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UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

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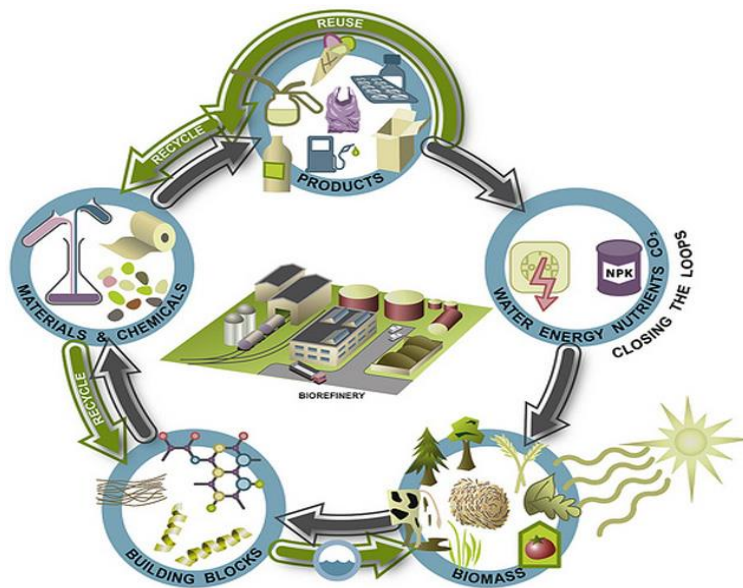
Dept. Of Life Sciences University of Modena and Reggio Emilia, Italy
Doctorate School in Agri-Food Sciences, Technologies and Bio-Technologies

Tutors: Prof. Andrea Antonelli and Prof. Francesca Masino



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CIRCULAR BIOECONOMY AND BIO-REFINERY



LA BIOECONOMIA IN ITALIA

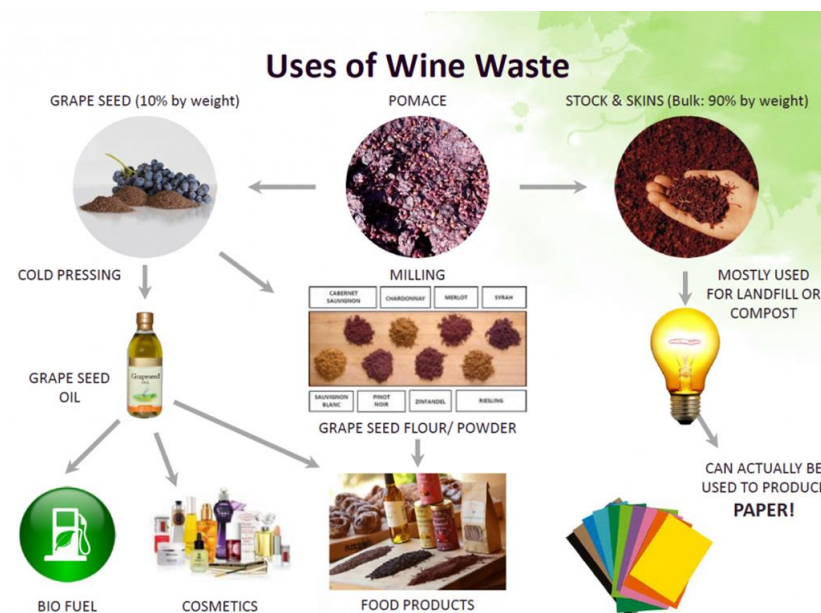
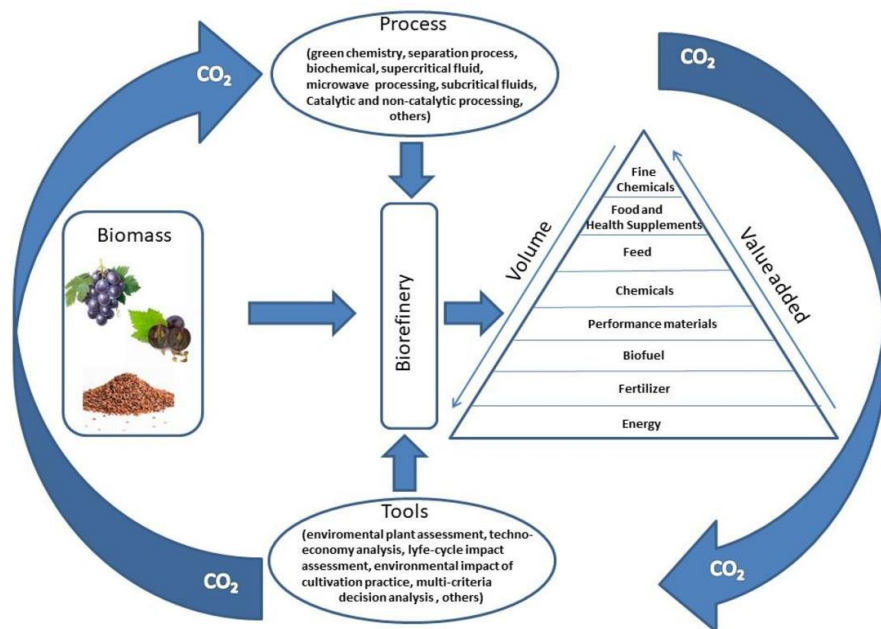
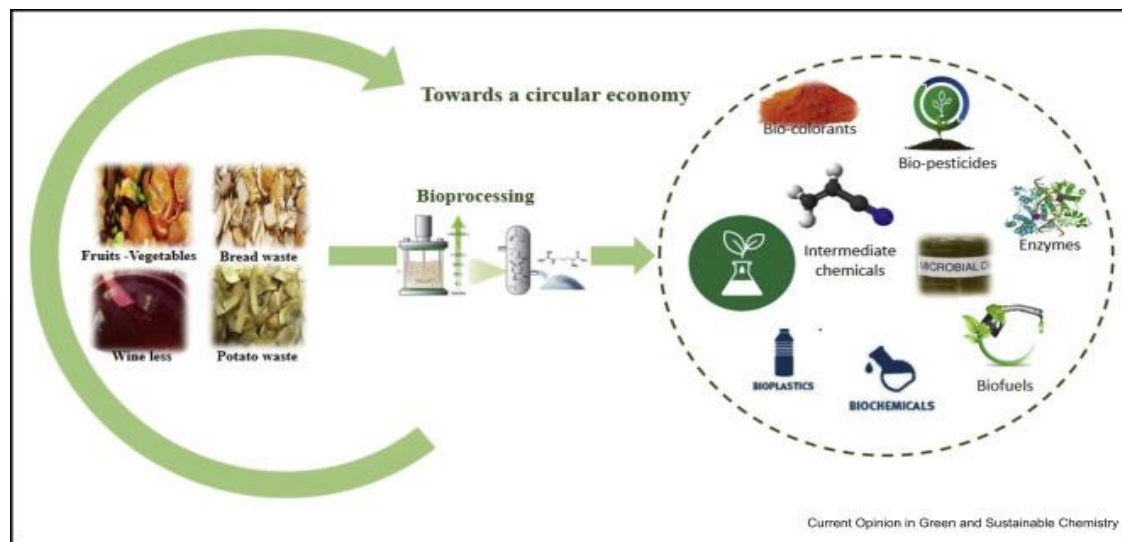


