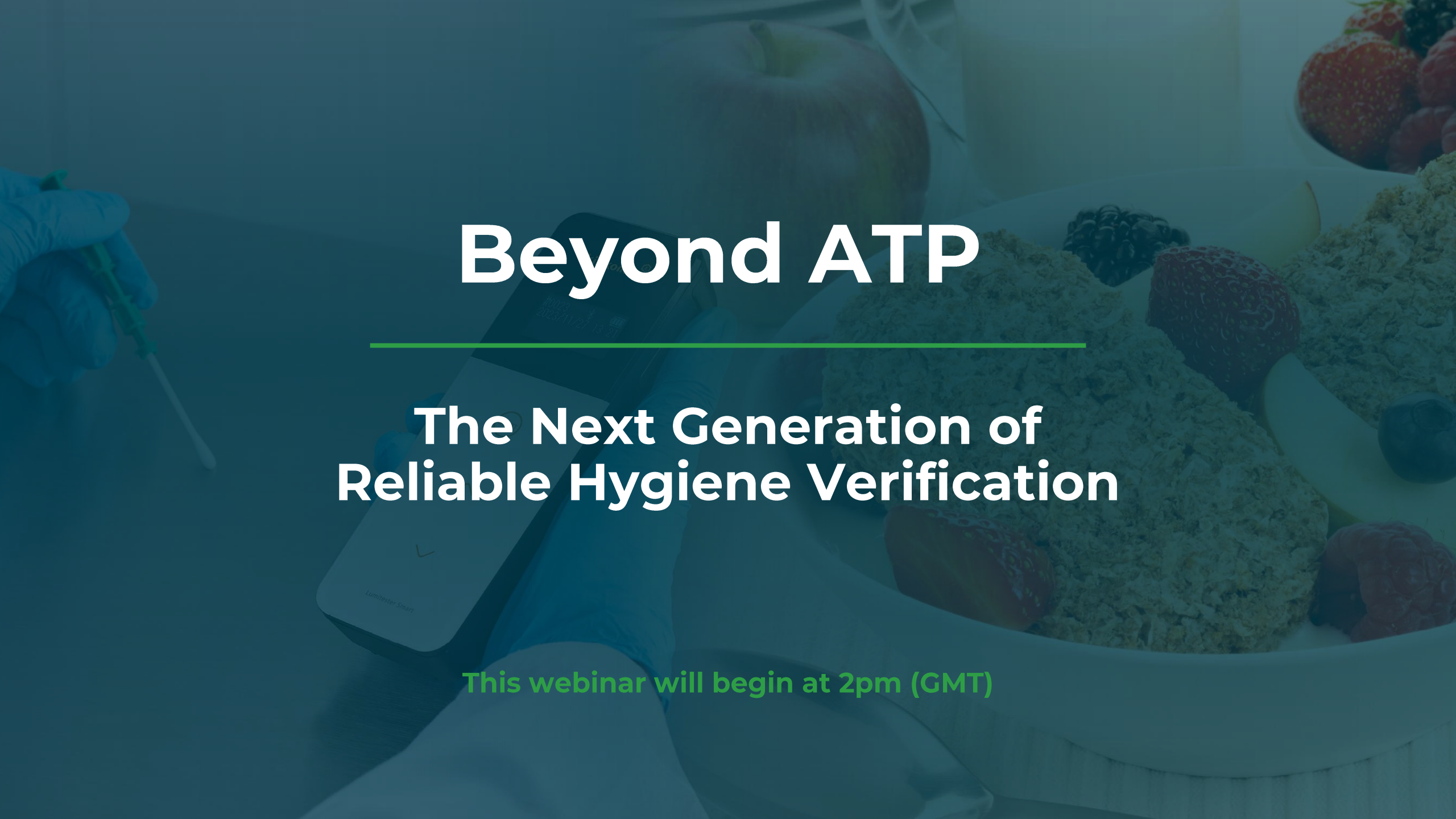
