



McDonald's Sensory evaluation: application of **Directional Degree of Difference method** for Quality Control in the food industry.

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McDonald's Fry supplier

10th Sensometrics - Past] **Present** [Future
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McDonald's: key facts & figures

- Operating over 32.000 restaurants in 119 countries
- Serving over 60 million customers every day
- Employing 1.9 million people worldwide



Lamb Weston:

- Core supplier of McDonald's potato products



Lamb Weston

Issues unique to in-plant sensory

- | | |
|--------------------------|--|
| ➤ Food manufacturing | <i>Large volumes</i> |
| ➤ Sampling frequency | <i>Low (statistically)</i> |
| ➤ Number of panelists | <i>Few</i> |
| ➤ Competence panelists | <i>High</i> |
| ➤ Sensory paneling | <i>Day & night - 24/7</i> |
| ➤ Evaluation time | <i>Short - fast</i> |
| ➤ Calibration & training | <i>Critically important</i> |
| ➤ Sample preparation | <i>Standard procedure needed</i> |
| ➤ Sample replication | <i>Not feasible (destructive method)</i> |



Panelist screening

- This is your “Instrument”

- Select people who are qualified to do the job
 - Test for normal acuity
 - Odor recognition
 - Basic taste recognition
 - Visual assessment
 - ✓ Color Blindness
 - ✓ Scaling Exercises



Our program in action



Directional Degree of Difference (9 pt. DOD)



Sensory scale – explaining DOD method

➤ Sensory scale gives Degree and Directional Information

Not McD Quality	Significant Difference	Marginal	Slight Difference	Equal to TARGET	Slight Difference	Marginal	Significant Difference	Not McD Quality
<<< Less Than <<<					>>> More Than >>>			
1	2	3	4	5	6	7	8	9

- Target = Not different from target product
- Slight Difference = Barely noticeable, threshold
- Marginal = Low level, but noticeable (end of acceptance range)
- Significant difference = Obvious, definite difference, out of specification
- Not McDonald's Quality = Extreme deviation and/or wrong product



Sensory scale – calculations of DOD method

➤ Quality values allow calculation overall product quality score

Not McD Quality	Significant Difference	Marginal	Slight Difference	Equal to TARGET	Slight Difference	Marginal	Significant Difference	Not McD Quality
<<< Less Than <<<					>>> More Than >>>			
1	2	3	4	5	6	7	8	9

- Target (5) = 100% for each quality attribute
- Slight Difference (4's & 6's) = 85%
- Marginal Difference (3's & 7's) = 60%
- Significant Difference (2's & 8's) = 25%
- Not McDonald's Quality (1's & 9's) = 0%



Sensory scale – final product scoring

Calculating the final product quality score

- Appearance, Texture and Flavour categories will each receive the score value of the attribute being furthest from target.
- Final score is average of all 3 category scores
 - One exception: Score 1 and 9 indicates total sample failure
⇒ entire score drops to zero.



Example: Calculating final product score (beef)

Appearance:

Sear Evenness:

Target								
1	2	3	4	5				

Appearance Defects:

Target					More			
				5	6	7	8	9

Overall Appearance:

Sample #

4 = 85%

5 = 100%

4

QI Score %

85%

Texture:

Toughness/Chewiness:

Soft/Mushy			Target			Tough/Chewy		
1	2	3	4	5	6	7	8	9

Juiciness:

Dry			Target			Wet		
1	2	3	4	5	6	7	8	9

Crumbliness:

Less/Tight				Target			Too Loose	
1	2	3	4	5	6	7	8	9

Texture Defects:

Target					More			
				5	6	7	8	9

Overall Texture:

7 = 60%

4 = 85%

5 = 100%

6 = 85%

7

60%

Flavour:

Beef Flavour:

Less			Target			More		
1	2	3	4	5	6	7	8	9

Off Flavour:

Target					Off			
				5	6	7	8	9

Overall Flavour:

4 = 85%

5 = 100%

4

85%

Overall Sample Score = (85% + 60% + 85%) 3 =

77%



Sensory evaluation - action standards

- Unacceptable Quality ⇒ restrict & hold, do not ship:
 - Scores outside of the 3 to 7 range of Acceptability for any individual sensory attribute (average panel score)
 - Scores <60% overall quality score (average panel score)
 - Any sample with a critical defect – foreign material, off flavor, spoilage, or which fails to meeting any other specification or food safety requirement, regardless of score.

