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Use of the Hygiena® Innovate™ System to Detect Thermophilic Spore-Formers in Plant-Based Drinks.

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Rapid adenosine triphosphate (ATP) based detection of microorganisms can be used for sterility testing in a wide range of products. Spore-formers pose a challenge for ATP-based systems because there is no metabolic activity in spores; thus no ATP is measurable. Therefore, optimal time points for measurement between germination and resporulation must be determined. Different thermophilic spore-formers were investigated using the Innovate™ System, to demonstrate the possibility of detecting spore-formers with a bioluminescence-based ATP method. In this study, the detection of five different thermophilic spore-formers in three plant-based drinks using the Innovate RapiScreen™ Dairy system were demonstrated compared to plate count-based methods. Seven thermophilic strains, *Geobacillus, Anoxybacillus and Aneurinibacillus*, were spiked directly into the plant-based Oat-, Almond- and Soy-based drink products. Samples were spiked with a low-level of the organisms. After incubation for 24, 48 and 72 hours at 48 °C and 55 °C, samples were analyzed with the RapiScreen™ Dairy kit. In addition, the pH of the samples was measured. For results comparison, the ISO 4833-2:2013 method was conducted in parallel. The 48-hour product incubation at 48 °C was found to be optimal for the detection of the thermophilic organisms using the Innovate System, due to the highest ATP production after 48 hours. This resulted in high RLU values, demonstrating that the cells are in vegetative phase. One exception was *Anoxybacillus kamchatkensis* in Almond-Drink: After 24 hours (high RLU values), it sporulated, but pH value dropped significantly by 1.5 units in the vegetative phase. Therefore, the solution is a combined pH and ATP measurements that allow the detection of all spore-formers at one time point (48 hours).The difficult detection of most common thermophilic spore-formers in plant-based drinks at one time point (48 hours) can be reached using the Innovate System when combined with pH measurement.

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