

# Microbiological Risk Management

## Sensitive Beverages Production

*“a case study”*



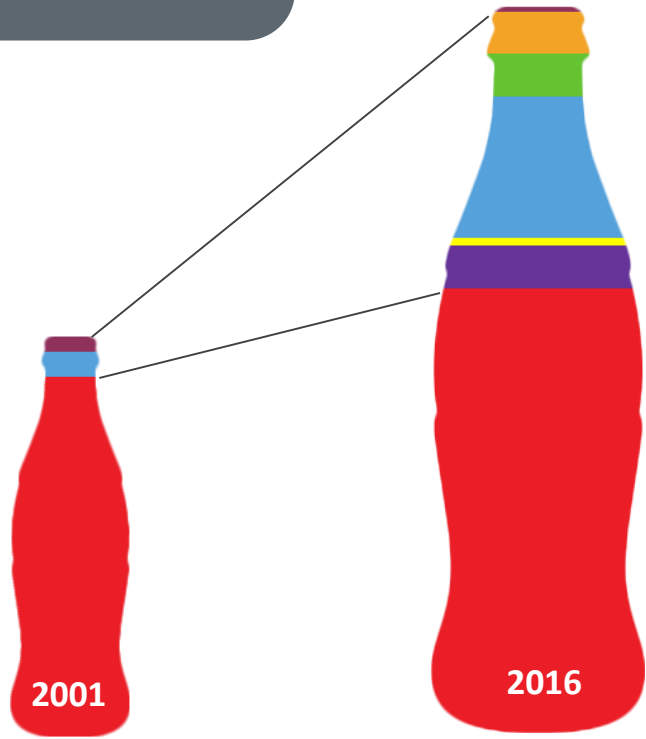
22-25 May 2017  
Amsterdam / NL

Zoltan Syposs  
CCHBC Group QSE Director

A leading bottler in the Coca-Cola System with a 60-year history

**2.1 billion**  
unit cases

## Meeting Consumer needs with a Diverse Product Portfolio



Sparkling Beverages  
Water  
Other

90%  
6%  
4%

Sparkling Beverages  
Low & no-calorie SSD  
Water  
Juice  
RTD Tea  
Energy & Other

62%  
8%  
18%  
7%  
4%  
1%



## Empowered by a Lean Supply Chain Footprint

		vs. 2008
Plants across our Markets	56	-30%
Warehouses/Distribution Centers	264	-27%
Filling Lines	271	-5%

# 2012

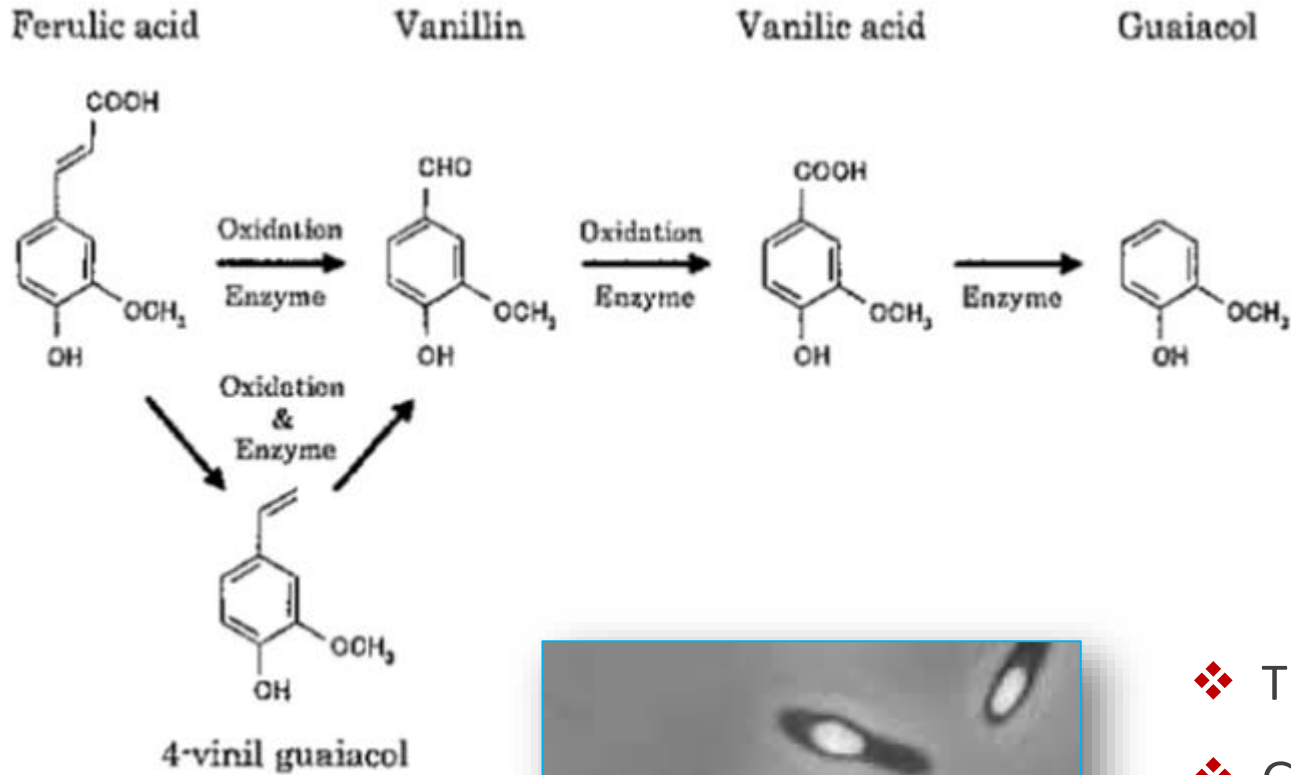
In one of our operations, there was a **public recall** of the ...

