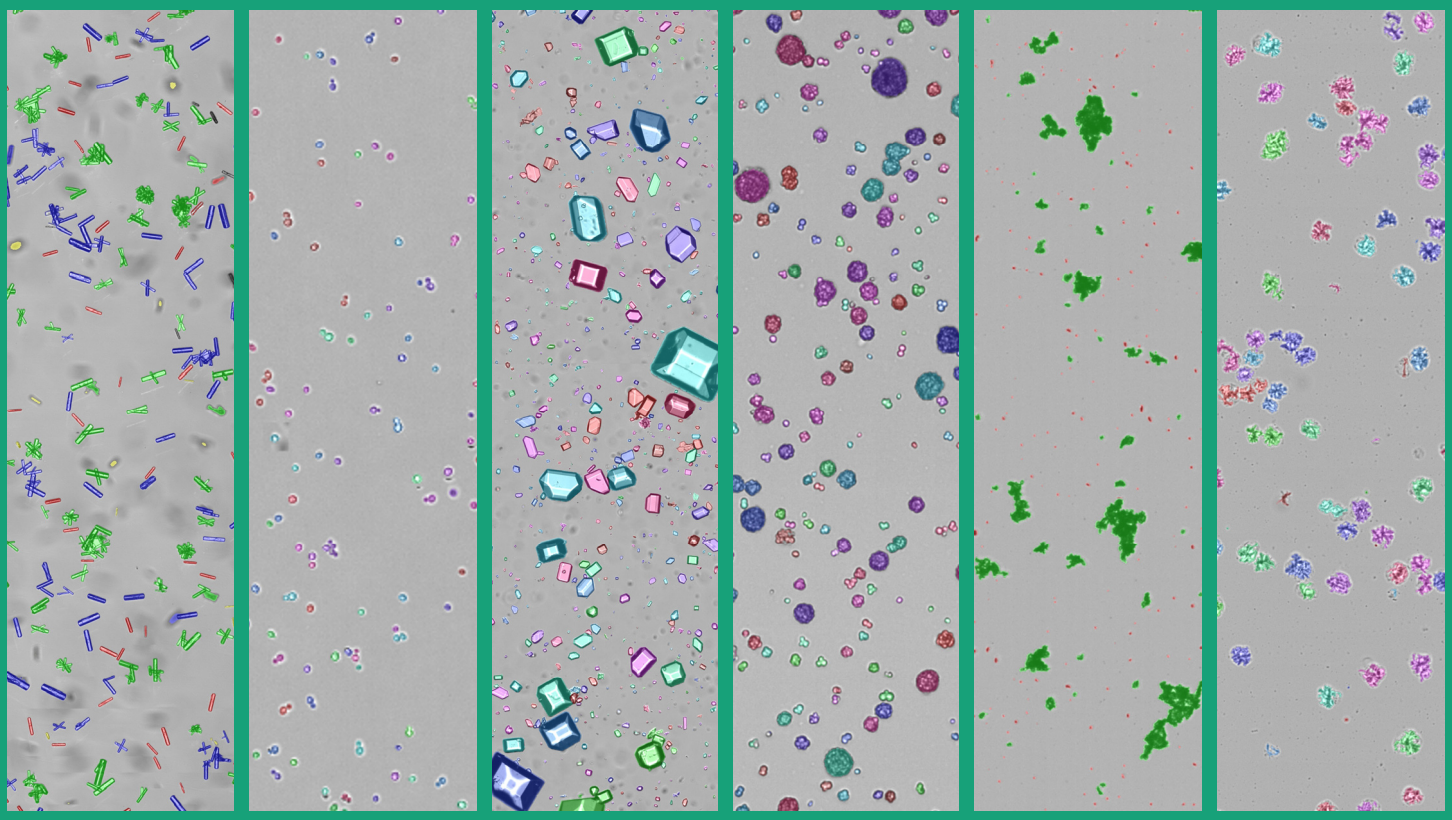
ParticleTech Solutions

Disrupting Process Optimization in Laboratory and Production

PARTICLE TECH



76% reduced processing time	Increased process yield	**25%** lower utility consumption	Faster quality control of product and raw materials	**36%** reduction of product loss	Improved product formulation

Your Shortcut to Optimal Production

Our mission is to assist manufacturing industries in their green transition. We do this by providing custom-tailored solutions for rapid and uncomplicated process optimization, from product development to production.

We have a long track record of enabling optimization in various industries, ranging from pharma, food, and biotech to cosmetics, construction, oil & gas.

