



**FOOD SAFETY SCIENTIFIC  
AUSTRALIA PTY LTD**

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**FSSA**

**INNOVATIVE FOOD SAFETY SOLUTIONS**

**Because better detection  
equals better protection.**



Food & Beverage Processors



Food Service



Hygiene Education and Feedback



**Lumitester<sup>TM</sup>**

**With A3 Detection**

**ATP+ADP+AMP**

*More Reliable and Sensitive*

*A3 Finds What Others Miss*

**Rapid**

Rapidly verify sanitation processes on-site  
Can be used as on-site improvement tool

**Simple & Easy**

Easy to operate  
Usable for anybody

**Numerical**

Result is displayed as numeric value  
Easy to standardize

**Accurate**

Detects not only ATP, but also ADP and AMP  
Finds what other methods miss

**kikkoman<sup>®</sup>**



## What is A Novel ATP Test? - ATP Test (Kikkoman A3)

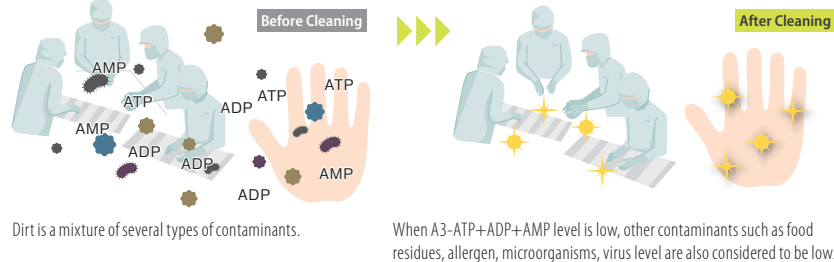
Kikkoman has developed ATP Test (Kikkoman A3) by utilizing brewing technique of soy sauce. Kikkoman's own Kikkoman A3 allows you to detect not only ATP but also ADP and AMP have been overlooked.

### What is ATP,ADP,AMP?

ATP (adenosine triphosphate) is a molecule found in all living cells and serves as an indicator of overall surface hygiene and cleaning Efficacy. ADP (adenosine diphosphate) and AMP (adenosine monophosphate) are derived from ATP during the processing, such as heat treatment and fermentation.

### Object to be measured

ATP, ADP, AMP are present in bacteria, food residues



### Kikkoman A3

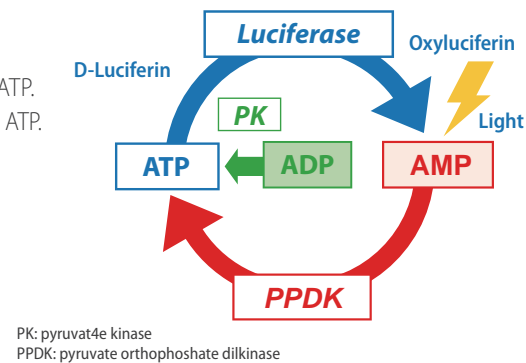
Kikkoman has forever improved the ATP test using Kikkoman A3 that employs advanced chemistry to detect ATP+ADP+AMP to offer higher sensitivity and better detection.

#### ATP recycling enzyme

PK: Enzyme for the conversion of ADP to ATP.  
PPDK: Enzyme for the conversion of AMP to ATP.