- If any of these conditions occur:
 - Plant / shift management is contacted.
 - Product is restricted and put on hold.
 - Previous sample is checked to assure problem is isolated.



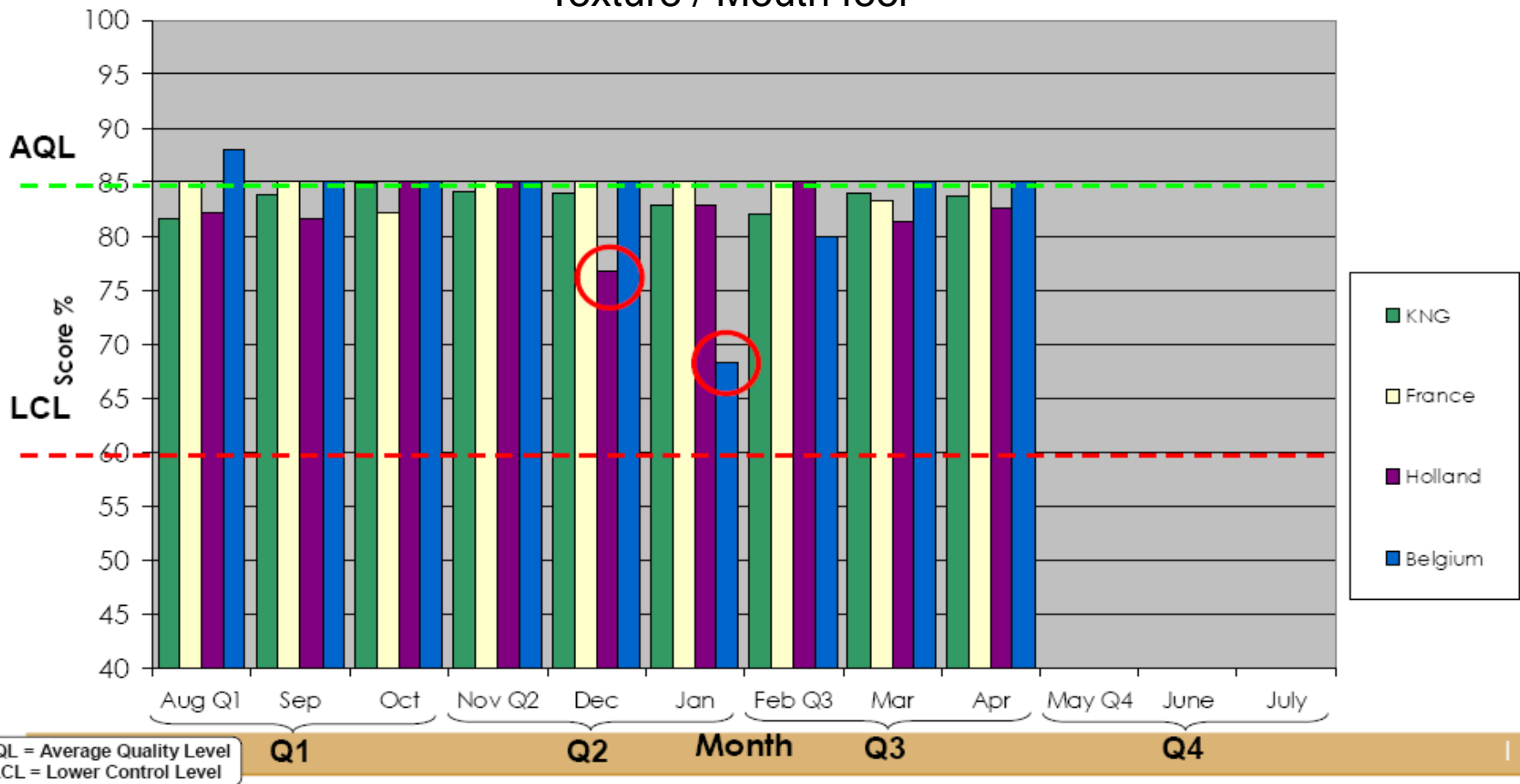
In-plant QC Sensory success measures

- Process effects, line capabilities and spec limits are known
- Raw materials, utilities and packaging meet your standards
- Results yield process improvements
- QC results are recorded and analyzed
- Continuous improvement is documented
- Efficiencies gained & savings achieved
- Product meets standards, always!