**No. #1 selling Juice Brand**



Contaminated with **TAB**

Numerous consumer complaints for **off taste**

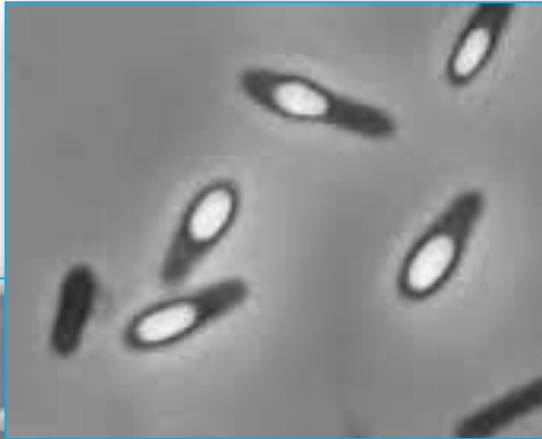


## Get to know your enemy

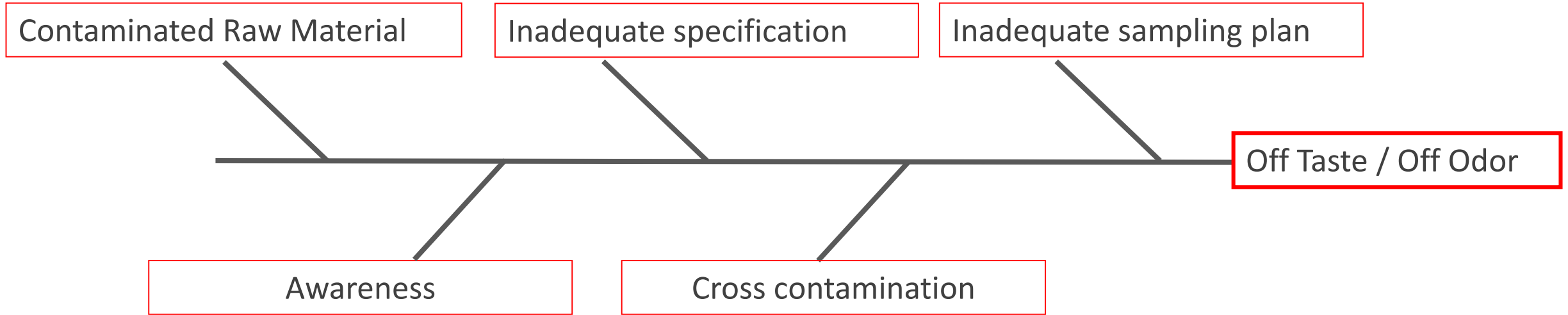
*Alicyclobacillus* spp.

- ❖ Thermo-acidophilic, rod shaped, spore-formers
- ❖ Gram positive; Aerobic / Facultative Aerobic
- ❖ Off-Odor & Taste: characteristic medicinal
- ❖ Main guaiacol producing species:

