

Microbial quality control and mycotoxin quantification in beverage production

Innovative solutions for your economic success



Innovation built on tradition: Over 50 years of expertise in research, development, and production of flow cytometric solutions in Germany

Profit Maximization in the Beverages Industry: Quality Control Redefined

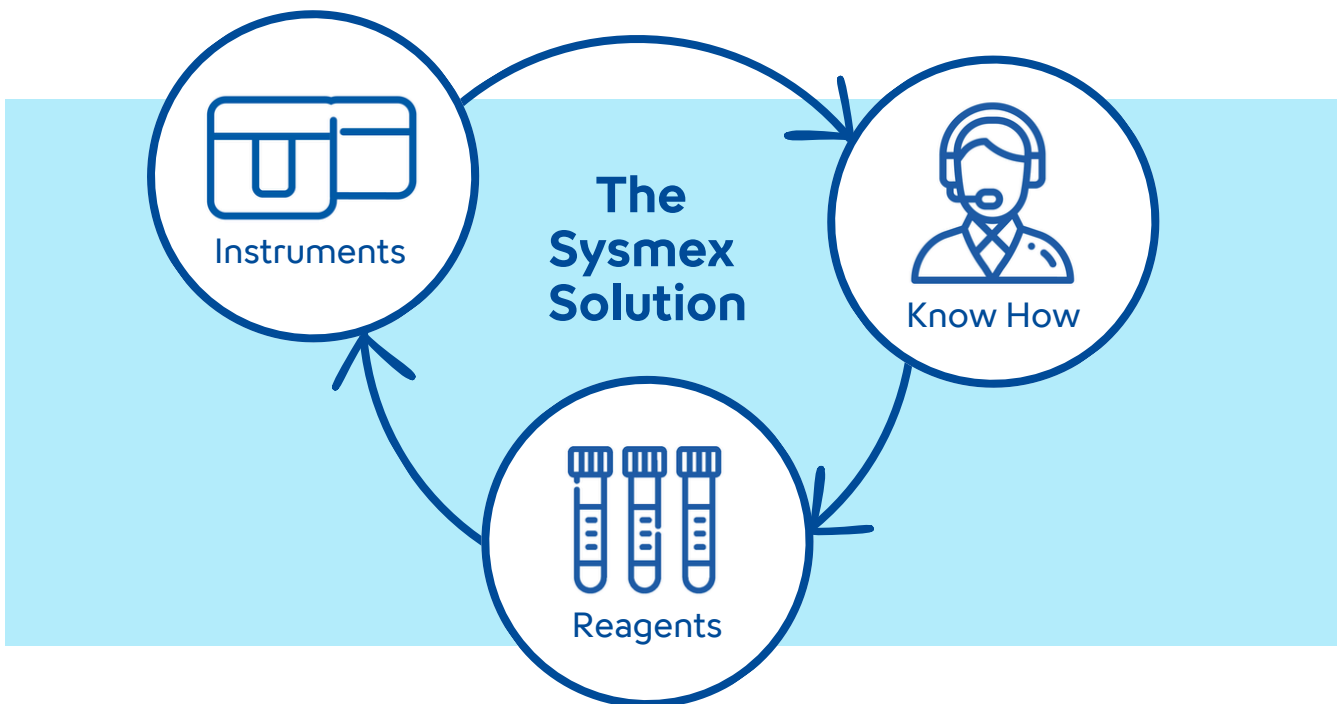
In the beverage industry, profit maximization also depends on efficient quality control (QC). An important aspect of this is effective QC for microorganisms and mycotoxins. Any undetected contamination can lead to costly recalls and reputational damage, resulting in loss of profit. The standard procedure for microbiological QC is the cultivation of microorganisms on agar plates. This method involves incubation times of several days and is based on the visual detection of microorganism colonies and their documentation by laboratory personnel. The flow cytometric solutions from Sysmex Partec offer the advantage of being significantly faster than plating while maintaining at least the same sensitivity.