#### Luciferase

Enzyme for producing light in the presence of ATP



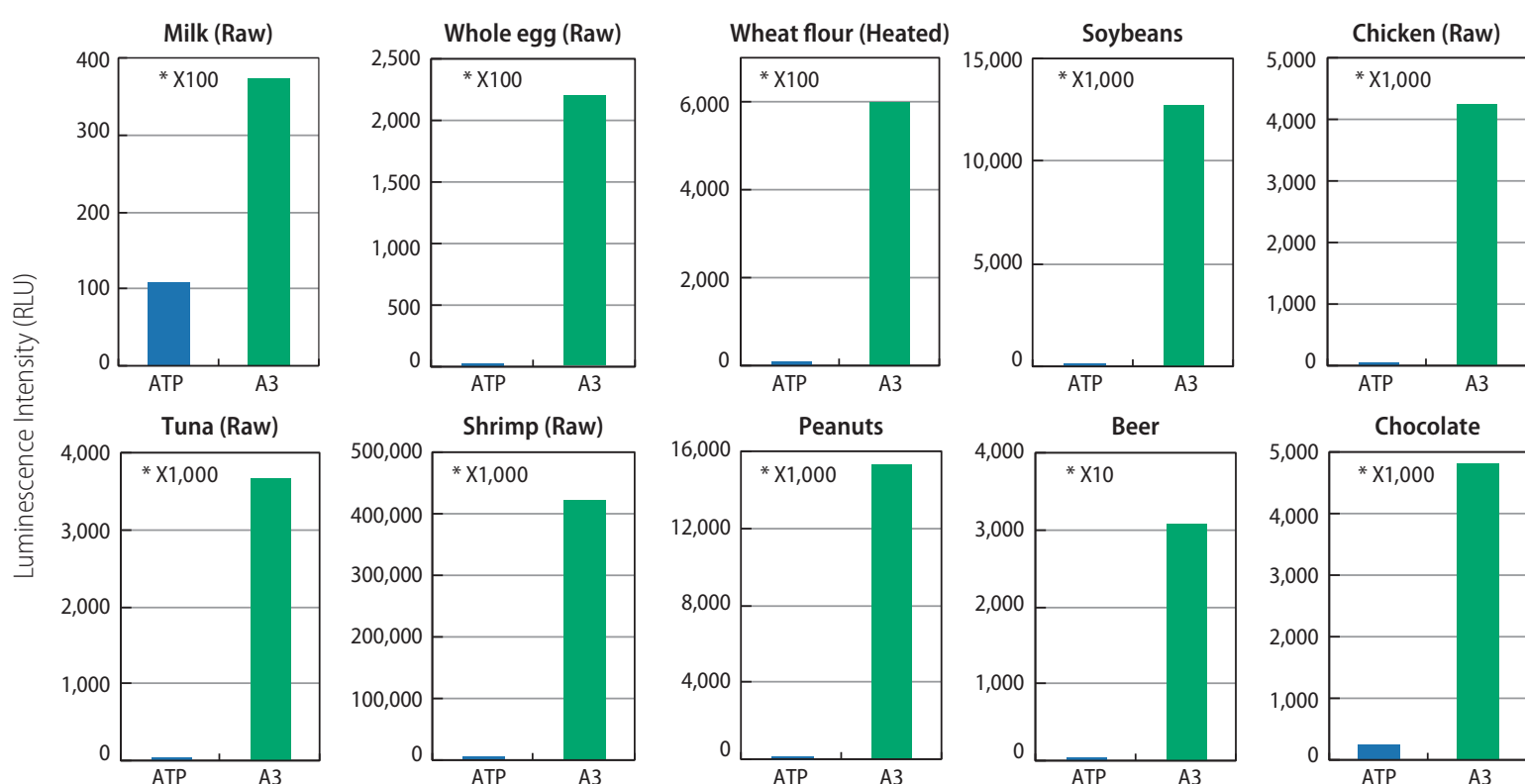
## Kikkoman A3- Detects ATP+ADP+AMP / More Reliable and Sensitive

LuciPac A3 detecting ATP+ADP+AMP, showed superior sensitivity and stability for detection of food residues and allergens compared to conventional ATP assays.

※ATP+ADP+AMP Hygiene Monitoring System (A3 Assay) is named originally by Kikkoman.

### A3 vs. ATP in Food

Food residues which contain high level of ADP, AMP such as meat, fish, processed food are detectable with high sensitivity.



