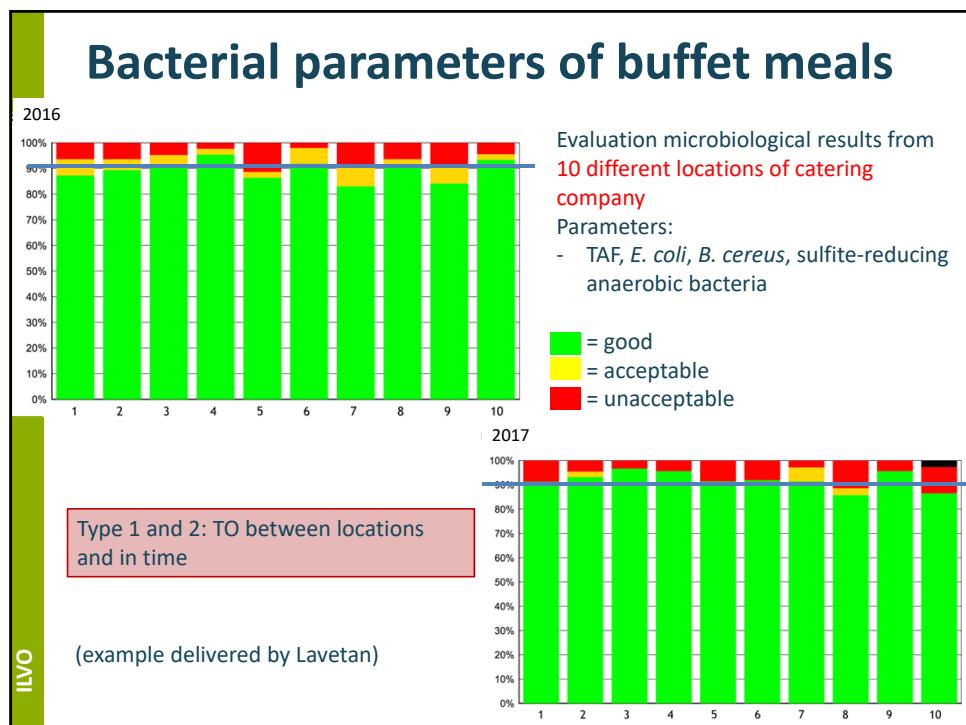
August 2014
 Defect dosing
 pump disinfectant

