



## *Genetic roadmap to solving microbial problems*

Metagenomic Analysis Protocol (MAP) is the next breakthrough step in diagnostic analysis for microbial control in paper applications. MAP provides us with an ability to look deep into the process and analyze microbial contributions to sheet defects and machine runnability with unprecedented precision.

MAP can:

- ▲ Identify if a class of sheet defects are a result of poor microbial control or a chemical interaction
- ▲ Identify which problematic bacteria are responsible for deposition/defects. Identify the source of inoculation, and where these organisms are growing uncontrolled in the process. Detection of problem bacteria is not limited by type of sample or organism viability.



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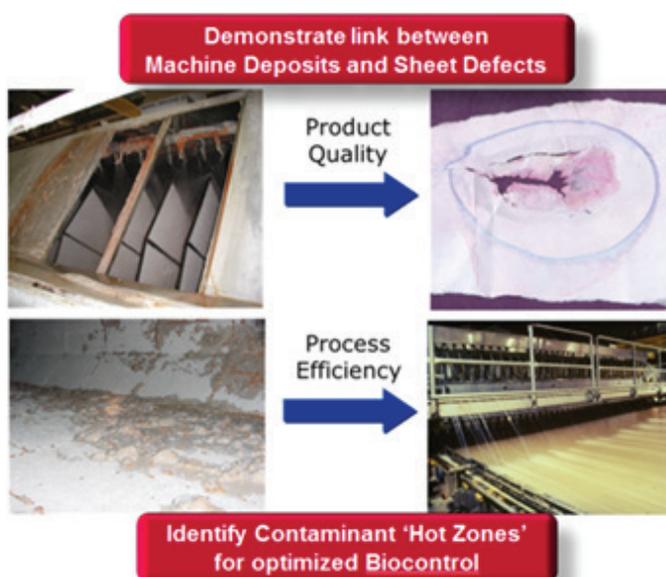
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MAP is based on advanced DNA-detection technology. DNA is a robust molecule that is present in all bacteria. It can be extracted and amplified in order to detect and quantify specific groups of problem-causing bacteria. MAP compiles microbial DNA data into simple problem-based groups of microorganisms and charts them through.

Knowing which group of bacteria is responsible for the problem, and where they are in the process gives the ability to:

- ▲ Rapidly troubleshoot complex contamination problems
- ▲ Connect process microbial contamination to machine deposits and sheet defects
- ▲ Detect and confirm sources of contamination to quickly and confidently make data driven adjustments to any microbial control program



## MAP delivers

With MAP and the Nalco Water approach papermakers can expect:

- ▲ Increased runnability
- ▲ Increased production
- ▲ Cleaner system
- ▲ Reduced sheet defects

## Microbial Control

Microbial control solutions and programs that have:

- ▲ Effective control of problematic microorganisms
- ▲ No impact or interference with other wet end programs
- ▲ Proactive monitoring insuring program is in control, improving response to process upsets, and confirming return to process control