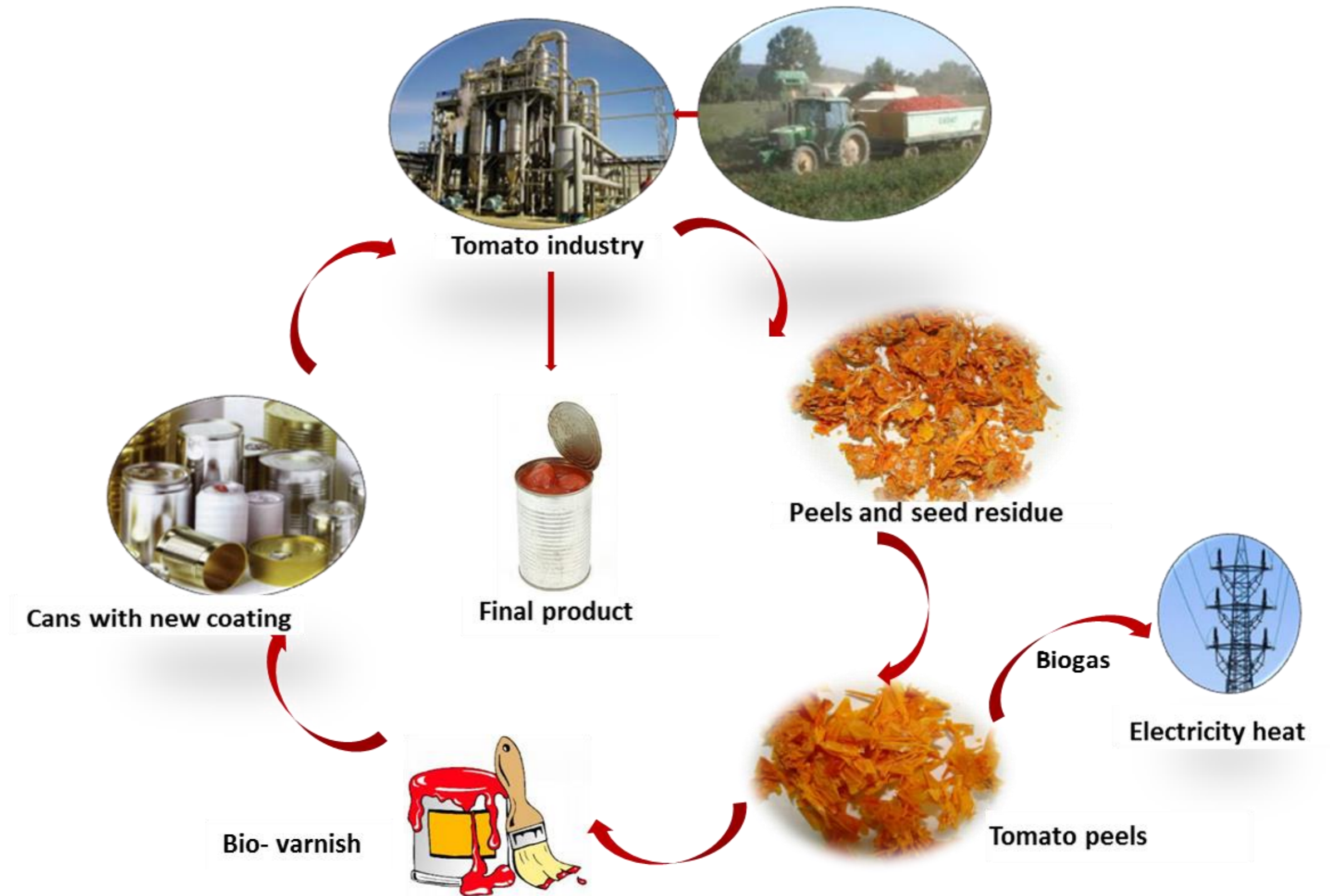


...INTRODUCTION

The recent greater attention toward hygiene, safety and environmental problems is requiring food industries to adopt eco-friendly, safe and more sustainable packaging for the consumer. Problems of food's contamination and of substances' migration from packaging are always focus of attention. The project BIOCOPAC aims to meet these demands by developing a novel bio-lacquer for metal food packaging produced from tomato by-products. The tomato processing industry, one of the most important in Europe, produces thousands of tons of waste, which are only partly reused and which contribute to pollution. On the other hand, the metal packaging industry in general and for food in particular, uses coatings obtained from oil for the protection of containers, depleting natural resources. It should be then considered that the production process of the synthetic resins used for food coatings, mainly epoxy based, are processes generating high CO₂ emissions.



...METHODS

The BIOCOPAC project develops a natural lacquer from the tomato skins. The starting substance for the production of the lacquer is cutin, a component of the cuticle of the tomato skins. The project is based on the extraction of the cutin from tomato peels. The composition of tomato skins' cutin has just been extensively studied, it consists of some n,16-dihydroxyhexadecanoic acids where the 10-isomer is largely dominant. The tomato cutin is a polyester biopolymer interesterified with potential to replace petroleum for the synthesis of polymer.

