

## Realise the Benefits of Rapid Microbial Testing with Adenylate Kinase Technology

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### Introduction

Personal care manufacturers around the world have recognised the economic benefits of implementing rapid microbial screening on a wide range of products including raw materials, in-process and finished goods. Today, over 300 industrial facilities around the world have implemented our Rapid Detection System, specifically.

Our ATP bioluminescence technology allows customers to detect the presence of microbial contamination within 24-48 hours rather than the 3-5 days required by traditional methods. This translates to quantifiable financial benefits in a few principle areas of manufacturing operations. By reducing quarantined inventory and manufacturing lead times, manufacturers also reduce their safety stock and working capital requirements leading to better utilisation and return on invested working capital. In addition, by using rapid screening, contamination is identified faster, corrective action is more timely and effective, and losses associated with contamination are minimised.

Although ATP bioluminescence is a very sensitive technique that is widely accepted and broadly used, it does have its limitations for certain product applications. Definitive detection is based on having a sufficient quantity of microbial ATP present that can generate a light signal that is distinguishable from product background. If the product itself has a high background based on ATP from non-microbial sources, or the product is contaminated with an adaptive, slow-growing organism, then definitive detection becomes more difficult.

Companies have overcome these two technical issues by moving to our AKuScreen™ product. AKuScreen reagents utilise a two-step, two-enzyme system that further decreases time to result. The AKuScreen technology is based on the amplification of microbial ATP and is not constrained by the

finite amount of ATP available in a standard bioluminescence assay. Amplification of microbial ATP is accomplished by exploiting microbial adenylate kinase (AK) that is also present in all living organisms. It is possible to use AK to generate almost unlimited amounts of its product because this is an enzyme, rather than a metabolite. The reaction catalysed by AK is:



This amplification allows for greater differentiation and a more sensitive measure of microbial contamination. Therefore, companies can more effectively screen products with elevated background of non-microbial ATP and products contaminated with adaptive, slow-growing organisms. Also, the time to result is reduced to 18-24 hours compared to 24-48 hours with standard ATP bioluminescence and 3-5 days with traditional methods.

### Case Studies

The following case studies show five manufacturers who have successfully implemented rapid screening for microbial contamination to improve operating income growth, despite initial product related technical concerns. Each of the manufacturers implemented our Rapid Detection system, including AKuScreen. All five manufacturers succeeded in overcoming perceived hurdles due to the core technology benefits and the flexibility of the system with regards to enrichment broth selection and incubation conditions.

With the core technology, the AK enzyme in a micro-organism can be made to produce, in one minute, approximately 40 times more ATP than the organism originally contained. If the reaction is allowed 25 minutes, the amount of ATP can be 1000 times more than the organism originally contained. The