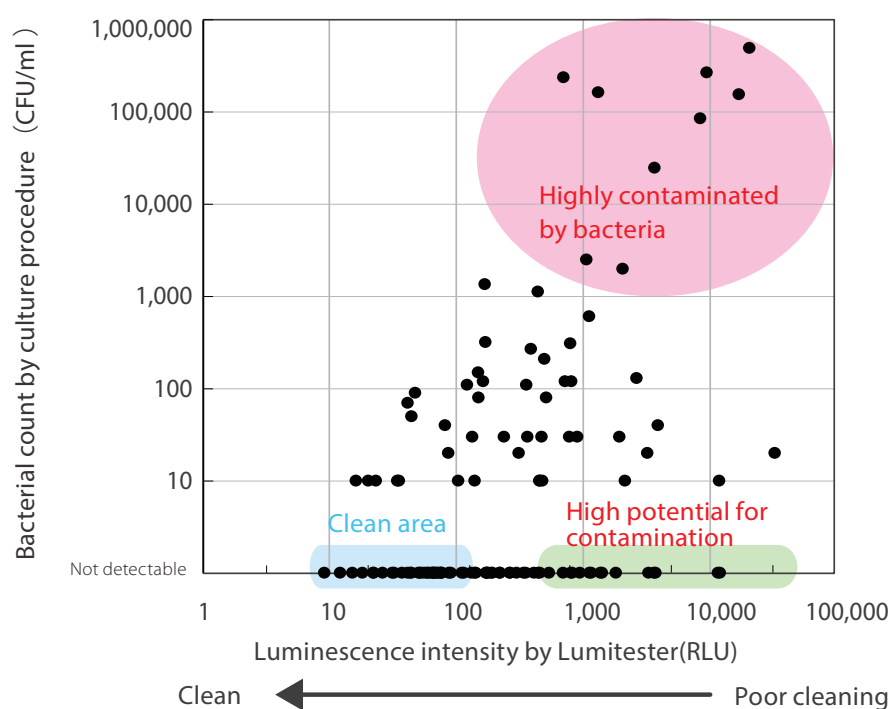
Reference: "Comparison of Detection Limits for Allergenic Foods between Total Adenylate (ATP+ADP+AMP) Hygiene Monitoring Test and Several Hygiene Monitoring Approaches" M. Bakke et al. *J. Food Prot.*, Vol. 83, No. 7



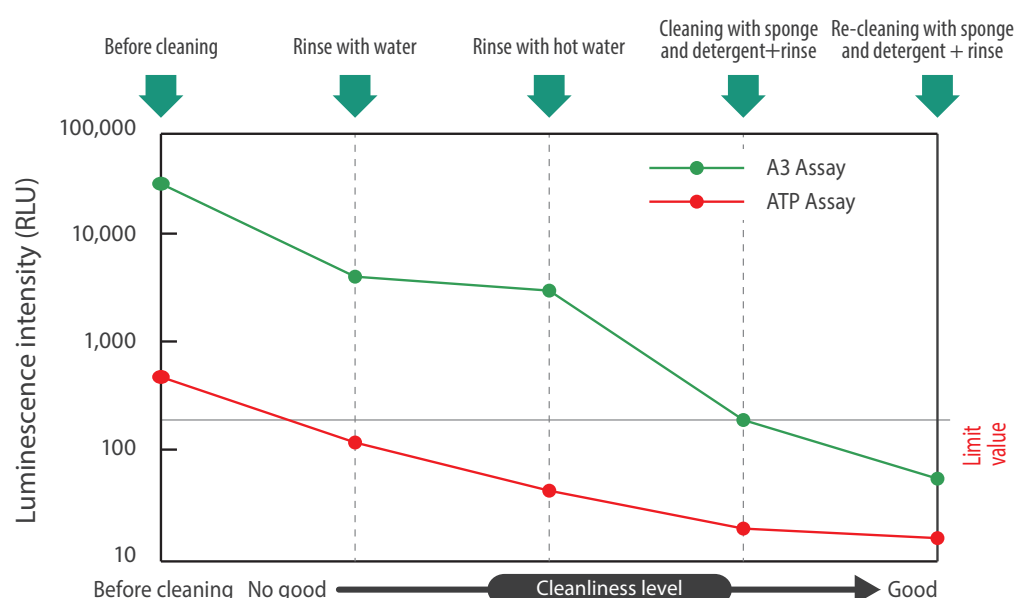
## Kikkoman A3- Indicator of Hygiene Monitoring / Prevents Contamination

Sanitation is critical to food safety. Kikkoman A3 prevent ineffective cleaning by monitoring environmental contamination. Many of the food processors use Kikkoman A3 as part of the sanitation program to verify the effectiveness of its processes.