*A. acidoterrestris*, *A. acidiphilus*, *A. pomorum*

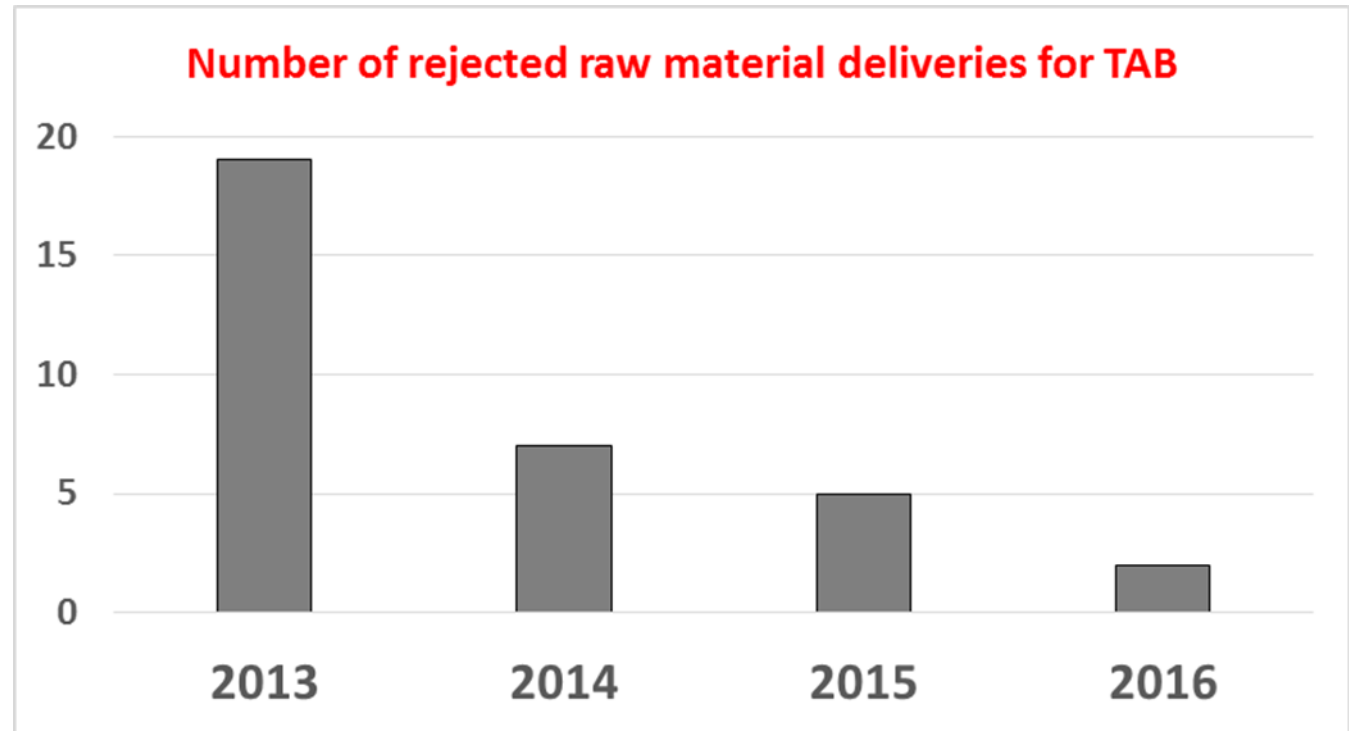
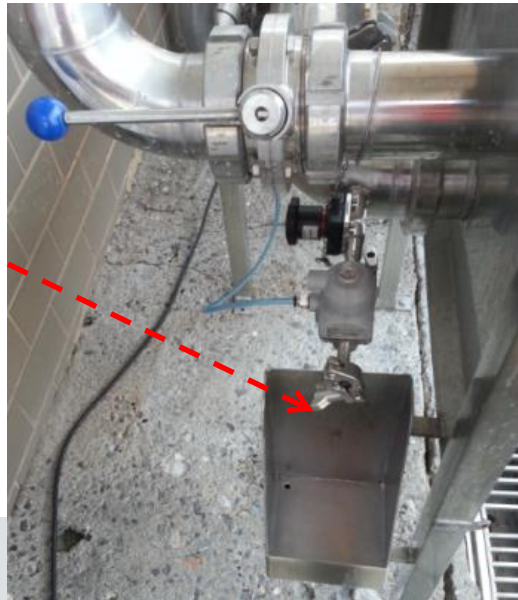


# We analysed the problem



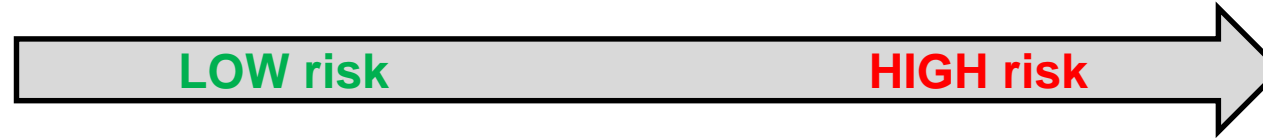
# Close collaboration with our Suppliers

- ❖ Joint Root-Cause Analysis
- ❖ Revised specifications
- ❖ Pre-shipment samples
- ❖ Revised sampling plan stringency



