

Customizing automated colony picking

Laboratory automation and LIMS specialist Mejoran Lab Automation has developed a customized method for automated fungal colony picking on a Freedom EVO® 150 platform with an integrated SciRobotics Pickolo™ colony-picker. This innovative colony picking method produces viable microinocula of consistent quality for downstream assays, reducing the time needed to select mutants for further investigation from one week to one day.



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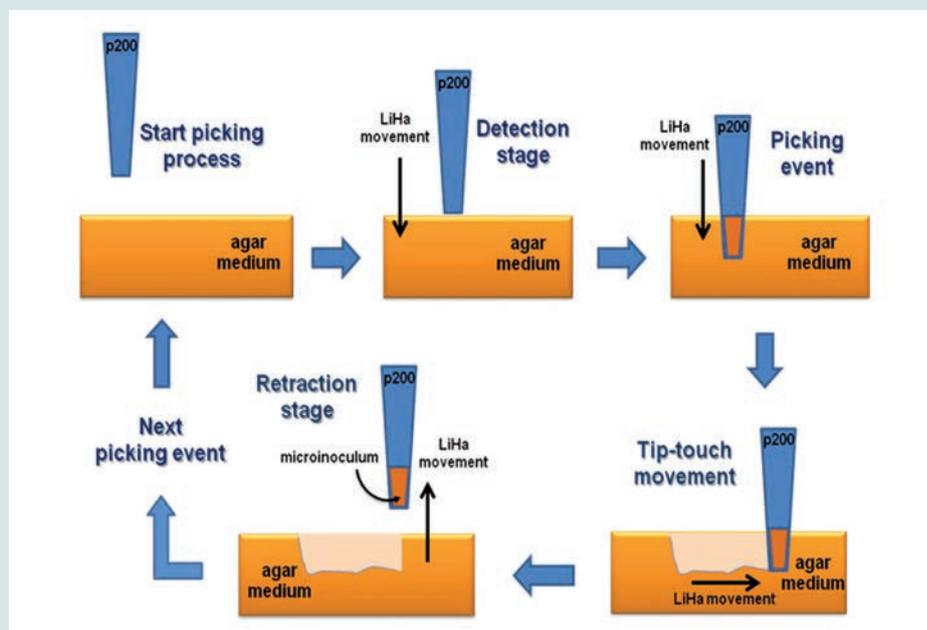
Mejoran Lab Automation, based in Madrid, Spain, has developed a customized colony picking method for use in biofuel research in collaboration with Abengoa Bioenergy New Technologies in Seville, a supplier of innovative solutions for biofuel production. Ongoing biofuel research at Abengoa focuses on screening of cellulase-producing fungal strains that degrade wood. This process involves growing lignolytic fungi in Petri dishes at 37 °C, colony picking and transfer of mycelia to 96-well microplates for further fermentation, followed by downstream analysis of the mutant strains. To meet the demands of this project, Mejoran developed and optimized a novel colony picking method for high throughput screening of fungal strains. Screening was performed on a Freedom EVO 150 workstation equipped with an eight-channel Liquid Handling (LiHa) Arm with 200 µl disposable tips, a Robotic Manipulator (RoMa) Arm, a Multidrop® Combi nL (Thermo Scientific), plate hotels, and an integrated SciRobotics Pickolo module, housed in a biological safety cabinet. Petri dishes containing the fungal colonies are transferred from the hotels to the

Freedom EVO worktable, where a digital image of the dish is captured and used to determine subsequent tip movements for colony picking and transfer to 96-well plates, creating microinocula for further fermentation for downstream assays.

Juan Bautista Crespo García, Laboratory Automation and Bioinformatics Director at Mejoran, explained: “The new picking method proved crucial. Manual screening processes are costly and time consuming, and so we developed an automated protocol for picking fungal colonies. A particular drawback of manual colony picking is the lack of control over how much fungal mycelium is transferred to the individual microplate wells; if too much mycelium is picked the plates will become overgrown. In contrast, automated colony picking using the Freedom EVO platform and integrated Pickolo module is very precise,

with much more control over the quantity and quality of the microinocula. This enables picking and transfer of uniform amounts of mycelium specifically from the perimeter of the colony, where growth is more efficient. Using a novel tip-touch picking method – a sideways movement of the tip slightly below the surface of the agar, mimicking the action of manual picking processes – we were able to generate excellent quality, identical microinocula with close to 100 % further growth efficiency for subsequent experiments.”

Mejoran LIMS Consultant Francisco Arenal added: “Our general laboratory automation experience, combined with a close collaboration with SciRobotics, allowed us to develop this innovative colony picking method suitable for any fungal strain in just five months. As the Petri dishes are



Graphical representation of Mejoran's automated tip-touch colony picking method

“We were able to generate excellent quality, identical microinocula with close to 100 % further growth efficiency for subsequent experiments.”

filled manually, there is some variation in the volume of agar, and so we needed to determine its exact position. New camera settings were established to capture the best possible images of the growing fungi, and the Freedom EVO's flexibility allowed us to switch between different tips to choose the most appropriate size and type for the application. We also created a bespoke worklist, selecting individual movements one at a time to optimize the position and behavior of each tip in each piece of agar. This is what makes the Freedom EVO special. It enables us to work with the instrument codes on a line-by-line basis, defining the exact movements required to correctly position each tip in each Petri dish, with no software-imposed limitations. The system can also successfully integrate a range of third-party instruments, offering maximum flexibility; the Pickolo software is easy to integrate with the Freedom EVOware®,



Mejoran developed a unique colony picking procedure on a Freedom EVO with an integrated SciRobotics Pickolo module

and the platform communicates very well with the Thermo Multidrop dispenser too.”

Juan concluded: “The automation of colony picking gives us a huge advantage. With efficient automation, laboratories can increase their colony picking and screening throughput significantly. Manual selection of a minimal number of mutant fungal strains may take five or six people a week to perform; using the Freedom EVO with the Pickolo module, one person can select the same number of

mutants in just one or two days. This frees staff to focus on testing new processes to avoid border or geometry effects in the microplates, as well as improving downstream assays to develop different cellulose-producing fungal strains.”

To find out more about Tecan's colony picking applications, visit www.tecan.com/colony picking

To find out more about Mejoran, visit www.mejoran.es