Our solutions generate massive daily customer benefits, including lower utility consumption, increased yields, and higher throughputs.

We can also help you in your green transition! Let us enable you to optimize the various stages of your production, including:

- Product formulation and testing
- Recipe development
- Process design and development
- Process monitoring, control and optimization
- Quality control

Solutions for

Crystallization
Fermentation
Sugar Refining
Powders and Granules
Filtration
Flocculation
Fats and Oils
and many more

> *We have worked closely with ParticleTech and incorporated their technology in our research to tackle some of the most challenging problems in particle monitoring technology. We look forward to many more years of co-development and research with them.*
>
> *Seyed Soheil Mansouri*
> *Associate Professor, Technical University of Denmark*

> *Thank you, ParticleTech, for the Sugar Analyser which has added much value to my work, and for the excellent service!*
>
> *Melvin Carter*
> *Chemical & Biochemical Engineering, Nordic Sugar*

Farum, Denmark www.particletech.dk info@particletech.dk +45 5354 8084

ParticleTech Solutions

Case Studies from Pharma and Biotech Industries

PARTICLE TECH

Pharma: Processing Time Reduced by 76%

ParticleTech assisted a pharmaceutical manufacturer in improving the product quality and simultaneously reducing the processing time by 76%! This was done by optimizing the production recipe of a critical crystallization process.

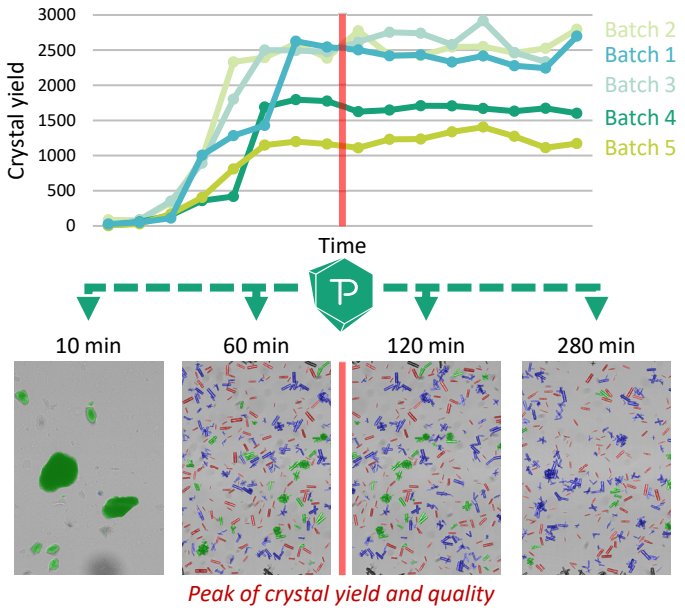
Solution

ParticleTech provided an at-line solution to rapidly quantify the crystal size, shape, and quantity of agglomerates in the production. Monitoring of five batch crystallizations revealed:

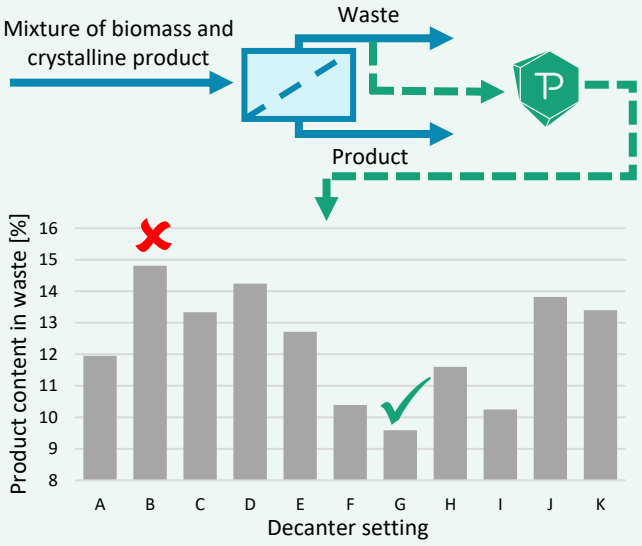
- Yield and crystal size reach a maximum after 1 hour
- After 1 hour, the crystal quality starts decreasing due to stirring

Outcome

Based on the findings, the manufacturer could refine the production recipe, obtain a higher product quality and increase the throughput of the crystallization process by more than 400%!



Peak of crystal yield and quality



Biotech: Product Loss Reduced by 36%

ParticleTech assisted a biotech manufacturer in optimizing a biomass separation operation in a decanter centrifuge. By directly measuring the separation efficiency, the manufacturer could reduce product loss by 36%!