# Setting release criteria and specifications

## FINISHED PRODUCT



Criteria	1	2	3	4	Weight
Total CFU TAB (containing Guaiacol positive) A: Conventional method B: PCR method	A:< 1 cfu B: < 10 cfu	A:1 - 10 cfu B: 10-100 cfu	A:11 - 100 cfu B: 101 - 1000 cfu	A:> 100 cfu B:>1000 cfu	1.5
Environmental conditions for minimum 7 days	< 20 °C	20 - 30 °C	31 - 40 °C	> 40 °C	3
Type of Product	RTD Tea / Isotonic / Cherry	Apple / Red- Grape / Sour- Cherry / White- grape/ Carrot	Orange / Strawberry / Mango / Bananas / Passion / Tropical Fruits	Multifruit / Peach / Apricot / Pineapple	5
Frequency of complaints Guaiacol off-note occurrence ( TAB )	< 1 / 5 yeas	1 / 5 years	1-3 / 5 years	> 3 / 5 years	0.5

Score	Zone
10 - 19	green zone
20 - 35	yellow zone
35 +	red zone

# We increased the robustness of E2E Validation



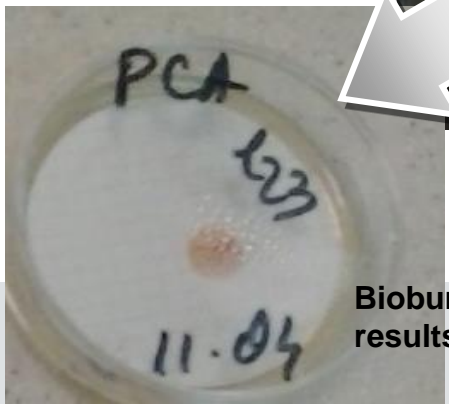
Package inoculation



Enhanced inoculation procedure



Package decontamination



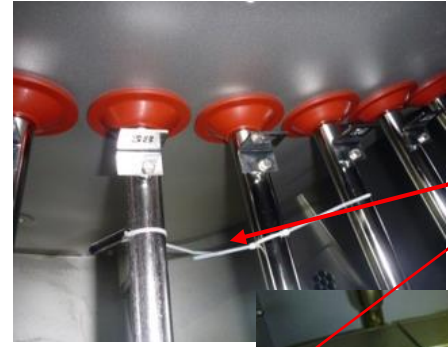
Bioburden results



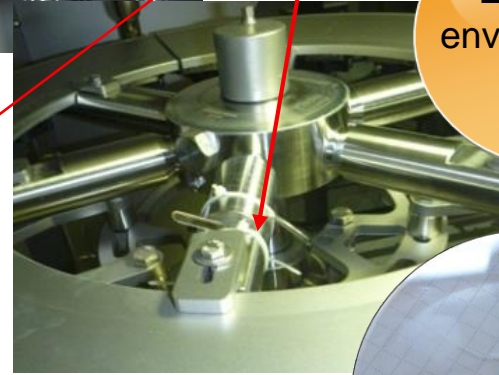
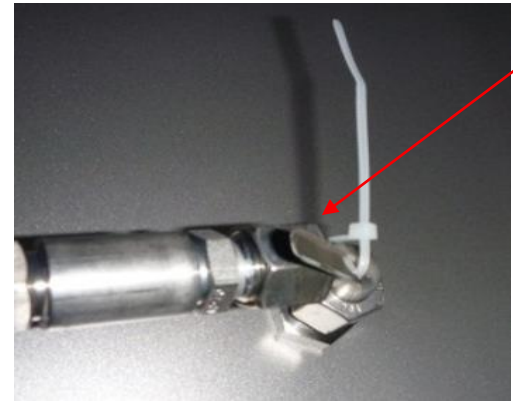
Log reduction calculation



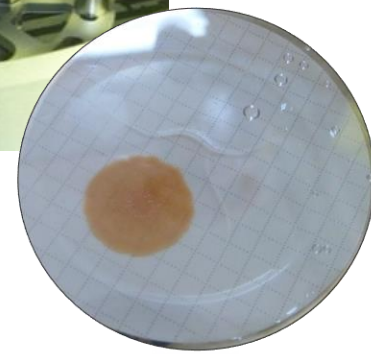
High sensitivity media fill tests



Strips inoculated with *B. atrophaeus* applied in areas of potential cross contamination zones