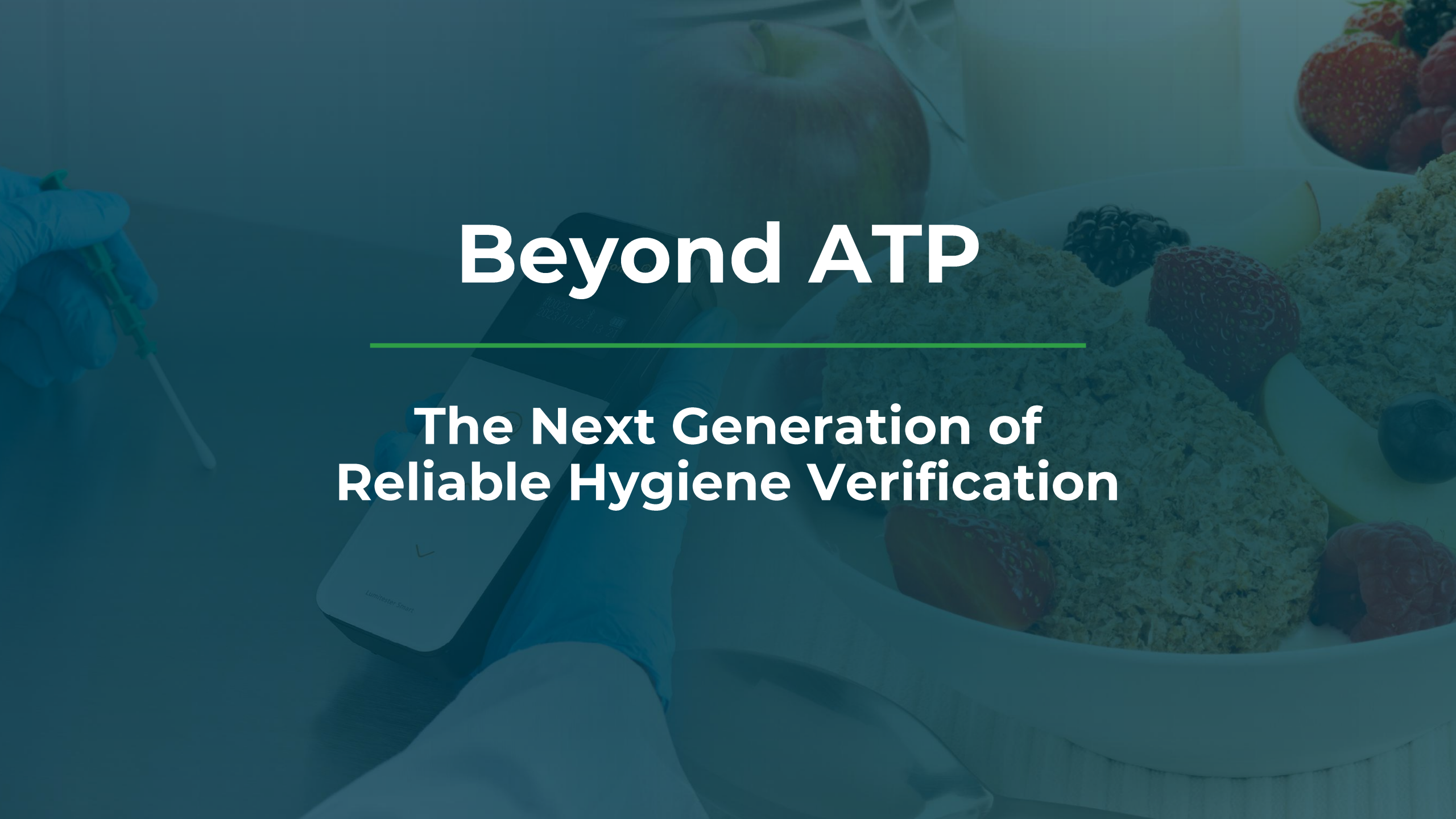