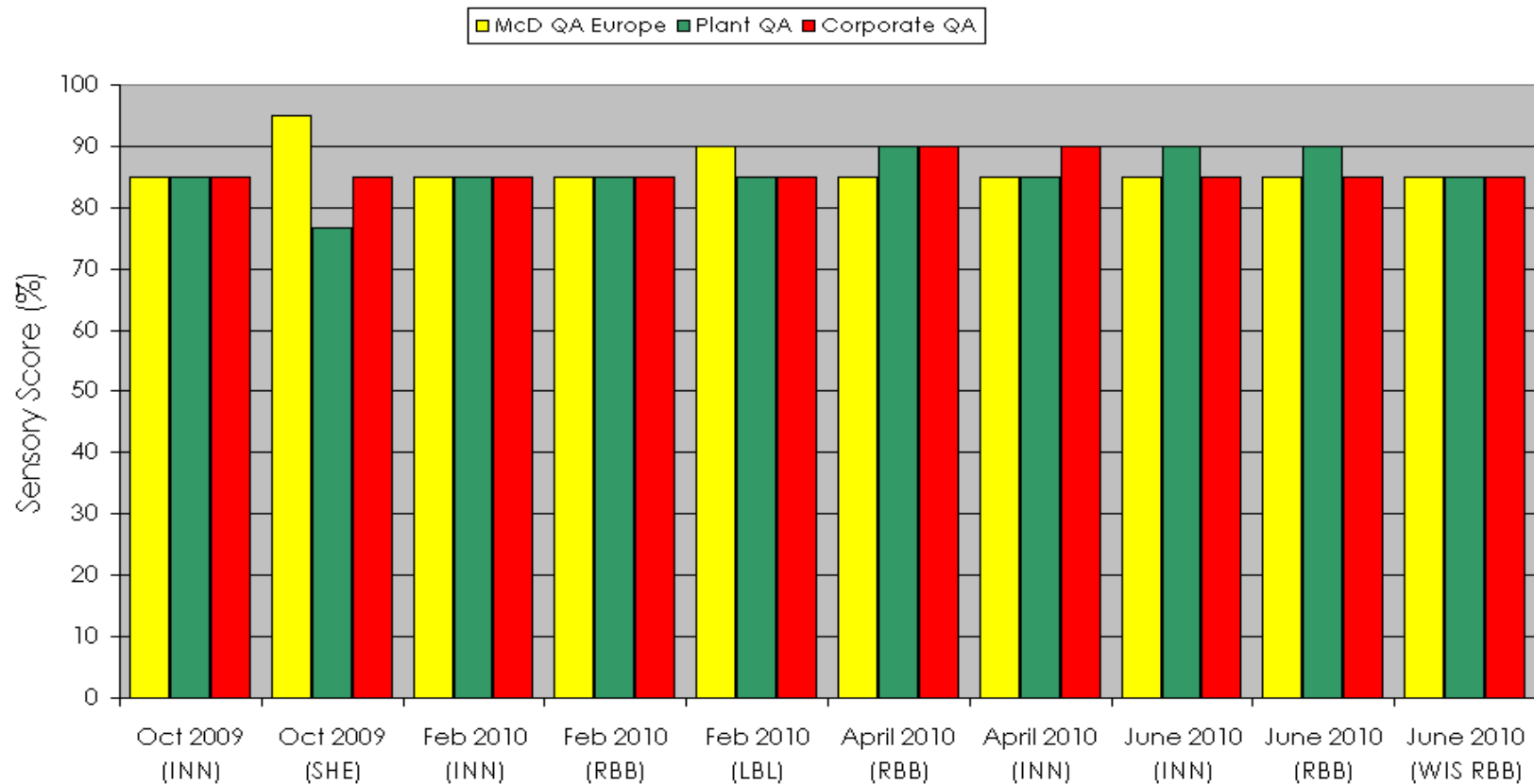
Importance of sensory 'customer calibration'

Texture / Mouth feel



Sensory alignment Supplier vs. McDonald's Corp.

McDonald's Sensory Evaluation



Sensory : verification of customer-centered process control

“Sensory evaluation is an essential verification step to assure that the ingredients, formula, and process are all in control and producing finished product that meets quality standards”.

*Quote by Jay Fechner,
Senior Technical Manager McClement
Management Group (McDonald's)*



Wish list McDonald's: further improvement

- Better separation among sample scores
 - only 20 final score permutations
- Plus-up for more '5's or penalty for fewer
 - to discriminate the great from the good
- Continue to fine-tune consumer validated/ weighted attributes
- Replication and statistical analysis vs. consensus
- Instrumental methods that correlate with human perception



on behalf of McDonald's:
Thank You for your attention



Lamb Weston