How can you ensure that your products always meet the highest quality standards? An innovative quality control not only quickly and reliably detects bacteria, yeasts, molds and mycotoxins, but is also highly sensitive.



The Sysmex Partec Solution

Our established device platforms such as the CyFlow™ Cube 6 V2m or the new CyFlow™ RI-300, in combination with various reagent kits, enable fast and reliable QC. For microbiological QC, the CyStain™ VitalCount Kit and the FlowVIT® Kits Alicyclobacillus and Dekkera anomala can be used. In addition, the SAFIA Mycotoxin Assays enable the quantitative detection of the most important mycotoxins. The water used in beverage production can be analyzed and bacteriologically monitored using the CyStain™ BacCount Kits.



Instruments: The CyFlow™ Cube 6 V2m and the new CyFlow™ RI-300 enable precise, fast and reliable flow cytometric measurements. Thanks to an optimized workflow, software analysis tools and meaningful reports, operation is easy to learn. The pre-prepared analysis templates minimize the risk of incorrect interpretations.

Reagents: CyStain™ kits stand for fast and easy sample preparation, measurement and analysis. For example, Cystain™ VitalCount consists of only four components. The execution of all kits is limited to a few work steps. The FlowVIT® kits for the specific detection of Alicyclobacilli and the yeast Dekkera anomala complete the microbial QC. You can achieve additional safety for your customers through mycotoxin detection. Cystain™ BacCount Total and Viable are suitable for the rapid detection of bacteria in water.

Know How: Our team of application specialists and scientists supports you in implementing our quality control solutions.

The Sysmex Partec Solution

Reliable quality control is a prerequisite for a smooth production and product release process. Classic growth-based methods, such as plating in microbiological QC, are very time-consuming. It can take up to 8 days to detect contamination. To prevent potentially contaminated products from entering distribution, this long incubation period must be waited for before the final product is release. Otherwise, a company risks product recalls.

The Sysmex Partec CyStain™ VitalCount test system delivers results for 96 samples in about 4 hours, after a pre-incubation of 24-48 hours. Product release can thus be carried out with time savings of up to 83%. This leads to significant savings in storage costs.

The CyStain™ VitalCount test system can be supplemented by CyStain™ BacCount Viable and/or CyStain™ BacCount Total for the determination of the viable or total bacterial count in production and process water.

In addition, harmful germs in raw materials, concentrates or end products can be detected using FlowVIT® Alicyclobacillus and FlowVIT® Dekkera anomala.

The microbiological QC can be expanded to include the detection of mycotoxins using mycotoxin test kits, which can also be analyzed on the Sysmex Partec device platform. Various relevant and potentially harmful mycotoxins can be reliably quantified within 30-120 minutes, depending on the sample type.

Classic microbiological QC:

- Time-consuming: Up to 8 days until results
- Long product release times
- Risk of product recalls
- High storage costs

Advantages of the Sysmex Partec test system:

- Fast results: depending on the test, already after 30 minutes
- Time savings in product release: Up to 83%
- Reduced risk of recalls
- Storage costs per production unit reduced by up to 37% *

*Calculation based on the storage cost simulation of one of our customers with and without the use of the CyStain™ VitalCount Kit

Our customers say



” An advantage of using flow cytometry and CyStain™ VitalCount is the 3-day faster product release. Samples can be analyzed quickly and abnormalities identified. In the past, this has meant that we have been able to hold back and destruct contaminated batches.

“

Customer with a production of 3 million beverage units per day

Sysmex Technology. How does it work?

The analysis of the microorganisms with the CyStain™ VitalCount Kit is based on a membrane-permeable substrate that diffuses into all microorganisms. The substrate is enzymatically cleaved into a green fluorescent product in living microorganisms. This product accumulates in the cells. The sample is then analyzed in the CyFlow™ Cube 6 V2m or CyFlow™ RI-300 flow cytometer. Living cells containing the fluorescent product emit a green fluorescent signal when excited by a laser. Dead cells do not show fluorescence because they cannot metabolize the substrate into the fluorescent product.

