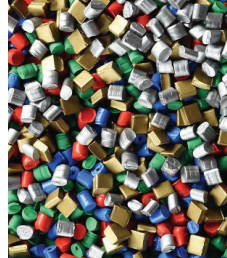




GREEN PACK



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FULLY RECYCLABLE 100% PET PACKAGE FOR FOOD CONTACT
WITH O₂ BARRIER IMPROVED TRANSPARENCY AND LOW CO₂ FOOTPRINT

GreenPack project has been financed by the European Commission and aims to radically change the market of food trays. Research activities officially started on the 1st of December 2013 under Grant Agreement no. 605698 with the Research Executive Agency of the European Commission.

THE PROJECT:

The main objective of the GREENPACK Consortium is producing prototypes of fully recyclable 100% PET trays for food preservation also by using recycled PET (RPET). PET trays will be designed for low-oxygen application and barrier properties will be based on specifically designed additives. The target is a mono-material fully-transparent tray which could be recycled for producing new trays.

A secondary goal of the project is designing and dissemination of a dedicated recycling model, inspired towards the replication and spreading of the recycling model of the 100% PET soft drink bottles, in the post-consumer phase, adapting its characteristics to the specific food package features.

BACKGROUND:

The main drawbacks of the current solutions for the PET trays' manufacturing are due essentially to the presence of different plastic materials in the packages. Being manufactured by sticking different layers of different plastic materials, PET included, the final package shows low recyclability. The multi-material feature poses severe limitations to an effective recycling not only for the trays at the end of their life but also for the manufacturing scraps. This is a dramatic reality for the economic and social development of EU because of the involved loss of raw materials, CO₂ footprint, landfill management.

From a theoretical point of view, the goal of having a fully recyclable PET container for food packaging is surely feasible. The environmental effect would be very positive: the manufacture of each ton of PET produces around 3 tons of carbon dioxide (CO₂). Nevertheless, this result is far from being obtained because of the absence of a proper combination of innovative technical solutions and systematic studies.

THE 10 STEPS TO REACH THE SOLUTION:

1. The use of an additive to have oxygen barrier properties of the PET;
2. The definition of a multi-layered structure for the packaging sheets, using a single base material (PET, virgin and recycled, RPET);
3. The study of the barrier properties of the final RPET sheets;
4. The study of the fabrication effect for additivated RPET sheets (mainly on the aesthetics and other functional properties);
5. The study of the processability of the multi-layered mono-material sheets;
6. The study of the combination with virgin PET for the film in contact with the food;
7. The shelf life assessment of the new PET container;
8. The definition of a recycling strategy for the final container;
9. The LCA (Life Cycle Assessment).

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Consortium:

- **Asociacion Valenciana De Empresarios De Plasticos – AVEP (Spain)**
- **The British Plastics Federation – BPF (United Kingdom)**
- **Kornyezetvedelmi Szolgáltatok és Gyartok Szovetsege Egyesulet – HAAE (Hungary)**
- **Point Plastic Srl – PLASTIC (Italy)**
- **University of Rome Tor Vergata, Department of Industrial Engineering, UNITV (Italy)**
- **Labor Srl – LABOR (Italy)**
- **Med Marine – MED (Italy)**



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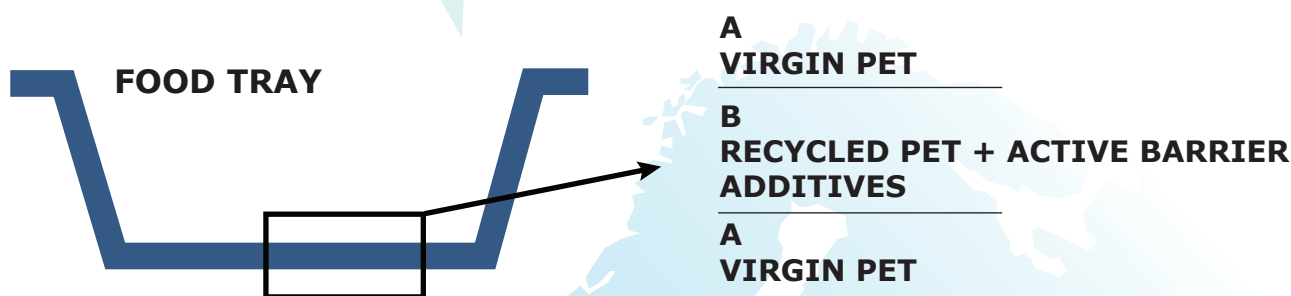
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ACHIEVED RESULTS

- Mono-material PET barrier sheets are now available for food packaging
- Oxygen barrier behaviour is achieved by means of additives in the PET matrix
- Additives (scavengers) react with oxygen which passes through the PET sheet
- Oxygen scavenger formulations are already approved by EFSA for food contact
- Active barrier PET sheets have optimal transparency and barrier behaviour
- Active barrier PET sheets and trays are already available on the market
- Barrier properties of active sheets may be better than traditional packaging
- Active barrier PET trays are fully recyclable to produce new sheets or trays
- Active barrier PET trays are not a source of contamination for bottle recycling
- GreenPack project develops and studies active formulations for PET barrier trays

The layout of the achieved A-B-A structure



The G-PET sheets have been prototyped and used to produce trays. Moreover these trays have been recycled and re-used to produce new barrier sheets. G-PET sheets with three different thicknesses have been used and deeply tested also in comparison with other traditional materials. Many testing activities have been performed to study the behaviour of the barrier sheets in all their manufacturing steps and many prototypes are available for further testing. Results show that industrial use of G-PET is feasible and final products have comparable or better performances of traditional barrier sheets with improved recyclability. Industrial actors have been interested to use G-PET sheets for thermo-forming and recycling..

The results obtained with several impact assessment methodologies show the environmental gain of the use of the innovative GREENPACK food packaging, mostly due to a reduction of the Global Warming Potential associated to the process, with an important consequent reduction also considering the overall energy needed and the correlated water footprint.