Solution

ParticleTech provided a fully automated at-line solution enabling operators to measure separation efficiency directly. This was done by quantifying the amount of biomass and crystals in the decanter's feed, light- and heavy-phase streams.

Outcome

The solution made it possible for the manufacturer to continuously adapt the decanter settings based on the feed composition, resulting in a 36% reduction in product loss!

Pharma: Process Yield Increased by 10%

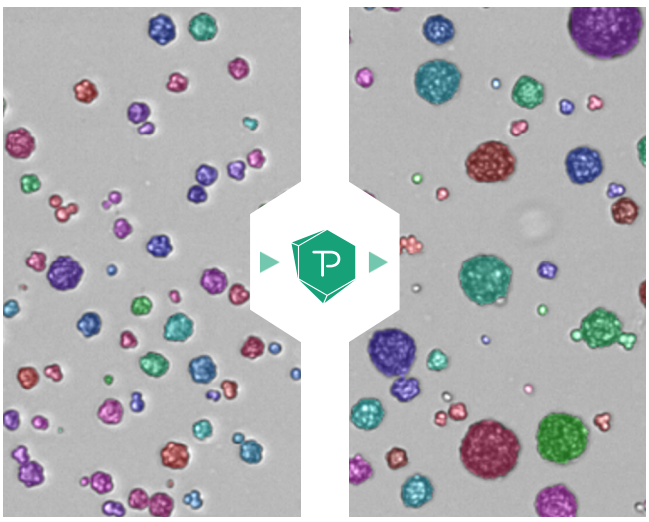
ParticleTech assisted a pharmaceutical manufacturer in improving the product yield. By quantifying and subsequently optimizing the size of particles produced in an iso-precipitation step, it was possible to increase the overall process yield by 10%!

Solution

ParticleTech provided an at-line solution that enables direct quantification of the precipitate size for both laboratory and pilot-scale precipitation experiments at low temperatures.

Outcome

The solution empowered the manufacturer to optimize the process conditions of the iso-precipitation. This resulted in a 450% increase in the precipitate size, an improved product recovery, and a double-digit million increase in yearly earnings!