The background image is a composite showing a gloved hand using a swab and a Lumimeter device on a bowl of food. The Lumimeter device is a small, handheld electronic device with a screen and a button. The bowl contains a mixture of oats, fruit, and other ingredients. The text "Beyond ATP" is overlaid on the image in a large, white, sans-serif font.

Beyond ATP

The Next Generation of Reliable Hygiene Verification

This webinar will begin at 2pm (GMT)

The background image is a composite of several elements: a gloved hand holding a green swab on the left, a Lumimeter Smart device in the center, and a bowl of food (oatmeal with fruit) on the right. The entire image has a dark blue overlay.

Beyond ATP

**The Next Generation of
Reliable Hygiene Verification**

Speakers



Alex Carlyon
Director



Radek Tameczka
A3 Specialist



Edward Campion
Hygiene
Transformation
Project Manager



Mercè Sánchez
Programme
Manager – Global
Food Standards



Yusei Tsuda
Head of Overseas
Hygiene Testing



Agenda



**Cleaning
Verification &
BRCGS Audit
Compliance**



**Exploring the A3
Technology**



**Practical
Adoption
Insights**



**Live Q&A
Session**

Hygiene Verification & BRCGS Food Safety Version 9



Mercè Sánchez

Programme Manager – Global Food Standards

BRCGS

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Housekeeping and hygiene (4.11)



Fundamental

Housekeeping and cleaning systems shall be in place which ensure appropriate standards of hygiene are maintained at all times and the risk of product contamination is minimised.

4.11.1	Cleanliness of premises and equipment
4.11.2	Documented cleaning procedures
4.11.3	Cleaning performance limits
4.11.4	Training and records
4.11.5	Cleaning inspection and sign-off
4.11.6	Cleaning equipment

4.11.7 Cleaning in place (CIP)

4.11.7.1	Effective operation, maintenance and validation of CIP systems
4.11.7.2	Operation of CIP equipment
4.11.7.3	Maintenance of the CIP system
4.11.7.4	Monitoring of CIP

4.11.8 Environmental monitoring

Risk-based environmental monitoring programmes shall be in place for relevant pathogens or spoilage organisms. At a minimum, these shall include all production areas with open and/or ready-to-eat products.

4.11.8.1	Risk-based environmental monitoring programme
4.11.8.2	Control or action limits
4.11.8.3	Review of the environmental monitoring programme

Housekeeping and hygiene in high-risk and high-care zones (8.5)

8.5.1	Documented cleaning procedures
8.5.2	Cleaning performance limits
8.5.3	Cleaning equipment
8.5.4	CIP equipment

Non conformities review

Cleanliness of premises and equipment →

Documented cleaning procedures →

Cleaning equipment →

Risk-based environmental monitoring programme →

Clause	N# Non conformities	Ranking
4.11.1	5304	1
4.11.2	2143	10
4.11.3	341	145
4.11.4	149	195
4.11.5	450	121
4.11.6	1583	26
4.11.7.1	94	232
4.11.7.2	137	203
4.11.7.3	96	229
4.11.7.4	104	219
4.11.8.1	1095	47
4.11.8.2	278	157
4.11.8.3	426	127
8.5.1	35	291
8.5.2	10	370
8.5.3	70	250

Non conformities review

4.11.1

The premises and equipment shall be maintained in a clean and hygienic condition.

Cleaning status
of equipment
and premises

TRICKS AND TIPS

Appropriate limits of acceptable cleaning performance shall be defined.

During the course of the audit, equipment that is not currently operating will be opened and inspected to assess whether cleaning has been completed appropriately and in accordance with the site's policies (including the acceptable limits), as well as to assess post-cleaning checks.

Production lines that are running will not be stopped for inspection, although records may be checked to ensure equipment was appropriately cleaned and checked prior to use.

Non conformities review

4.11.2

Documented cleaning and disinfection procedures shall be in place and maintained for the building, plant and all equipment. Cleaning procedures for the processing equipment and food contact surfaces shall, at a minimum, include:

- responsibility for cleaning
- item/area to be cleaned
- frequency of cleaning
- method of cleaning, including dismantling equipment for cleaning purposes where required
- cleaning chemicals and concentrations
- cleaning materials to be used
- cleaning records (including records for completion and sign-off) and responsibility for verification.

The frequency and methods of cleaning shall be based on risk.

The procedures shall be implemented to ensure appropriate standards of cleaning are achieved.