Extended environmental tests



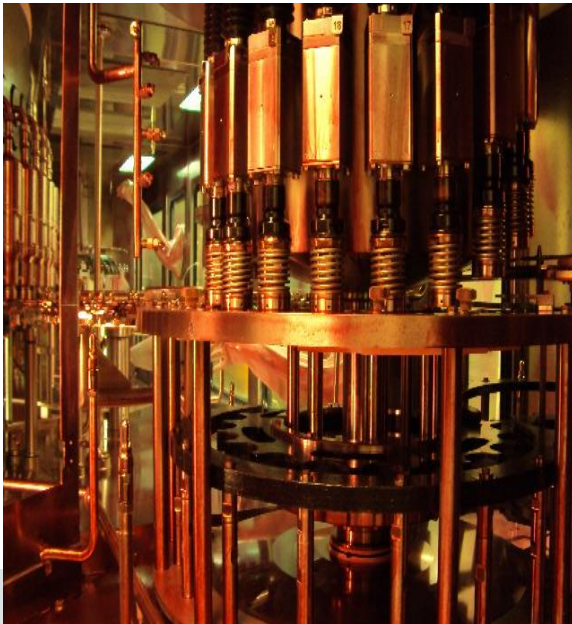


# “From fire fighting to prevention” approach

Critical to Quality Preventive Maintenance Matrix



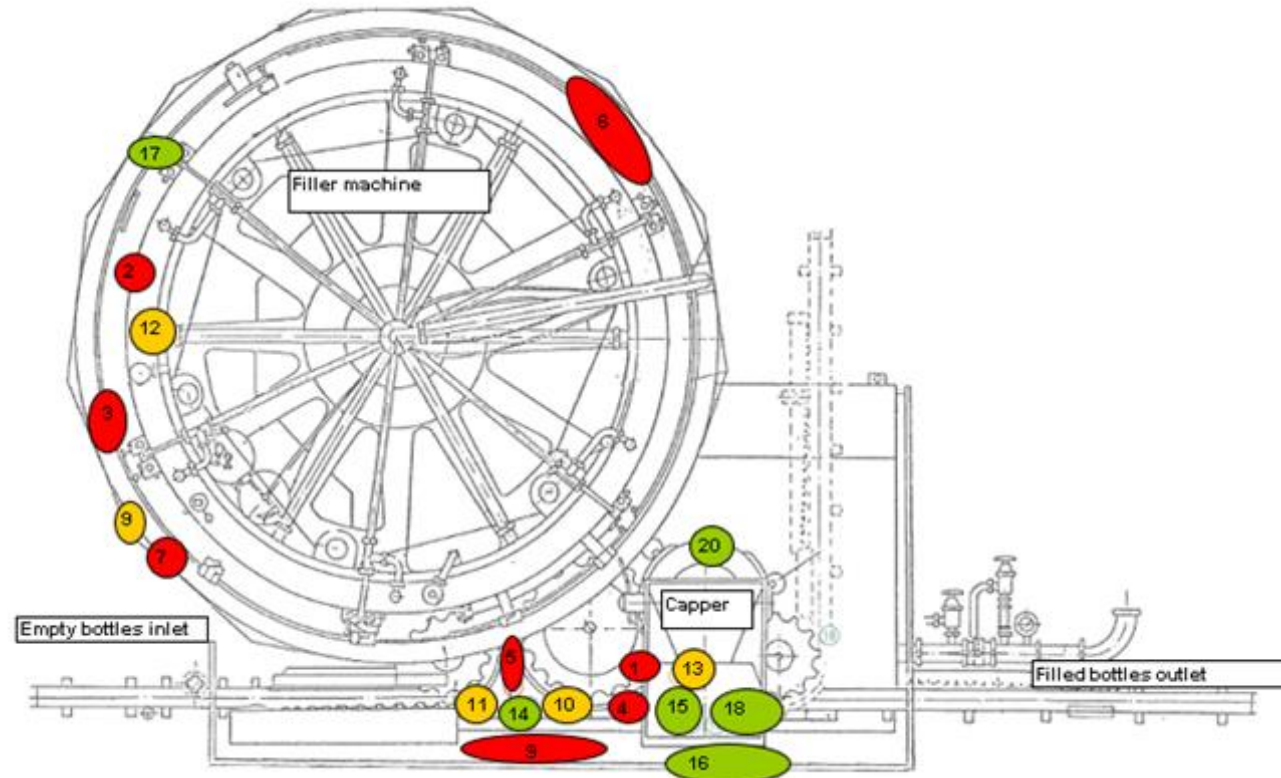
COP validation- Dye test



Dye Test applied on Filling Equipment



Test passed


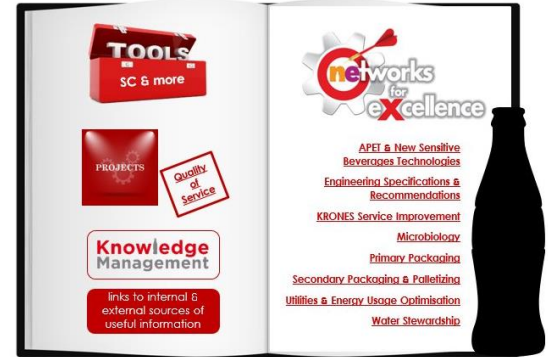


# People Development

Click on the links below for more information

MDP – What does my operation need to do?