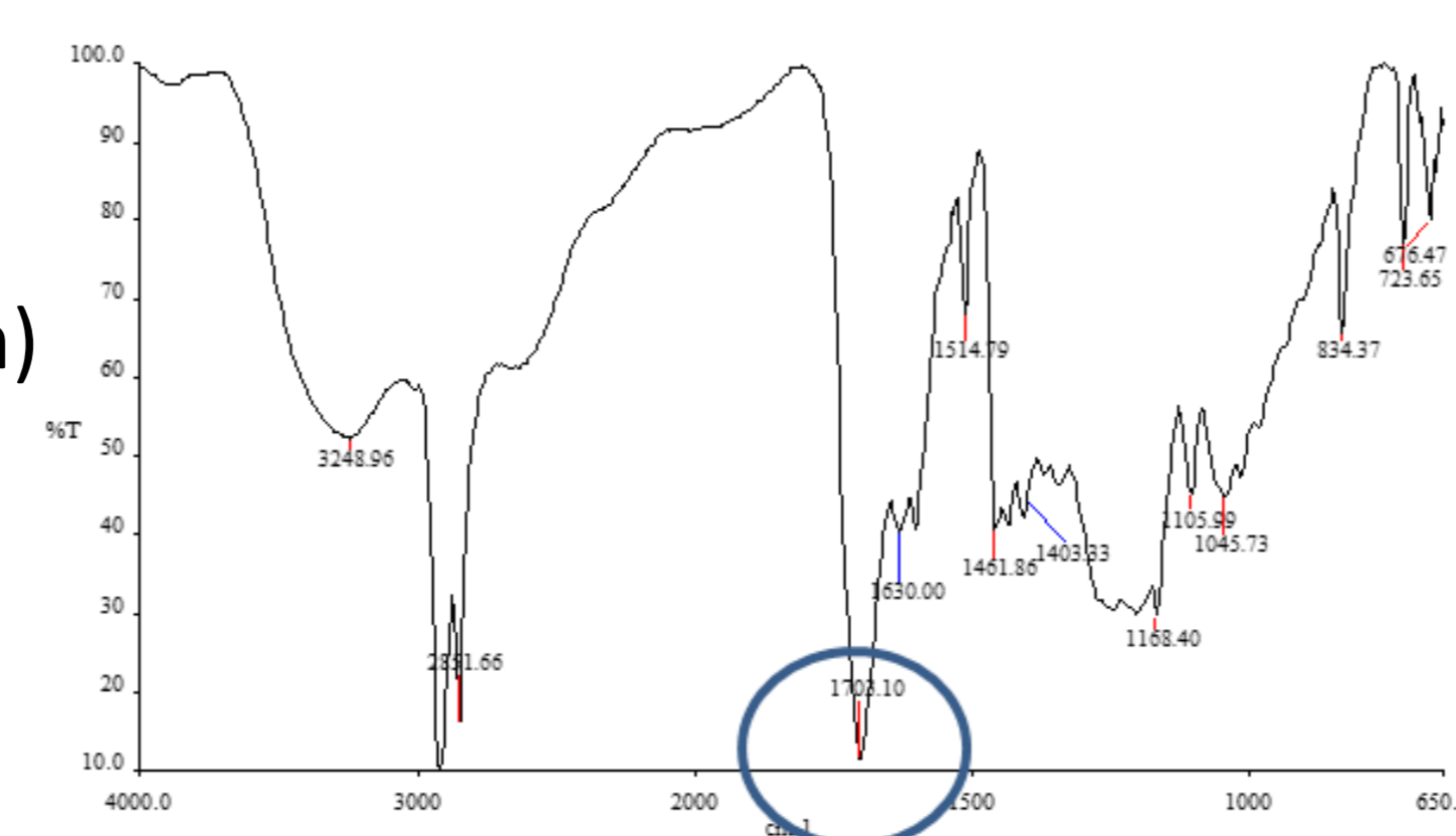
The research started with the analysis and characterization of the tomato waste, it continued with the setting up, the optimization and standardization of an experimental method to extract cutin from tomato peels. Finally, the Consortium is developing the resins and the formulations for different cutin-based bio-lacquers applicable to metallic materials.

...RESULTS

Characterization of the extracted Cutin:

- Heavy metal <10ppb (Al, As, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Sb, Si, Sr, V, Zn)
- No pesticides residues
- Total sugar < 0.1%
- Total fiber <0.1%
- No microbiological contamination

A national and international patent related to the industrial process for the Extraction Procedure was registered: WO 2015/028299A1; PCTEP20146187.



Grafic 2. FTIR spectrum. All raw cutin samples obtained in different tests presented the characteristic peaks of an aliphatic fatty acid at 1702 cm⁻¹



The formulations have been applied on different metallic substrates (tinplate, tin free steel and aluminium; roughly 5 g/m² of dry film weight). The results obtained showed good values of chemical resistance (MEK test), good adherence (tape test), good mechanical properties and a good resistance to thermal sterilization in water.



...ACKNOWLEDGMENT

Thanks to all the partners of the BIOCOPAC project, funded under 7th FRAMEWORK PROGRAMME - Research for the benefit of SMEs (Grant Agreement No. FP7-SME-2011-286446):

Stazione Sperimentale per l'Industria delle Conserve Alimentari SSICA (RTDP) Italy, SYNPO (RTDP) Czech R., Centro Tecnológico Agroalimentario Extremadura CTAEX (RTDP) Spain, Fundación TECNALIA (RTDP) Spain, Chiesa Azienda agricola (SME) Italy, Schekolin AG (SME) Lichtenstein, Conservas Martinete S.A. (SME) Spain, National Can Hellas S.A. (SME) Greece, Pugar (SME) Croatia; Saupiquet (OTH) France, Rodolfi S.p.A (OTH) Italy.