**Lack of evidence of verification (not well recorded).
Lack of verification.**

TRICKS AND TIPS

Developing a cleaning procedure can be done in a few simple steps:

Step 1 Set the required standard of cleaning

Step 2 Develop draft procedures

Step 3 Validate the draft procedures

Step 4 Finalise procedures and associated documentation (e.g. cleaning records and sign-off)

Step 5 Train relevant staff

Step 6 Complete ongoing monitoring and verification

Non conformities review

4.11.6

Cleaning equipment shall be:

- hygienically designed and fit for purpose
- suitably identified for intended use (e.g. colour-coded or labelled)
- cleaned and stored in a hygienic manner to prevent contamination.

Lack of verification of cleaning equipment (e.g. dosage of chemicals in cleaning stations).

TRICKS AND TIPS

- Equipment or utensils used for cleaning activities, must be suitable for the purpose for which it is intended and capable of achieving the desired level of cleaning.
- Stored hygienically and in a manner that prevents contamination (e.g. stored in designated locations and not in contact with the floor).

Non conformities review

4.11.8.1

The design of the environmental monitoring programme shall be based on risk, and at a minimum include:

- sampling procedures
- identification of sample locations
- frequency of tests
- target organism(s) (e.g. pathogens, spoilage organisms and/or indicator organisms)
- test methods (e.g. settle plates, rapid testing and swabs)
- recording and evaluation of results.

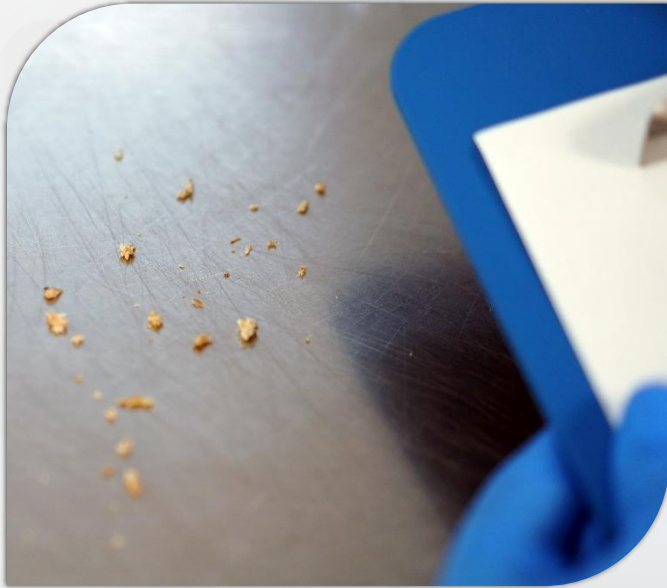
The programme and its associated procedures shall be documented.

Lack of controls and verification of results related with environmental monitoring programme.

TRICKS AND TIPS

- **Sampling procedure**
 - ✓ Sampling method does not inadvertently create false positives or false negatives.
 - ✓ Timing and intended purpose of the sampling are relevant as the cleaning validation, monitoring and verification
- **Frequency of tests**
 - ✓ These require a greater frequency of testing than those that do not support growth
 - ✓ Locations with previous positive results or an upward trend towards an action level (Clause 4.11.8.2). These are likely to require increased testing to confirm the effectiveness of the action taken
- **Test methods.**
- **Recording and evaluation of results.**

Hygiene Verification



**Visual
Inspection**



**Rapid Hygiene
Verification Test**



**Complementary
Testing Methods:
Protein Swabs and pH
or Conductivity Tests**

Why ATP Tests don't show the full picture

ATP is a high-energy unstable compound that naturally breaks down under a variety of conditions.

Several processes can accelerate ATP degradation. For example:

- ✓ Heating
- ✓ Use of cleaning agents or disinfectants
- ✓ Physical or environmental stress



ATP Tests and Food Safety

ATP degradation gives a false impression of cleanliness.

Even when food residues contain little or no ATP, they can still pose serious risks:

- ✓ Allergen carryover
- ✓ Microbial regrowth
- ✓ Biofilm formation
- ✓ Physical contamination