<a href="#">MDP Announcement Letter</a>	<a href="#">MDP Capabilities, Evaluation &amp; Development</a>
<a href="#">MDP Project Presentation</a>	<a href="#">MDP Assessment Tool User Manual</a>
<a href="#">MDP Practical sessions Groups &amp; Assessors</a>	<a href="#">The Programme Step by Step</a>
	<a href="#">Central Hellenic Microbiology group Support &amp; Contact</a>

# We are focusing on the 4' Essentials of QFS Step Change



Leadership emphasis



Message Credibility



Peer Involvement



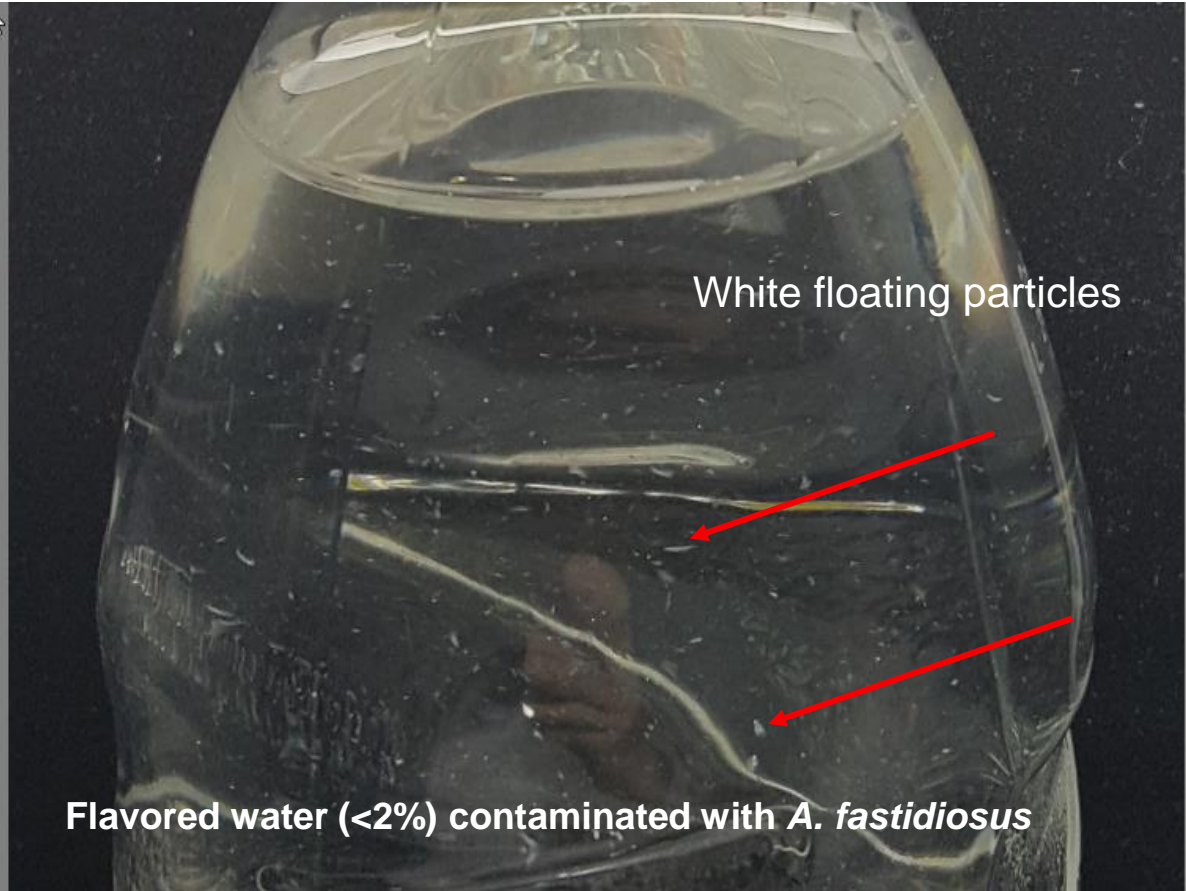
Employee Ownership

# 2012 - 2016

**ZERO** consumer complaints related to off taste

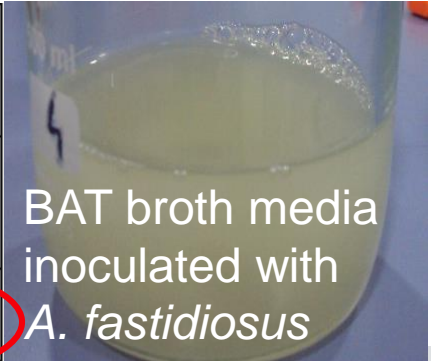
caused by TAB contamination have been received