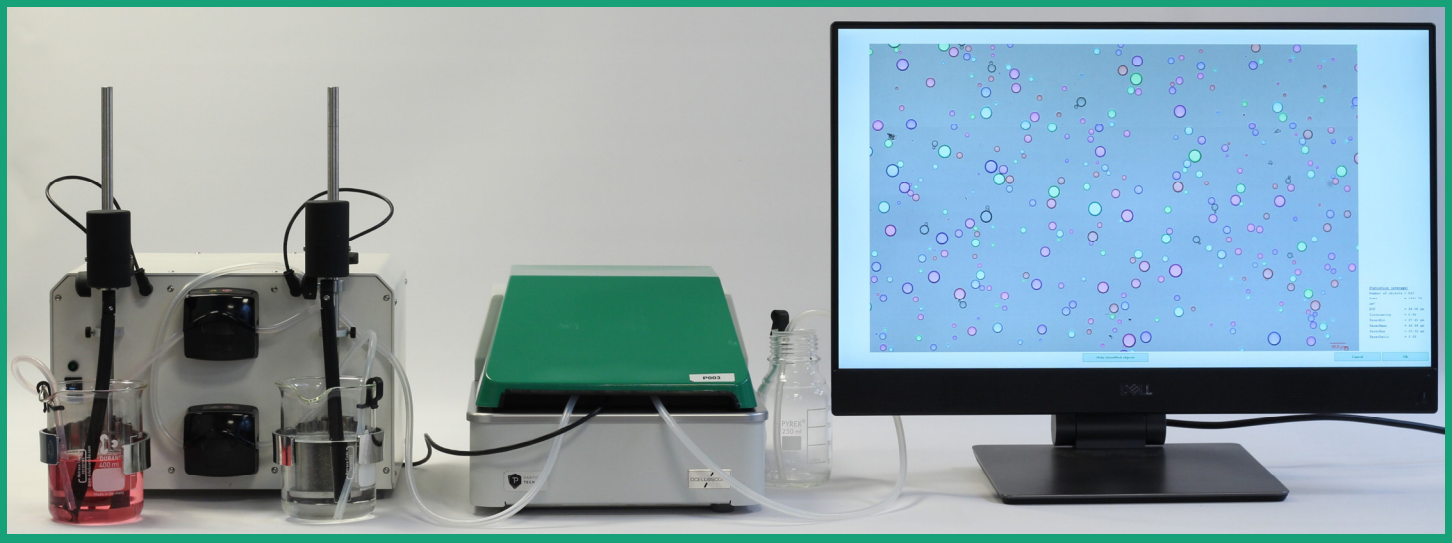


Before optimization | After optimization

Farum, Denmark www.particletech.dk info@particletech.dk +45 5354 8084

ParticleTech Analyzer

Portable Particle Analysis Solution for Lab and Production



On-line and at-line analysis of particles suspended in liquids using flow-cells

At-line analysis of dry particles on slide adapter, including powders and granules

At-line analysis of particles suspended in liquids using titer-plates

Particle Analysis Solution for Optimization and Control

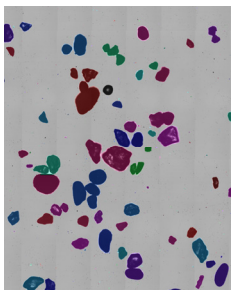
With ParticleTech Analyzer, you get a robust and portable particle analysis solution, ideal for process optimization and control. It provides fast and reliable quantification of critical process parameters and critical quality attributes, such as:

- Particle size distributions in 2D
- Particle shape distributions
- Particle morphology
- Particle concentrations
- Particle composition
- Homogeneity and stability

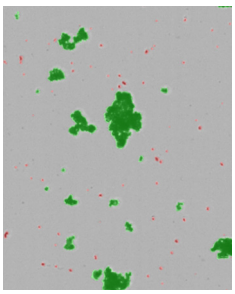
Our extensive algorithm library offers both generic and specialized analysis possibilities for in-depth static and dynamic systems analysis. This includes measurement of the degree of aggregation, dissolution/growth rates, and many more.

The analyzer utilizes a combination of advanced 3D scanning and image analysis. This makes it possible to achieve a low sampling uncertainty even with minimal sample quantities.

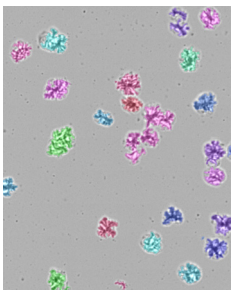
Particle Size Range
0.5 µm – 3000 µm
Size Resolution
0.5 µm
Sample Types
Liquid suspensions, Dry powders and granules
Minimum Sample Quantity
~100 µL / ~100 mg
Sampling Methods
At-line and on-line
Automation Protocols
OPC and OPC-UA



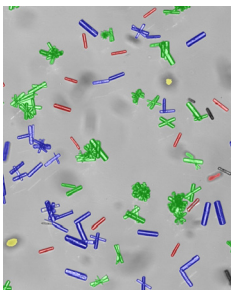
Dry Powders



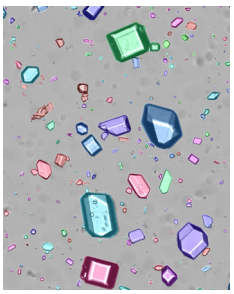
Flocculates



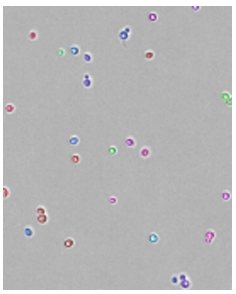
Fats and Oils



Crystals



Sugar Refining



Fermentation

Farum, Denmark www.particletech.dk info@particletech.dk +45 5354 8084

ParticleTech Solutions

Case Studies from Food, Biotech and Construction Industries

PARTICLE TECH

Food: Analysis Time Reduced by 98%

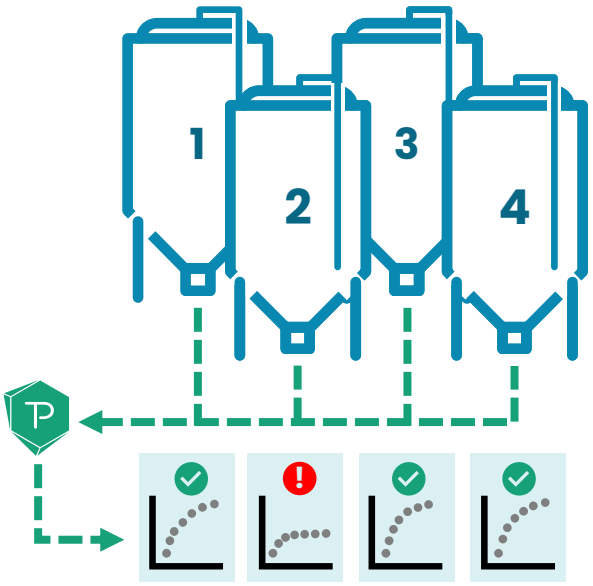
ParticleTech assisted a sugar manufacturer in reducing product variability and improving the overall efficiency of the sugar refining plant. This was achieved with a solution from ParticleTech that enabled technicians to detect and act on deviating operations 60 times faster than with sieve analysis.