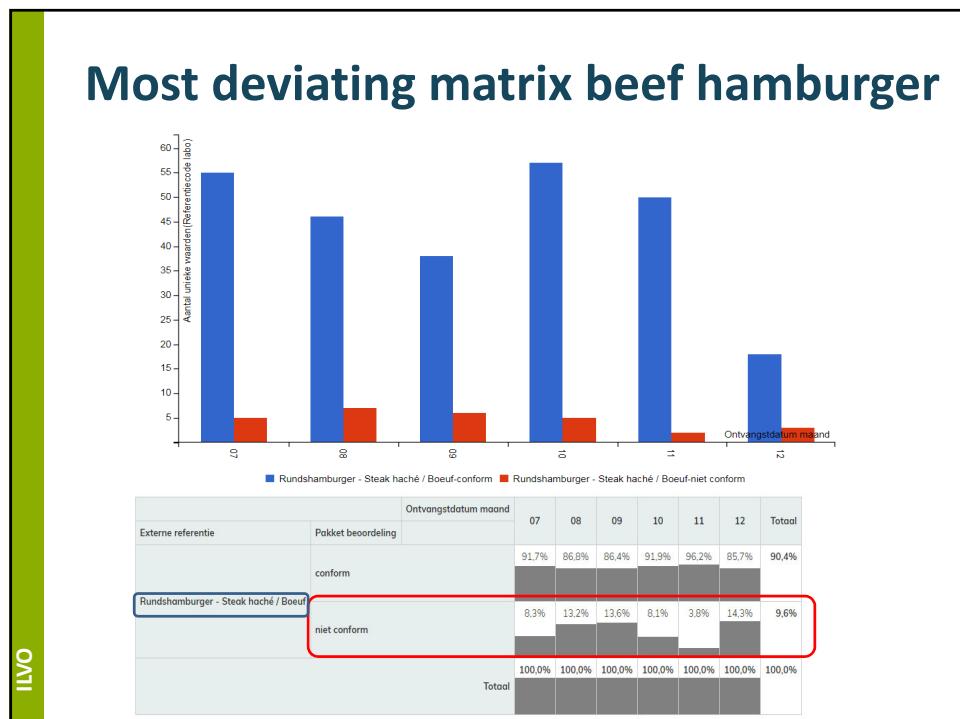
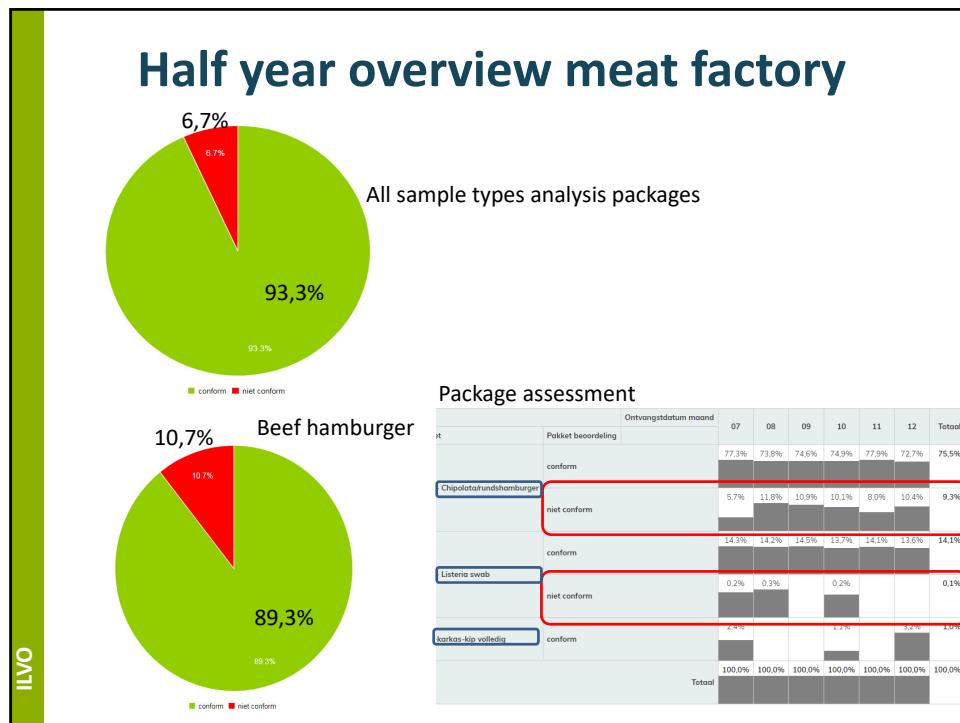
Hygiene monitoring after C&D Wholesale and cutting of meat