# Another Lesson learned



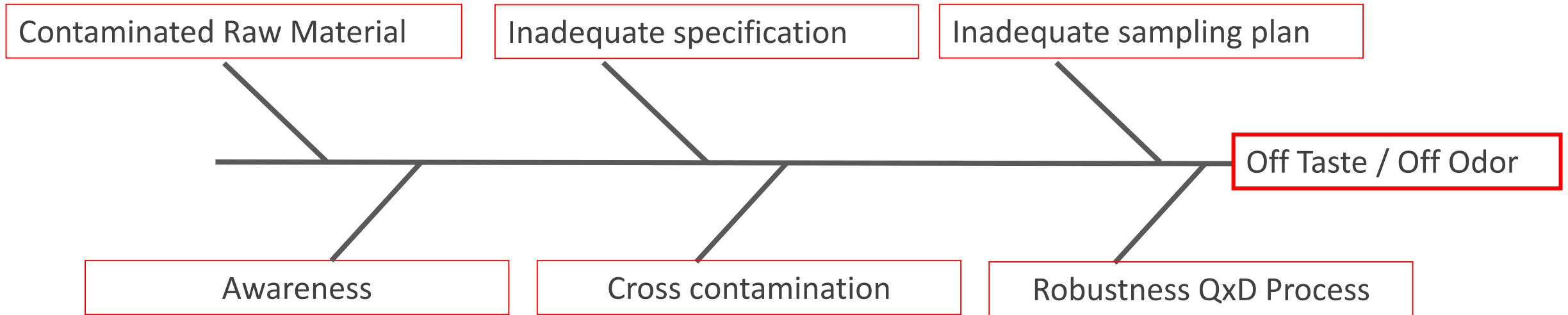
- ❖ Found in lemon juice concentrate (pH 2.0)
- ❖ Contamination occurs 4-6(+) weeks
- ❖ No swelling, no changes in fruit juice pH value
- ❖ Complaints described: “medicinal”, “phenolic”
- ❖ Very rare but visible white particle

Alicyclobacillus Species	Source of isolation	Temp. range (°C) (optimum)	pH range (optimum)	Main Fatty Acids	Growth in NaOH (w/v)	Guaiacol production
<i>A. acidoterrestris</i>	soil, acidic beverages	20-55 (40-50)	2.0-6.0 (3.5-4.5)	ω-cyclohexane	5%	+
<i>A. fastidiosus</i>	soil, beverages	20-55 (40-45)	2.0-5.5 (4.0- 4.5)	ω-cyclohexane	≤2%-5%	-



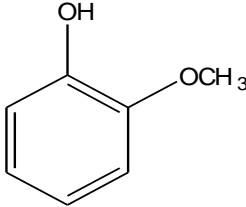
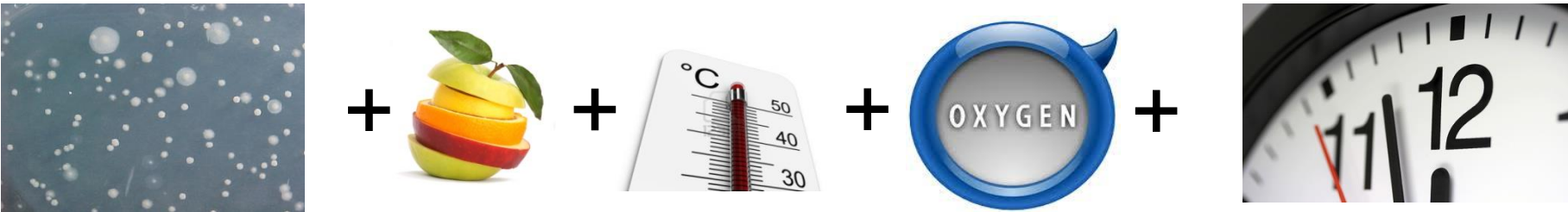
Goto, K., and all in International Journal of Systematic and Evolutionary Microbiology (2007), 57