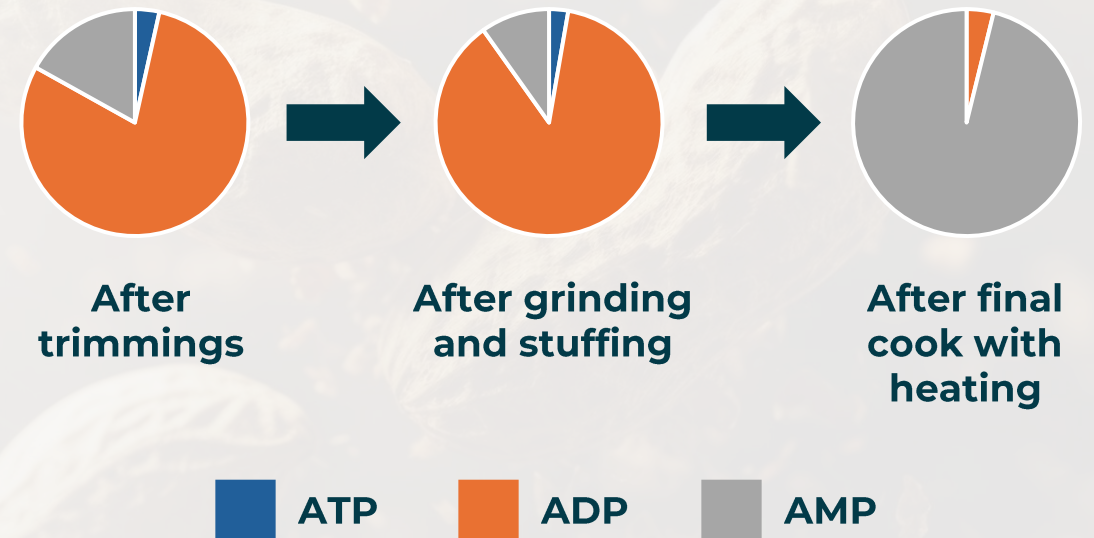


Figure 1: The change of ratios of adenylates at select manufacturing steps during smoked sausage production at UW-Madison Meat Science and Muscle Biology Laboratory.

The History of the A3 System

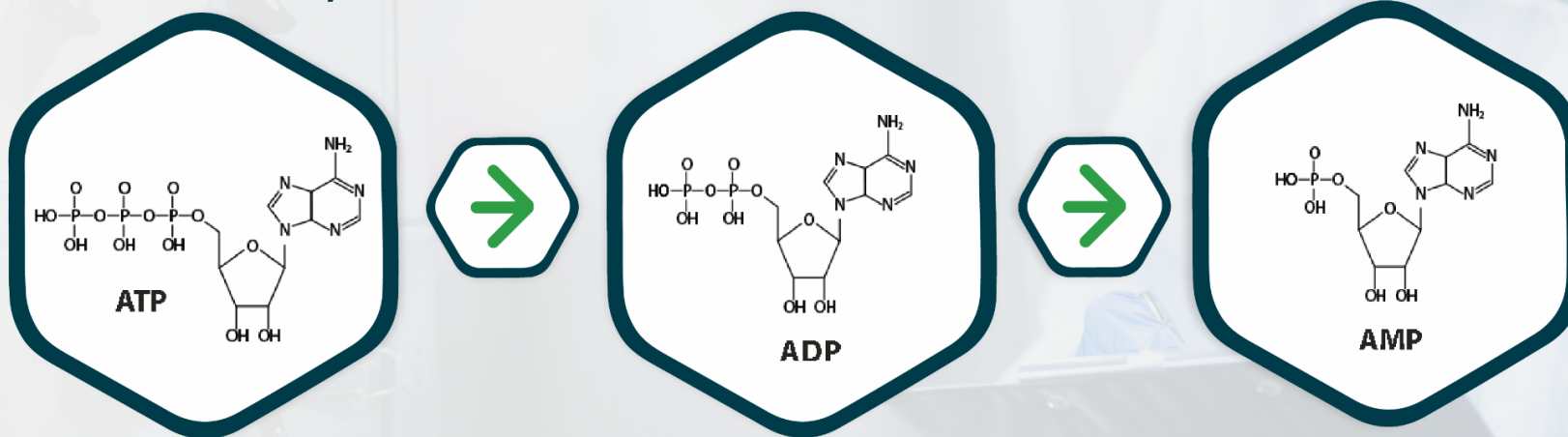


Yusei Tsuda
Head of Overseas Hygiene Testing



ATP Testing

- In 1998, Kikkoman launched the first-generation LuciPac Swab. It measured ATP.
- The LuciPac Swab was an immediate success, as it enabled on-the-spot cleanliness checks.
- However, ATP is an unstable molecule that breaks down into ADP and AMP.