FlowVIT® Alicyclobacillus and FlowVIT® Dekkera anomala are based on the gene probe principle FISH (fluorescence in situ hybridization). Here, the fluorescence-labeled gene probes - specific for a particular microorganism - pass through the membrane into living and dead cells. There they bind according to the lock-and-key principle, but only to the non-denatured RNA of living cells and are measured in the flow cytometer. The Alicyclobacillus test detects both Alicyclobacillus spp. and Alicyclobacillus acidoterrestris. It can be carried out within 2 days, including a pre-incubation, or 3 hours without pre-incubation. The FlowVIT® test for Dekkera anomala is even completed within 3 hours, as no pre-incubation is required.

With the help of the SAFIA mycotoxin tests, several mycotoxins, for example AFL, DON, ZEN, FUM or T-2, can be quantified simultaneously within 30-120 minutes. This is done using specific SAFIA multiplexing technology on the same flow cytometer. The time span depends on the sample material and the type of measurement (single manual measurement or measurement of 96 samples in the autoloader).

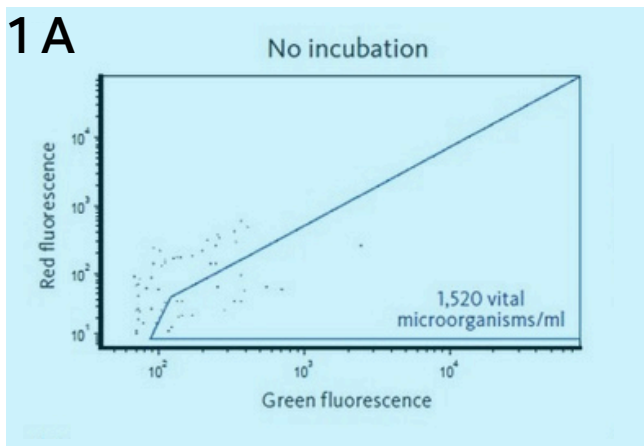


CyFlow™ RI-300 Flow Cytometer with Autoloader CyFlow™ AL-20

Application example viable cell count

CyStain™ VitalCount enables the quantification of living bacteria, yeasts and molds. Figure 1 shows the analysis of an apple juice sample before and after pasteurization using the CyStain™ VitalCount test system: In Figure 1A and 1C it can be seen that the microorganisms contained in the juice before pasteurization can be detected. If the juice samples are pasteurized, no more microorganisms can be detected (Figure 1B and 1D).