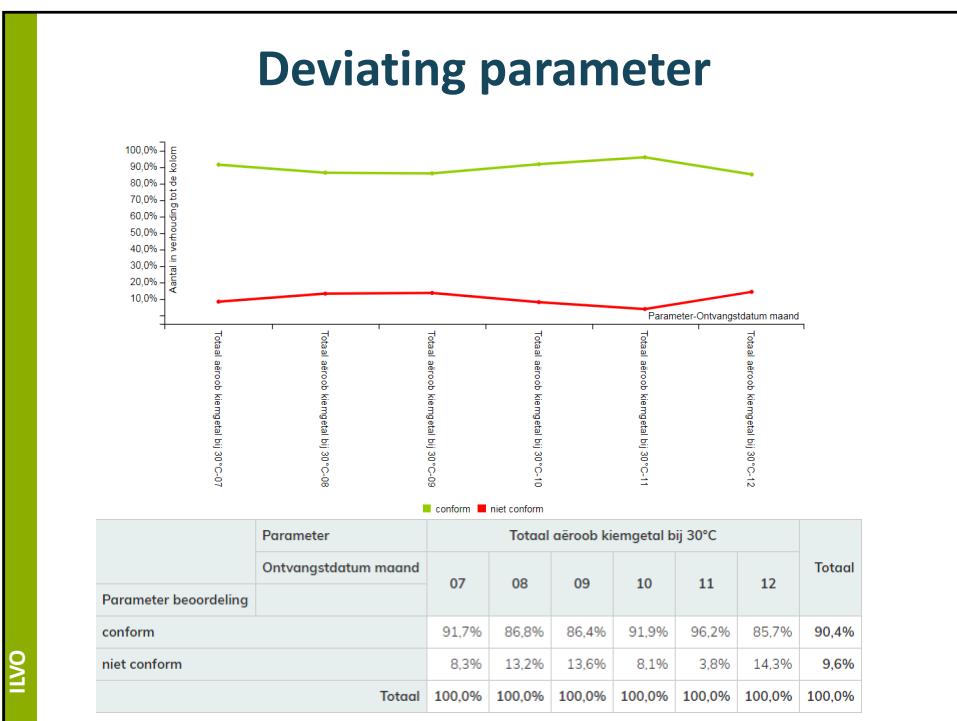
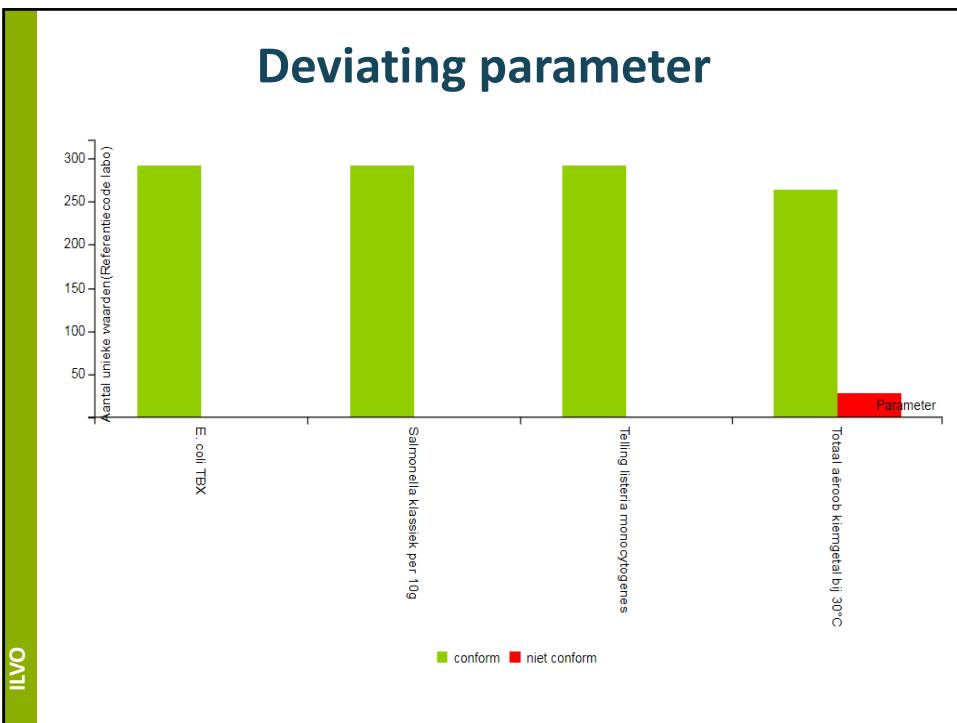
Trends in types of contaminated surfaces



Trend watching in the catering







Take home messages

- In every stage of AFPC TW found to control microbiological quality and safety
- TW with wide variety of types of data handling
- Mainly trend observation is used
- Used to compare analytical results:
 - Products, parameters, batches, lines, area, plants, during production, time evolutions, incidents, complaints, ...
- In all companies TW is used to:
 - Detect problems
 - Improvement of quality and safety of products

→ TW very useful tool giving extra information out of analytical results

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11 invited (international speakers)

8 short communications

At least 40 poster presentations

300 participants

Fantastic social event

Cheap participation: 110 euro/1 day – 180 euro/2 days

More information: www.bsfm.be



Words of thanks

Different concerned companies of the AFPC

Kristof Mertens (Prophyrio)

Jan Robrechts en Raf Peeters (Lavetan)

Sophie Sleuyter en Tom Benijts (Biotox/ECCA)

Saskia Desnyder (LIEMAQS bvba)

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Thank you

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