Solution

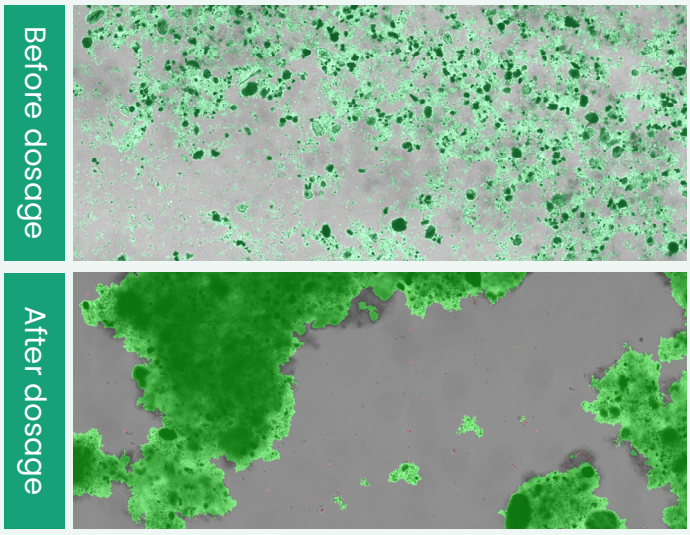
ParticleTech provided an analysis solution that allows operators to easily monitor the development of sugar crystal sizes over time of multiple crystallizers at a time. Compared to the previously used analytical techniques, the analysis time and workload per sample were reduced by 98%!

Outcome

With the faster analysis, the manufacturer could reduce the process variability and obtain a higher product quality and production efficiency.



Biotech: Optimized Polymer Dosage



ParticleTech assisted a biotech manufacturer in optimizing raw materials consumption in their flocculation and clarification processes. By directly quantifying the clarification efficiency, it was possible to reduce the overall operational costs notably.

Solution

ParticleTech provided an at-line solution, which makes it possible to measure the particle size distribution before and after the dosage of coagulating chemicals and polymers. Based on these measurements, the flocculation efficiency could be quantified.

Outcome

The solution enabled the manufacturer to directly optimize the polymer dosage vs. flocculation efficiency, which resulted in lower operational costs of the clarification.

Construction: Enhanced Quality Control

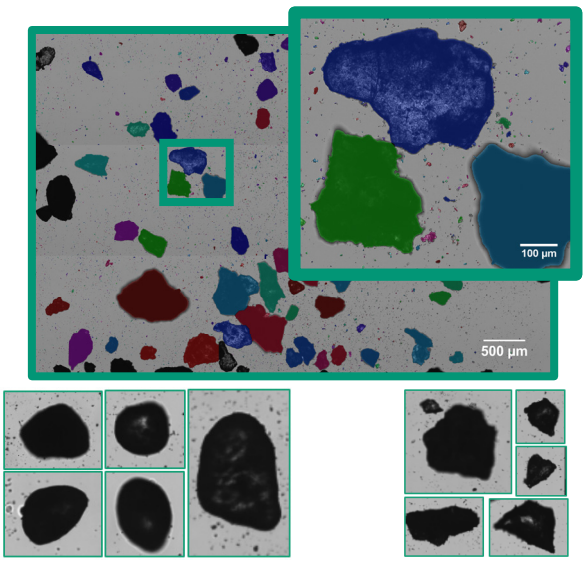
ParticleTech assisted a building construction materials supplier to improve and enhance their quality control of the raw materials used in concrete. An analytical solution could directly quantify the quality within a couple of minutes.

Solution

ParticleTech provided a portable solution that could measure the roughness of sand grain samples. The roughness could subsequently be directly correlated to the final concrete strength, allowing for a fast screening of the raw materials before use.

Outcome

The solution allowed the materials supplier to carry out direct and fast grading of raw materials, which previously was not possible. This allowed them to improve their product blends.



Farum, Denmark www.particletech.dk info@particletech.dk +45 5354 8084