Before Pasteurization



After Pasteurization

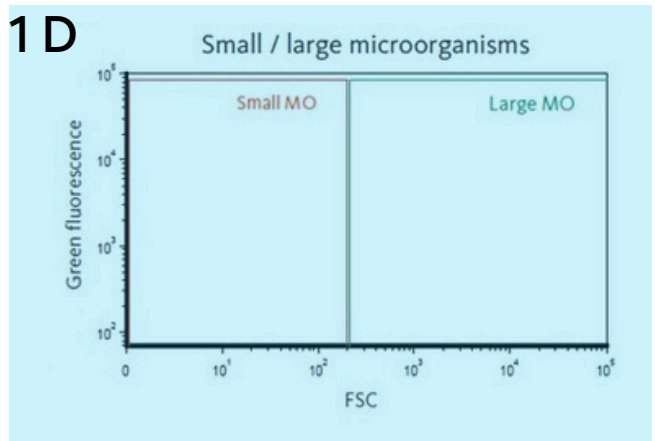
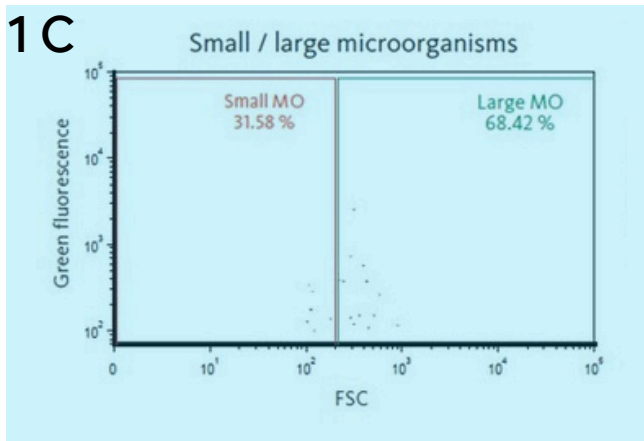
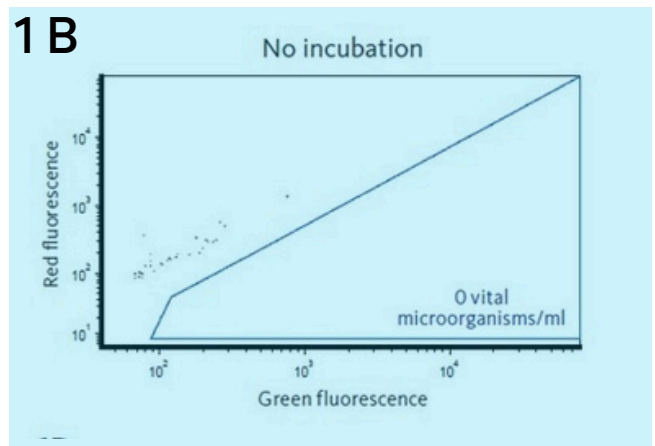


Figure 1: Representation of measurements of apple juice samples that were stained with the CyStain™ VitalCount Kit and measured with the CyFlow™ Cube 6 V2m flow cytometer.



Application example detection of harmful germs

FlowVIT[®] Alicyclobacillus and FlowVIT[®] Dekkera anomala are used for the specific detection of microorganisms in juice based on FISH technology. Figure 2 shows an example measurement of the FlowVIT[®] Alicyclobacillus kit in orange juice. There is no contamination with Alicyclobacillus spp. or Alicyclobacillus acidoterrestris in the sample.