ATP and AMP Testing

- In 2001, Kikkoman launched the second-generation LuciPac Pen Swab. It measured ATP and AMP.
- The LuciPac Pen Swab was extremely well received, as it could detect contamination that ATP-only tests would miss.
- However, the LuciPac Pen Swab had a blind-spot. It was unable to detect ADP-rich residues.



The Adenylate composition of different food materials

Food Products	Adenylate Composition
Raw animal products (milk, meat, fish)	High levels of ADP
Processed and fermented foods (processed meat, processed fish, shellfish, eggs, ice cream)	High levels of AMP
Plant-based foods like grains and especially nuts (peanuts, beer, spinach)	High levels of AMP

The A3 System

In 2017, Kikkoman launched the LuciPac A3 System – a device that can measure ATP, AMP and ADP simultaneously.



Looking Ahead



**The A3 System measures
ATP + AMP + ADP.
It detects what ATP-only
tests miss.**



**The A3 System is now used
in more than 75 countries,
helping sites to advance
hygiene management.**



**Kikkoman and
Klipspringer will
continue to support
the food industry.**

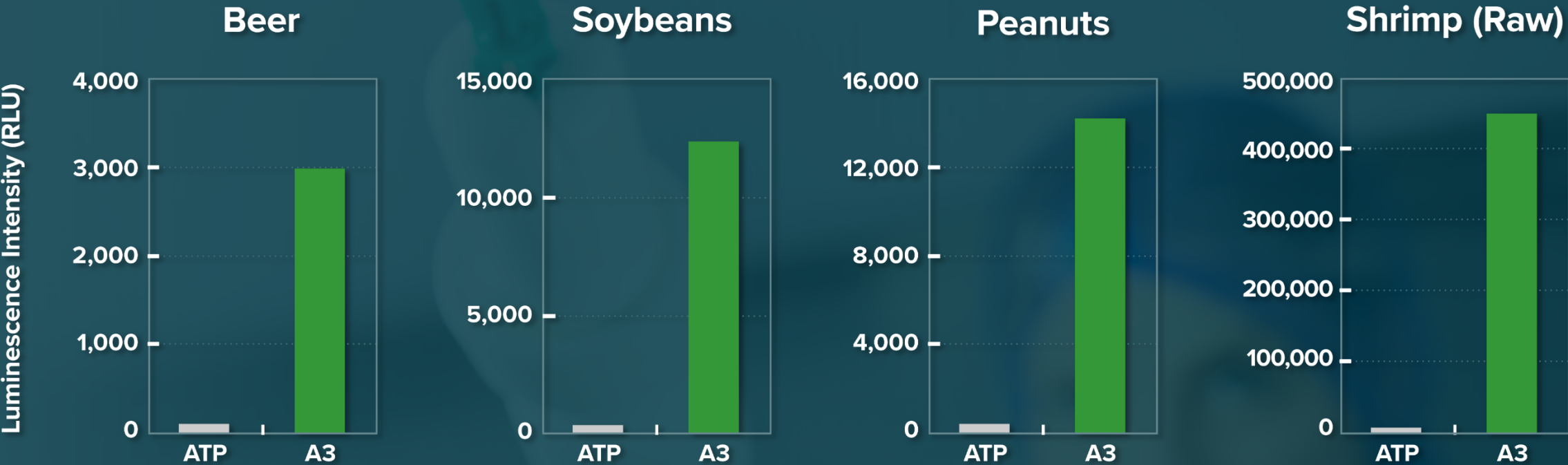


Video Comparison: **ATP Tests vs The A3 System**

Results

	Bread	UHT Milk	Egg	Steak
ATP	⚡ Quick Test Result ✓ Pass 43 RLU 29/10/2025 16:23	⚡ Quick Test Result ✓ Pass 45 RLU 29/10/2025 16:34	⚡ Quick Test Result ✓ Pass 76 RLU 29/10/2025 16:30	⚡ Quick Test Result ✓ Pass 131 RLU 29/10/2025 16:54
A3	kikkoman® #0441 28/10/2025 18:06 4238	kikkoman® #0439 28/10/2025 18:01 13307	kikkoman® #0440 28/10/2025 18:04 2143	kikkoman® #0438 28/10/2025 17:58 35236
				

ATP and Allergens



Reference: M Bakke et al. J Food Prot., Vol. 83.