### Correlation between bacterial counts and ATP+ADP+AMP level



### Evaluation of cleaning(stainless surface)



Kikkoman A3 represents a novel ATP test that can detect residues left behind by ineffective cleaning at lower levels.



# Implementation Guide — Case example of initial stage —

## ATP Test (Kikkoman A3) for Preventive Controls

Easy to use and provides immediate feedback and verification of sanitation processes. Enables monitoring environmental contamination, including food residues and bacteria, and for detection of biofilms that can harbor pathogens and allergens.



### Food & Beverage Processors

Evaluate the cleanliness of production line

#### Determination of test locations

- The areas likely remain contaminated such as valves of tank outlet or pipe-coupling packings
- The surface of conveyor belts contact with products or raw materials directly

#### Pass/fail limits and swabbing methods

- 200 RLU or lower:** Smooth / direct contact / easy-to-clean surfaces (e.g. stainless, glasses)
- 500 RLU or lower:** Unsmooth / indirect contact / hard-to-clean surfaces (e.g. resin products)
- Large sample:** Swab 10 cm square area you want to measure vertically and horizontally about 10times for each.
- Small sample:** Swab the entire area thoroughly

LuciPac A3 can be used for daily evaluation of cleaning, also allows for users can detect especially contaminated locations. The risk of presence of residual allergens can be decreased by thorough washing.



Test points	Limits lower/pass   upper/fail	Swabbing method
Filler / Nozzle	200   400	Swab the inner surface and make circles 2 to 3 times, while turning the cotton swab around
Tank	200   400	10 cm square of the center bottom portion and top end portion of the inside
Pipe	200   400	Swab the inner surface and make circles 2 to 3 times, while turning the cotton swab around
Valve	200   400	Inner side such as disk, seat
Processing equipment (e.g. meat processing equipment)	500   1000	10 cm square around the center
Production line (e.g. conveyor)	500   1000	10 cm square around the center

※When you make a measurement, it needs to be performed after cleaning.

### Food Service

Prevent secondary contamination by hygiene monitoring

#### Determination of test locations

- The areas difficult to wash and likely remain contaminated
- The areas contact with food that is not sterilized (raw food)

#### Pass/fail limits and swabbing methods

- 200 RLU or lower:** Smooth / direct contact / easy-to-clean surfaces (e.g. stainless, glasses)
- 500 RLU or lower:** Unsmooth / indirect contact / hard-to-clean surfaces (e.g. resin products)
- Large sample:** Swab 10 cm square area you want to measure vertically and horizontally about 10times for each.
- Small sample:** Swab the entire area thoroughly

You can check if cleaning is properly done with on site measurement, then prevent the accident with re-cleaning. A numerical display of test results allows effective cleanliness management, comparing readings from different shops, sites, etc



Test points	Limits lower/pass   upper/fail	Swabbing method
Knife	200   400	Both sides of the entire blade, a handle, joint between the blade and the handle
Cutting board	500   1000	Swab a 10 cm by 10 cm area at the center in the left-to-right and up-to-down directions
Counter / Table	200   400	Swab a 10 cm by 10 cm area at the center in both the left-to-right and up-and-down directions
Refrigerator handle	500   1000	Swab the entire surface of the handle

※When you make a measurement, it needs to be performed after cleaning.

### Hygiene Education and Feedback

Conduct hygiene education for employees  
Encourage hand washing by training and feedback

#### When do you measure?

- Please use this kit after hand washing and before using disinfectants.