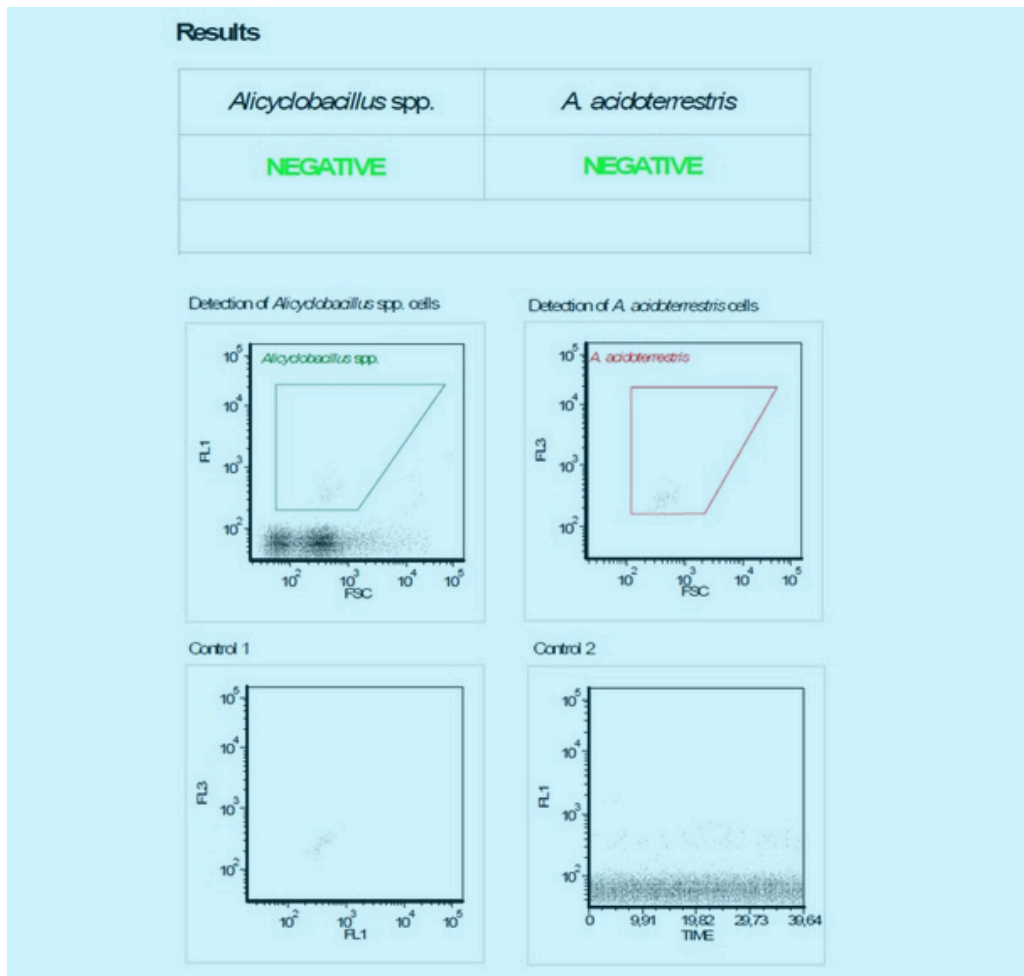


Figure 2: Measurements of an orange juice sample with the FlowVIT[™] Alicyclobacillus Kit on the CyFlow[™] RI-300 or Cube 6 V2m flow cytometer.



Application example quantification of mycotoxins

With the help of the SAFIA mycotoxin kits, storage and field toxins in beverages can be quantified. Figures 3 and 4 show example measurements with the SAFIA Mycotoxins Screening Kit:

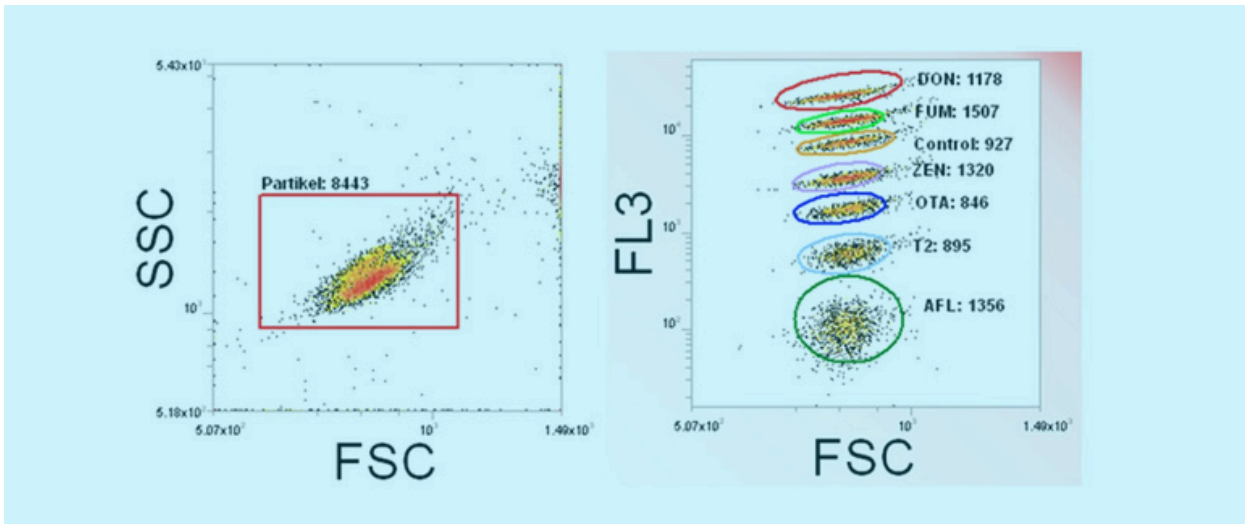


Figure 3: Measurement and quantification of mycotoxins using SAFIA Multiplexing technology of the Mycotoxins Screening Kit on the CyFlow™ Cube 6 V2m.

