SINTEF
Department of Biotechnology and Nanomedicine

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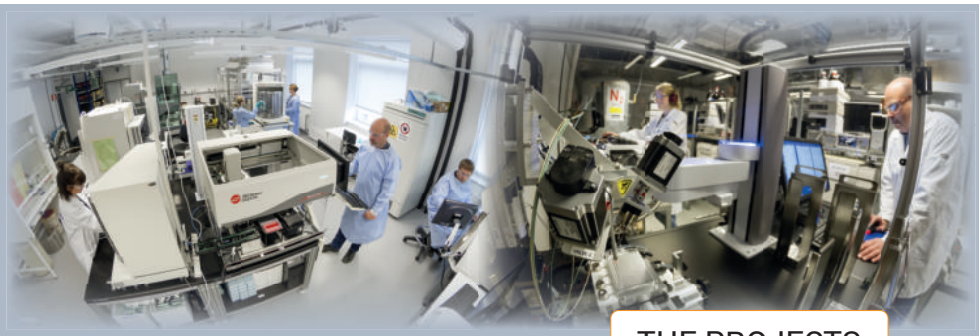
specialist screening site

TRONDHEIM

an official partner site of eu:openscreen



THE PEOPLE

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THE PROJECTS

Reference Project 1

The aim of the project was to identify an improved strain for secondary metabolite production for an industrial customer.

A strain library of more that 20.000 mutant strains was established, cultivated in micro-scale and screened for production of 2 secondary metabolites with antibacterial and cytotoxic activity. The Agilent Rapidfire 365 high throughput mass spectrometry screening unit with and Agilent G6495 triple quadrupole MS QQQ detector was used in order to identify strains with eliminated production of a cytotoxic secondary metabolite.

The identified strains were cultivated and characterized for secondary metabolite production using high resolution mass spectrometry methods and a set of mutants was with desired properties were delivered to the customer.

Reference Project 2

Screening of metagenome libraries for novel enzyme activity using high throughput mass spectrometry. A library of more than 20.000 clones was screened for production of cellolytic enzymes using Agilent Rapidfire 365 high throughput mass spectrometry screening unit with and Agilent G6495 triple quadrupole MS QQQ detector quantifying soluble cellulose oligomers (DP1 to DP6).

A set of clones was selected for further characterization and 15 metagenome clones producing enzymes with activity on crystalline cellulose was verified. In another metagenome library screening project, 15.000 clones was screened for identification of thermostabile lipolytic enzymes using spectrophotometric readout. 3-4 clones with a verified activity was discovered. Publication of this work is in progress, and several publications are already published.

THE HARDWARE

- 4 fully automated liquid handling robotic systems
- Fully automated cell cultivation robotics with or image based readouts
- MoFlo Astrios EQ and traditional FC.
- High throughput mass spectroscopy
- High content confocal analysis
- Screening, analyses, sample prep and on-line cultivation
- High capacity (> 90.000 wells per week)

hardware in detail

- Beckman Coulter integrated robotic workstation with i7 pipetting unit, incubator plate reader, microplate dispenser, Molecular devices ImageXpress confocal high-content image recorder and SCARA robotic arm.
- Beckman Coulter integrated robotic workstation with FXp pipetting unit with dual arms (96/384-head), incubator, Molecular devices i3X plate reader with Minmax cytometer, microplate dispenser
- Beckman Coulter integrated robotic workstation with NXp pipetting unit, incubator, plate reader, microplate dispenser, sealer and SCARA robotic arm.
- Tecan Evo liquid handling workstation with LiHa 8 channel and MCA384 pipetting tools, SPE/Filtration, microplate dispenser, incubator, microplate reader
- Beckman Coulter MoFlo AstriosEQ FACS system
- Agilent RapidFire365 High throughput MS system and Agilent G6495 triple quadrupole MS QQQ detector and Agilent 1290-6530 LC-MS/MS QTOF mass spectroscopy detector

THE SOFTWARE

- LIMS laboratory management software
- Customized database routines
- Script-based data processing routines

THE OUTPUT

1. Lewin, A., et al. "Discovery and Characterization of a Thermostable Esterase from an Oil Reservoir Metagenome, Accepted for publication in Advances in Enzyme Research 2016
2. Tøndervik A, et al. Alginate oligosaccharides inhibit fungal cell growth and potentiate the activity of antifungals against Candida and Aspergillus spp. 2014, PLoS One. Nov 19;9(11)
3. Tøndervik A, et al Mannuronan C-5 Epimerases Suited for Tailoring of Specific Alginate Structures Obtained by High-Throughput Screening of an Epimerase Mutant Library. 2013. Biomacromolecules 14, 8, 2657-2666.
4. Sletta H, et al () Anti-microbial and cytotoxic 1,6-dihydroxyphenazine-5,10-dioxide (iodinin) produced by Streptosporangium sp. DSM 45942 isolated from the fjord sediment. 2013. Applied Microbiology and Biotechnology. volum 98.
5. Kahn S, et al Overcoming drug resistance with alginate oligosaccharides able to potentiate the action of selected antibiotics. 2012. Antimicrobial agents and chemotherapy. 56:5134-5141
6. Sletta H, et al, A new high resolution screening-method for study of phenotype stress responses of Saccharomyces cerevisae mutants, 2011, Journal of Microbiological Methods, 87(3),363-367

THE FUTURE

Independent non-profit research organization.
Open for all academic and industrial collaborations.
Partner in The European nanomedicine characterisation laboratory.

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