



PLANT TECHNOLOGY

Somatic embryogenesis

Automated somatic embryogenesis production

In most cases, protocols to achieve somatic embryogenesis (SE) are highly specific. As they are specifically designed for a plant variety, standard automation and machinery is hard to find. Nevertheless, there are common steps that Viscon has identified as customizable and automatable to match your SE procedures. Independently of the pathway followed to achieve embryogenesis.

Automation presents the opportunity to decrease costs, time, and human mistakes, as well as increase productivity and uniformity. However, a completely automated production line presents a series of challenges due to the nature of the work, the precision requirements, and because sterility and sanitation are extremely demanding.

The automated process for SE production follows almost the same steps as when done manually on a lab scale. In the automation process, each step must be customized for the cell line that is being grown as they might not show the same tolerance to mechanical stress. Moreover, already existing technologies can be adapted to automate some of the steps in SE production.

1 Automated filling and labelling of petri dishes and agar trays

2 Manual filling of petri dishes with start material

3 Climate chamber

4 Embryo grading and transplanting

5 Climate chamber

6 Grading and transplanting to pots/trays



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Automatic media preparators

All somatic embryogenesis processes, independent of the selected pathway, require a large amount of media preparation. This can be either liquid or semi-solid media. The media preparation process has always been time consuming and one of the most important steps in any plant tissue culture (PTC) process. We build and develop automatic media preparators, and together with dosing machines the entire process is covered with our plug-and-play solutions. The system works for liquid and semi-solid media, dispensing either directly in bioreactors, petri dishes or culture cups.



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Climate chamber and LED trolleys

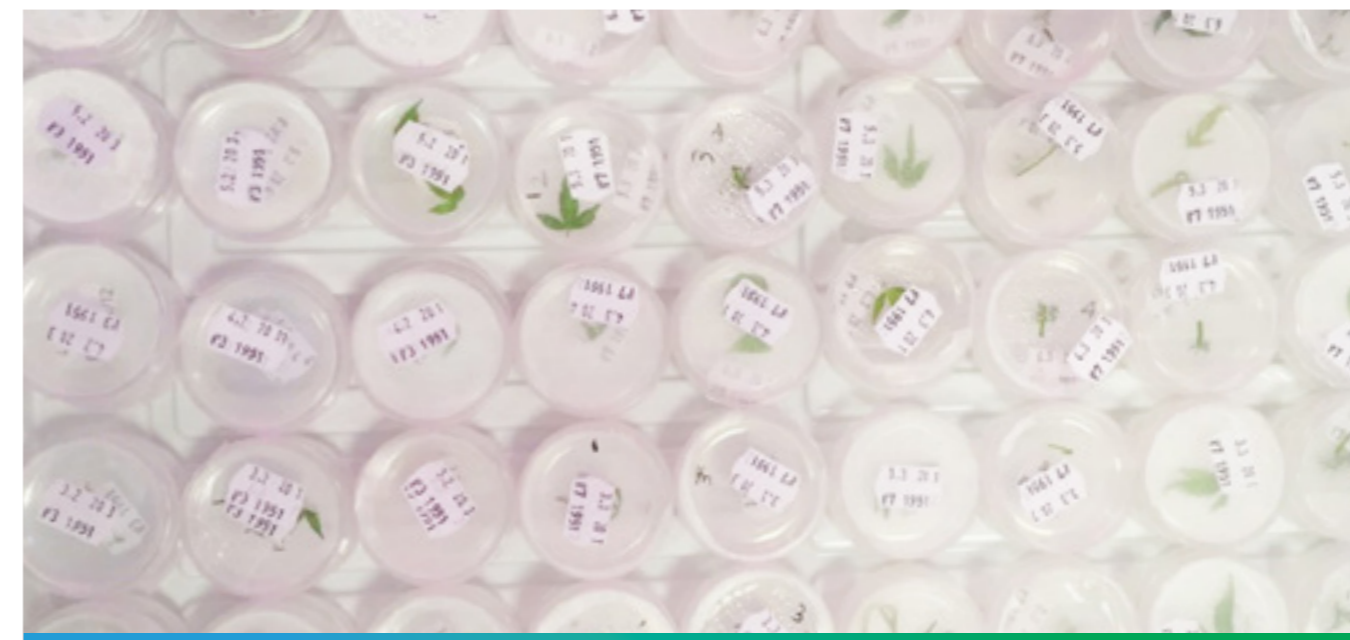
Environmental conditions play a fundamental role in the development of embryos, independent of the plant variety. For this process, we have developed the ViCabin where all environmental conditions can be strictly controlled. This includes temperature, relative humidity, CO2 concentrations, photoperiod, and wind speed.

In combination with the ViTrolley's diffused LED light technology, this enables an unprecedented capacity. The design allows you to modify and customize the light spectrum according to the plant demands.



Callus proliferation

Proliferation of pro-embryogenic cells can either be done in semi-solid media or liquid. With the latter being the best option for automation and decrease of production times and costs. We have developed controllers and dosing units for different production methods, like: Temporary immersion bioreactors, rocking wave bioreactors, etc.



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Embryo selection

This step is undoubtedly the greatest challenge in the automation process, and the biggest “bottle neck” in SE production. Embryos coming from a liquid or semi-solid system need to be selected and transplanted into an embryo germination media.

One of the biggest challenges is that embryos in different developmental stages can be found throughout the systems, so individual selection of embryos must be done. Physical characteristics of the embryos are considered length, width, crown shape, etc. The embryos need to be selected in a sterile environment, making it extra challenging. We have designed a singulation machine that, with the use of AI, uses visual recognition and robotics to pick up the cells.



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Germination & acclimation consumables

Germination of mature embryos usually occurs in a semi-solid system. After the embryos have become plantlets and have their first pair of true leaves and a root system, transplanting the plantlets from the semi solid media (in vitro) to an organic media (ex vitro) is required. The transplanting can bring different complications, like handling soft plant tissue, washing the agar out, inserting into dry compact soil plugs, etc.

We have developed an automated system that can handle the fragile plantlets and place them into the ViTrays. The ViTray allows the plants to root and harden at the same time, for the further development and acclimation for the last stage in the greenhouse/ outdoor production.



Plantlet grading & transplanting

Viscon Plant Technology offers multiple solutions for the automatic grading and transplanting of young plants. Our transplanters are equipped with smart vision technology. The Wireless+ grippers make it possible to take a picture of the plant when it's held in the gripper. The vision system can determine if the plant meets the selected quality. Bad plants and empty plugs will be thrown away, so that only the good plants will be transplanted.



Excellence in sustainable plant production



Viscon Plant Technology

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