Orange Juice 1 Dilution Factor: 8				Orange Juice 2 Dilution Factor: 8			
Analyte	[µg/l]	Interpretation	Included	Analyte	[µg/l]	Interpretation	Included
Control	0.454 ± 0	passed (<1.52 µg/L)	3/3	Control	Out of Lower Co...	passed (<1.52 µg/L)	0/3
OTA	0.105 ± 0.0590	<1.01 µg/L (IC20)	3/3	OTA	1.66 ± 0.0990	>1.01 µg/L (IC20)	3/3
DON	8.05 ± 2.09	<37.9 µg/L (IC20)	3/3	DON	Out of Lower Co...	<37.9 µg/L (IC20)	0/3
FUM	14.7 ± 1.19	<17.0 µg/L (IC20)	3/3	FUM	0.633 ± 0.619	<17.0 µg/L (IC20)	2/3
ZEN	0.942 ± 0.158	<5.35 µg/L (IC20)	3/3	ZEN	Out of Lower Co...	<5.35 µg/L (IC20)	0/3
AFL	0.112 ± 0.0325	<0.607 µg/L (IC20)	3/3	AFL	Out of Lower Co...	<0.607 µg/L (IC20)	0/3
T2	Out of Lower Co...	<6.87 µg/L (IC20)	0/3	T2	0.432 ± 0	<6.87 µg/L (IC20)	2/3

Figure 4: Evaluation tables of orange juice samples measured with the Mycotoxins Screening Kit on the CyFlow™ Cube 6 V2m. On the left side, a sample can be seen in which all mycotoxins were below the limit values. On the right side it can be seen that the limit value for Ochratoxin A (OTA) has been exceeded (marked in yellow).



Cost per Test

The development of efficient quality control is not an expense, but an investment in the future of a manufacturing company. It protects against costly recalls, enables faster releases, leads to lower storage costs and strengthens the trust of your customers.

We would be happy to determine the costs for a solution tailored to your individual needs in a conversation.

COSTSSIMULATION FOR YOUR INDIVIDUAL AMOUNT OF TESTS PER DAY

TESTS PER DAY: **XXXX**

Automation mode / 96-well microplate 100µl analysis at 2µl/s with QC with CCGbeads

PRODUCT	TESTS	PRICE PER TEST	TOTAL
Sheath Fluid, 5 liter	5000	XXXX	XXXX
Cleaning Solution, 250 mL	125	1	\$10
Decontamination Solution, 250 mL	125	1	\$10
Hypochlorite Solution, 250 mL	125	1	\$10
Count Check Beads green	300	1	\$10
Sample tubes 3.5 ml, 12x55mm	500	1	\$10
Caps for Sample Tubes 3.5 ml	1000	1	\$10
Polystyrene 96 well microplate, flat bottom	100		XXXXX
96 Well Receiver Plates	20		XXXXX
96 Well Filter Plates	10		XXXXX
Cleaning vial (12ml)	20		XXXXX
CyStain™ VitalCount	10		XXXXX

YOUR COSTS **XXXX**

COST-OF-OWNERSHIP (TCO)

Cost-of-ownership (TCO) is a financial estimate costs associated with our product and services over its lifetime. This calculation include the cost of the hardware, reagents, consumables, maintenance, and support. Not included are VAT, transportation and insurances.

Get in touch with us

With the help of innovative flow cytometric methods, you are relying on a future-oriented solution that not only ensures the highest product quality, but also sustainably increases your profitability. Take the opportunity to take your quality control to a new level and secure a decisive competitive advantage.

Benefit from over 50 years of expertise in research, development and production of flow cytometric solutions - Made in Germany.

Connect with our experts and
discover our solutions:

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