# We analysed the Problem



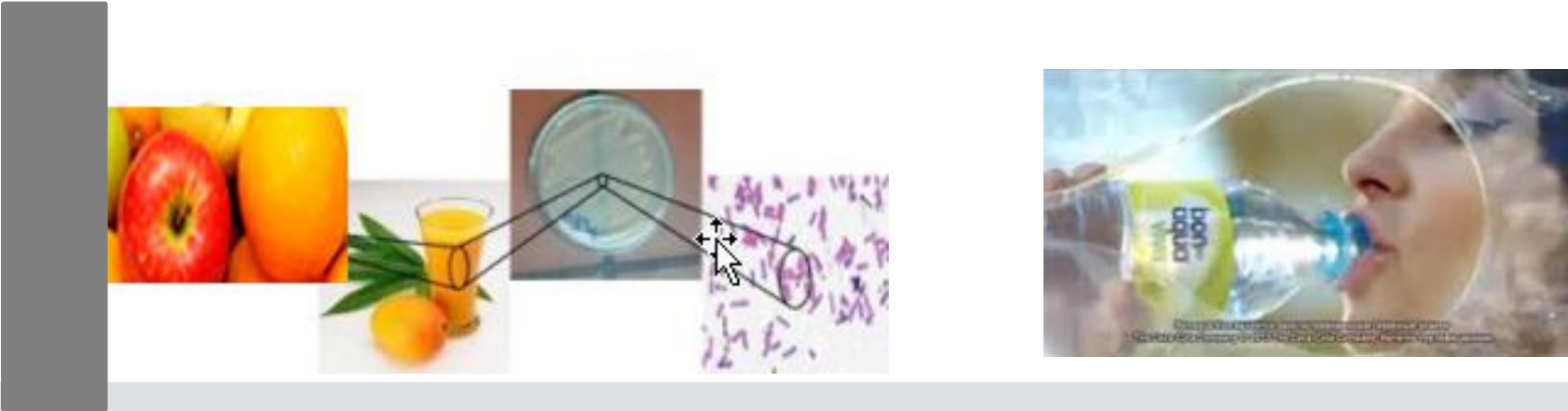
# Expect the unexpected

More robust Challenge Studies → QualityxDesign

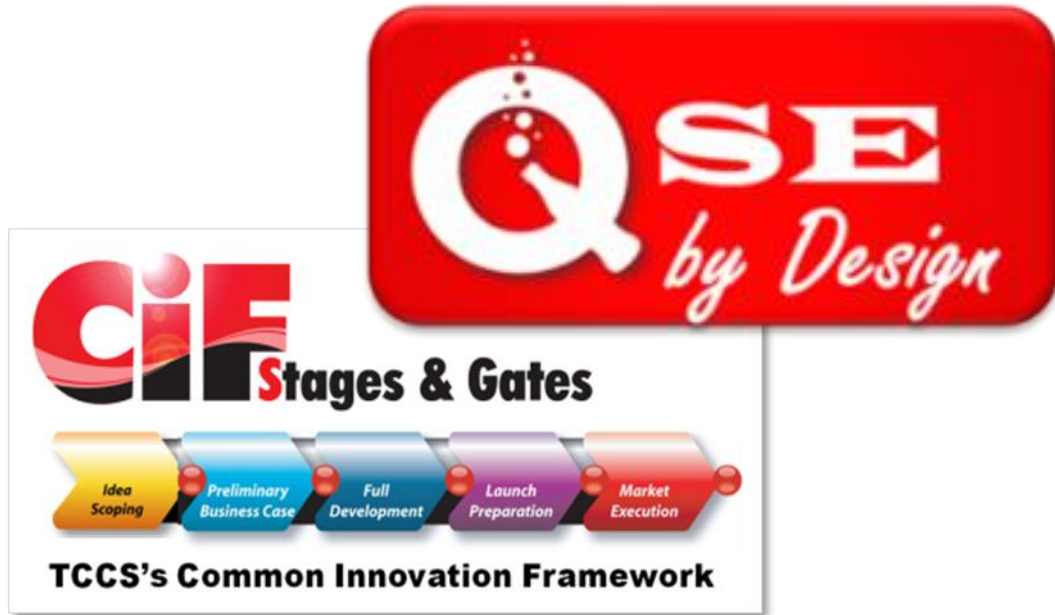


Guaiacol

# We are monitoring TAB ALSO in (Aseptic) Flavoured Waters carefully



# What could have we done better to avoid these issues?



E2E Risk Assessment in all phases

- ❖ Design
- ❖ Commercialization
- ❖ Marketplace

We are focusing on the 4' Essentials of QFS **Step Change**



1 Leadership emphasis



3 Peer Involvement



2 Message Credibility



4 Employee Ownership

11

Coca-Cola  
Hellenic Bottling Company

Food Safety/Quality **CULTURE**  
Maturity Continuum



# Let's Work together

# Thank you



Dana Muresan  
Romania



Kalliopi Chalkou  
Greece



Colm Scully  
TCCC



Veronique Breyne  
TCCC



Tamara Djurdjic  
Serbia



**Coca-Cola**  
Hellenic Bottling Company

NET  
TW  
WO  
ORK  
ORK  
FC  
OR  
EX  
XCELL  
LENCE  
E MIC  
ICRO  
BIOLO  
LOGY



Network  
for  
Excellence  
Microbiology



Pawel Kwiecien  
Poland



Monika Rochminska  
Poland



Thomas Stellini  
Italy



Ilaria Meneghelli  
Italy



Tetiana Nivyevska  
Ukraine