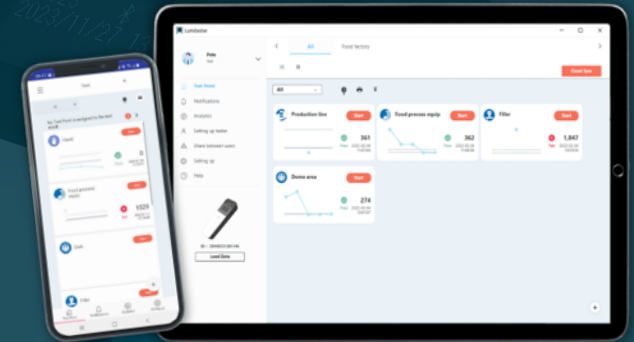
The A3 System – Components



**The Lumitester™ Smart
measuring instrument**



**Dry Swabs,
Pre-moistened Swabs,
Water Swabs**



**Data Management
and Connectivity**

Setting and Validating Benchmarks

4.11.3

Limits of acceptable and unacceptable cleaning performance shall be defined for food contact surfaces and processing equipment. These limits shall be based on the potential hazards relevant to the product or processing area (e.g. microbiological, allergen, foreign-body or product-to-product contamination). Therefore, acceptable levels of cleaning may be defined by visual appearance, ATP bioluminescence techniques (see glossary), microbiological testing, allergen testing or chemical testing as appropriate.

The site shall define the corrective action to be taken when monitored results are outside of the acceptable limits.

Where cleaning procedures are part of a defined prerequisite plan to control the risk of a specific hazard, the cleaning and disinfection procedures and their frequency shall be validated and records maintained. This shall include the risk from cleaning chemical residues on food contact surfaces.

Source: BRCGS Global Food Safety Standard Version 9

Setting and Validating Benchmarks

- Record A3 values after each type of clean
- Perform clean and re-clean trials
- Demonstrate the best achievable clean
- Include results from allergen or protein swabs
- Record results from microbiological testing
- Adjust benchmarks based on product type, surface type, and cleaning frequency

Setting and Validating Benchmarks

Explanation of "Validation Measurement"

This sheet is for setting your own pass/fail limits

1. Site		Measurement A3 in RLU	pH	Microbiological Analysis in CFU / g	Pass / Fail Limit	5
A	No. 1	200				80%
	No. 2	200	3.	4.	lower limit A3 200 ✓	200
	No. 3	81			upper limit A3 400	400
	No. 4	99				
	No. 5	74				
B	No. 1	487				80%
	No. 2	501			lower limit A3 500 ✓	501
	No. 3	465			upper limit A3 1000	1002
	No. 4	455				
	No. 5	502				
C	No. 1	302				80%
	No. 2	354			lower limit A3 300 ✓	334
	No. 3	334			upper limit A3 600	668
	No. 4	299				
	No. 5	311				
D	No. 1	154				80%
	No. 2	187			lower limit A3 200 ✓	187
	No. 3	149			upper limit A3 400	374
	No. 4	159				
	No. 5	193				
E	No. 1	254				80%
	No. 2	233			lower limit A3 300 ✓	256
	No. 3	300			upper limit A3 600	512
	No. 4	256				
	No. 5	254				

1. name your test point

2. insert five A3 results for test point "A"

3. insert pH values for liquid samples

4. insert microbiology analysis

5. Pass/ Fail limit is calculated

6. lower and upper limit is calculated by rounding pass / fail limit and then multiplying by 2

Practical insights on adopting the A3 System



Edward Champion
Hygiene Transformation Project
Manager



Practical insights on adopting the A3 System



**Past
experiences
with ATP**



**Validation
study
(A3 vs ATP)**



**Reliable
data**



**The
Benefits**

Live Q&A



Further information & support



<https://www.klipspringer.com/a3-monitoring>

Klipspringer
Compliance with confidence



Radek Tameczka
A3 Specialist

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www.klipspringer.com



Thank you