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Process and product innovations for the development of a circular economy model in agricultural areas affected by environmental crisis

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Corso di Dottorato di Ricerca in Ingegneria dei Materiali e delle Strutture e Nanotecnologie – XXXVI Ciclo

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This project represents an innovative study that, for the first time, explores the possibility to use agricultural wastes to produce biopolymers. This research activity aimed at performing an environmental analysis of the new territorial structures of Montesano, a small village near to Lecce. An original green method will be applied to extract cellulose from the agricultural wastes (work will be done in University of Alicante, Spain). Biopolymers are readily processed, biodegradable polymers. Bio-polymers come from microbial systems, organisms, and seasonal crops and plants including maize, wheat, potato, and sugarcane. These polymers are widely used in food, textiles, cosmetics, pharmaceuticals, and industrial plastics



Figure 1. Images of three different types of mixing (a) PLA (90%)/Wood (10%), (b) PLA (80%)/Wood (20%) and (c) PLA (50%)/Wood (50%)

Initially, biopolymer film produced where wood, polylactic acid (PLA) and a plasticizer has been used. Plasticizer used to increase the mechanical properties of biopolymer. Figure 1(a), (b), & (c) shows that the biopolymeric film produced with the help a mixing ratio of PLA (90%)/Wood (10%) and PLA (80%)/Wood (20%) and PLA (50%)/Wood (50%) respectively. The amount of plasticizer (30%) has been taken on the weight of the PLA.

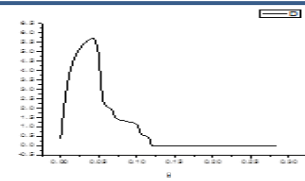


Figure 2. stress-strain curve of PLA (80%) and wood (20%)

Another approach has been taken to produce the biopolymer where commercial flour are using and plasticized with glycerol. After getting the best mechanical properties, PLA and wood will be added.



The University of Alicante was established in 1979 on the basis of the Center for University Studies, which was founded in 1968. The University main campus is located in San Vicente del Raspeig/Sant Vicent del Raspeig, bordering the city of Alicante to the north.

The University of Alicante offers courses in more than fifty degrees. It comprises over seventy departments and research groups in areas of Social Science and Law, Experimental science, Technology, Liberal Arts, Education and Health Sciences, and five research institutes. Almost all classes are taught in Spanish language, some are in English, in particular, in computer science and in business degrees, and a few are in Valencian language. The University offers English Language versions to PhD level including religion. Julian Havell was the first to graduate from this scheme. The Department of Economics runs, in Europe, a well-known Graduate Program in Economics which is an American-style full-time program taught entirely in English. The program provides students with a thorough theoretical and practical training in microeconomics, macroeconomics and econometrics, as well as specialization in applied fields.



Montesano Salentino is a town and comune in the province of Lecce in the Apulia region of South-East Italy. Montesano Salentino is a village located in a zone of the lower Salento predominantly rural, that it has always characterized by the presence on its territory of artisan workshops. The inhabited center is surrounded by a landscape of great beauty and very rich from the point of view of the fauna and flora.

The topographical position of Montesano, just 11 km within the eastern coast of Salento, has favored the penetration and the preservation of a cultural substrate pre-Roman and pre-Christian. In this small center in the basso Salento, situated on the road Lecce-Leuca, there is a steady increase of the population: in the census of 1884 are counted 838 individuals in 1981 are 2494.

As a part of the research activities, I should have to stay there for three months but unfortunately, due to pandemic situation I could not come into Italy and could not stay there. But as of my own interest I just go through website and try to know something about that village.