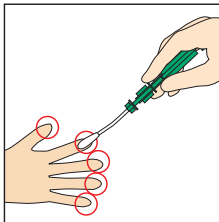
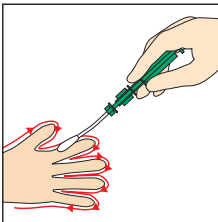
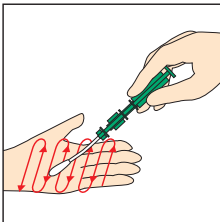
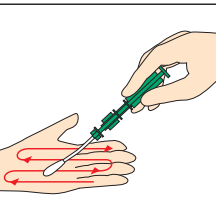
#### Pass/fail limits and swabbing methods

- 2000 RLU or lower※:** After hand washing.  
Swab entire palm including fingertips and between fingers,etc.

Hand washing is primary measure of infection prevention and control!



Test points	Limits lower/pass   upper/fail	Swabbing method
Hand washing / Hand and Fingers	2000   4000	Swab the entire palm of the hand over 5-10passes in the left-to-right and up-to-down directions as well as between fingers and the tips of fingers



※90% of people can achieve this level when they conduct A3 test after hand washing. Since the previous model, LuciPac Pen, detects ATP+AMP, the pass limit is 1500 RLU.

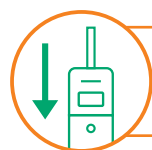
**Note** Please note that benchmark RLU value depends on the condition of the surface, and type of ingredients/materials contacted on the surface, also risk management level of the area. We recommend our customer to conduct self-validation and establish own pass/fail limit.



# DAILY HYGIENE MONITORING FOR HYGIENE MANAGEMENT

With the App, anyone can check cleanliness easily

App  
Lumitester

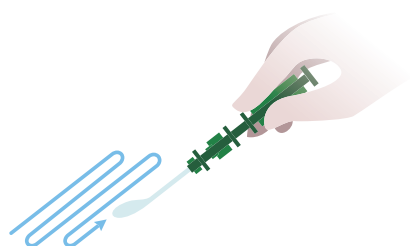


## Measure | Detection Perfection in 10 Seconds

STEP  
1

### Swab

Swab the sample and insert the swab into main body



STEP  
2

### Measure

Shake well and insert into the Lumitester



STEP  
3

### Analyze

Measurements (RLU) displayed within 10 seconds



## Understand | App to continuously monitor multiple data

Recorded data can be displayed in time-series by registering with our specialized App. Inspection pass rates are automatically graphed and improvements can be visualized. Employees will be more conscious of hygiene, and will maintain a high standard of environmental sanitation, which will help build greater trust in your business



Display time-series data for each inspection



Visualize overall inspection scores through graphs



## Connect | Centralized multi-site data with cloud data management

Data will be stored in the cloud and can be accessed from anywhere in the world. This will allow fast detection and response to any problems that may arise.



### ■ Rapid Hygiene Monitoring System

Lumitester™ Smart Product code: 61234

Measurement time: 10 seconds

Data output: RLU (Relative Light Unit)

Power: Two AA alkaline or nickel hydride rechargeable batteries

Accessories: Two AA alkaline batteries, cleaning brush, USB cable, strap, Quick Manual

- ※ Do not use this product for purposes other than hygiene monitoring.
- ※ It is not to be used for counting general living bacteria or detecting specific pathogens.

### ■ ATP Test (Kikkoman A3) LuciPac™ A3

LuciPac™ A3 Surface  
LuciPac™ A3 Water

Product code: 60361 100 swabs/kit  
Product code: 60365 100 swabs/kit

Storage Condition: 2-8°C (Do not freeze)

25°C: 14 days (Unopened)

30°C: 5 days (Unopened)

Expiry: 15 months after manufacturing date

- ※ Use LuciPac A3 for Lumitester Smart, PD-30 or PD-20. Do not use it for other models.

## Kikkoman Biochemifa Company

※ The information contained in this leaflet is subject to change without further notice. © 202 Kikkoman Corp. (1512C2 0 01)



Learn about Kikkoman A3



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