

Tobacco for Health with New Plant Breeding Techniques

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Neutral Supply Chain Ltd is a participant in the EU-funded project NEWCOTIANA, a research and innovation action that combines several new plant breeding techniques, to produce medical and cosmetic products in tobacco plants.

- NEWCOTIANA is a €7.2M Horizon 2020 EU project coordinated by scientists at the Institute for Plant Molecular and Cellular Biology (IBMCP) from the Spanish Research Council (CSIC), with the participation of 19 industrial and academic partners from eight European countries and Australia.
- Taking advantage of cutting-edge molecular breeding methodologies, researchers will develop new varieties of tobacco and its wild relative *Nicotiana benthamiana*, to produce in a sustainable manner added-value compounds such as antibodies, vaccines and drugs.

Tobacco (*Nicotiana tabacum*) is a crop used mainly for producing cigarettes and other products for smokers. With overwhelming scientific evidence that smoking is harmful, even major cigarette companies are now committed to smoking cessation. Tobacco plants can, however, also be used for other purposes that are beneficial for health. Instead of drying the leaves to make cigarettes, researchers have found promising New Plant Breeding Techniques (NPBTs) that can transform tobacco leaves into efficient plant factories for medical, pharmaceutical and cosmetic products. The same is true for the leaves of *Nicotiana benthamiana*, a dwarf tobacco relative from Australia, which is especially suited for indoor production of bio-pharmaceuticals. In this way the plants will be bred to produce vaccines, antibodies, and other health-promoting substances including anti-aging or anti-inflammatory compounds.



The cutting-edge NPBTs include the so-called CRISPR technique, also known as genome editing, which offers unprecedented opportunities for crop breeding. Other techniques that researchers will apply are modern forms of grafting, or infiltration for temporary gene expression.

"We will breed new varieties of tobacco and Nicotiana benthamina that will work safely and efficiently as biofactories." explains CSIC's Professor Diego Orzaez, the project's lead scientist. *"Plants will be used as production platforms for molecular farming to harvest high value medical substances."*



By taking advantage of NPBTs, NEWCOTIANA is expected to contribute to reviving the traditional cultivation of tobacco, creating new applications that are good for health, and revitalizing rural areas with high-value products, in line with the European Knowledge-Based Economy.

"The consortium will carry out experiments to assess the efficiency and safety of NPBTs, providing the industry, policy makers and consumers with experimental evidence that facilitate the decision-making process on the adoption of NPBTs in Europe," adds Diego Orzaez, who is also the project coordinator. *"NEWCOTIANA's scientific aims are ambitious, and in addition to solving a number of technical issues we realize that we also need to take into account regulatory requirements and start a dialogue with stakeholders and the general public."*

Louis Notley and Yaw Koram from the UK's Neutral Supply Chain Ltd, will play an important role in NEWCOTIANA, by conducting market research and developing commercial business models for products identified by the project. These will be aimed at industrial partners to bring this research to market in the form of new manufacturing techniques.

NEWCOTIANA, which was launched in February 2018 in Brussels, is a 4½ year project funded by the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 760331.

Updates can be found at: newcotiana.org and via the project's Twitter feed @NewcotianaP