

1. PUBLISHABLE SUMMARY

Summary of the context and overall objectives of the project (For the final period, include the conclusions of the action)

The objective of the CleanPack packaging machine is to provide (at a small scale) aseptic/ultraclean food packaging conditions and safety standards that until now only clean rooms of big food processors could ensure. In response to customers' needs, TECSELOR is developing the CleanPack prototype that allows ultraclean/aseptic packaging conditions for food products, which will represent a cost-effective alternative to a clean room with the same level of food safety.

CleanPack goes beyond clean rooms in terms of shelf-life extension of foods. This goal could be achieved through a new packaging technique, which combines different patented technologies: sterile thermoforming and packaging, filling with surface decontamination of perishable fresh foods and ultraclean cutting of trays. The integration of these techniques in a whole CleanPack machine will allow SME-packaging to maintain the same level of food safety as clean rooms and extend shelf-life and freshness of their packed foods even more than big producers.

The industry sector of preparation and packaging of solid refrigerated foods such as dairy products, meat, fish, ready meals and salads or cut fruits and vegetables, is demanding increased levels of hygiene to package products with minimal microbial contamination or commercial sterility conditions (aseptically). CleanPack extends food shelf-life, preserving fresh-like characteristics of food as a clean label since there is no need for addition of further chemical preservatives. The implementation of this milder technology also has the potential of reducing energy consumption and the dependence on cold-chain logistics, which enables decentralized production for a more sustainable and economic distribution-chain. Therefore, a huge array of SME food industries would achieve better products with extended shelf-life thanks to CleanPack, improving the competitiveness of the sector.

Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far (For the final period please include an overview of the results and their exploitation and dissemination)

Summary and Overview for Year 1: During the first stage of the project new designs of CleanPack were performed. This was comprised of the four modules and the aseptic enclosure: (i) Thermoforming Module; (ii) Filling Module with essential oils for surface decontamination; (iii) Thermosealing Module; (iv) Cutting Module. All technical designs have been elaborated since year 1 considering compatibility with the other modules, which has been essential for a successful assembly for the whole CleanPack machine during the project. In addition to these technical designs, it's noteworthy to mention that the microbiologically controlled enclosure was also successfully validated during year 1 according to the ISO class 5 standard conditions (less than 100 particle size $\geq 0,5 \mu\text{m}$; microbial count in the air $\leq 1 \text{ CFU/ft}^3$), to ensure ultraclean conditions of the assembled machine. The on-site validations started initially at the end of the first period. This was to verify the performance of the machine under real conditions and using different type of food products.

CleanPack information has been published in TECSELOR website, social media networks and specialised media. Several demonstration actions have been developed in events related to food-industry and in meetings with potential clients. Moreover, an exhibition-truck containing the manufactured prototype was developed to facilitate the transportation of the machine for several

project tasks, such as the on-site validations or the demonstration and marketing activities. The preliminary results during year 1 were positive, where several commercial contacts were established with potential customers and distributors within the food-packaging technology industry.

Summary and Overview for Year 2: During the second period of the project, and according to the implementation of the Project Work Packages, the industrial validation was finalised: obtaining positive results regarding microbiological control, as well as sensory and self-life preservation of food products [WP3]. The internal and external validations were also successfully developed and pre-commercial activities, such as further dissemination, extension international of the industrial protection (Patent), certifications and documentation for market deployment, were carried out [WP4]. Thus, positive preliminary results were obtained, establishing – pre-commercial agreements with potential clients and distributors interested in the acquisition and installation of CleanPack equipment. [WP5]

Progress beyond the state of the art, expected results until the end of the project and potential impacts (including the socio-economic impact and the wider societal implications of the project so far)

CleanPack is a unique solution will allow packaging-SMEs to maintain the same level of food safety as clean rooms and extend shelf-life and freshness of their packed foods even more than big producers. The four-module design of CleanPack machine can be adapted to different market and customers' needs, resulting in a more efficient and economic process. In addition, the new decontamination technique using essential oils, within the filling module, helps to extend shelf-life of products, estimated at a minimum of 150%, without additional chemical preservatives. CleanPack technology also has the potential to reduce energy and costs within the food distribution chain, by decreasing the dependence from cold-chain logistics, enabling decentralized production and improving the competitiveness of the food sector.

The results derived from the CleanPack project; following the successful implementation of the work packages during year 2 enabled TECSELOR to bring to the RTE (ready-to-eat) food packaging market a thermoforming machine for in-situ production of aseptic trays, which enables to reduce foodborne diseases and food waste, and increases shelf-life of RTE food, mainly fresh-cut fruits and vegetables, sliced food (meat, fish, poultry) and other RTE prepared meals. Moreover, such results have provided significant technological advantages over TECSELOR's competitors.

Address (URL) of the project's public website

www.cleanpack.es

CleanPack1



CleanPack2