Bio-refinery scheme and Circular Bioeconomy in Italy



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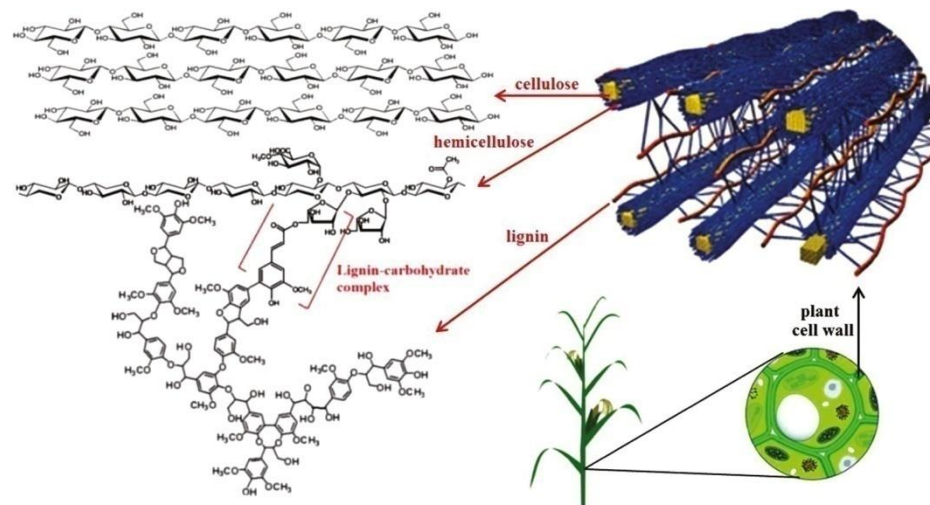
CIRCULAR BIO-ECCONOMY APPLIED TO FOOD WASTE AND GRAPE BY-PRODUCTS





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Preliminary Results: choice of grape by-product and reduction of the structural complexity of the matrix



Grape stalks and structure of their lignocellulosic biomass



Drying of the
grape stalks



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Preliminary results: Grinding of the dried material and separation of the powder obtained in its granulometric classes



Grinding apparatus



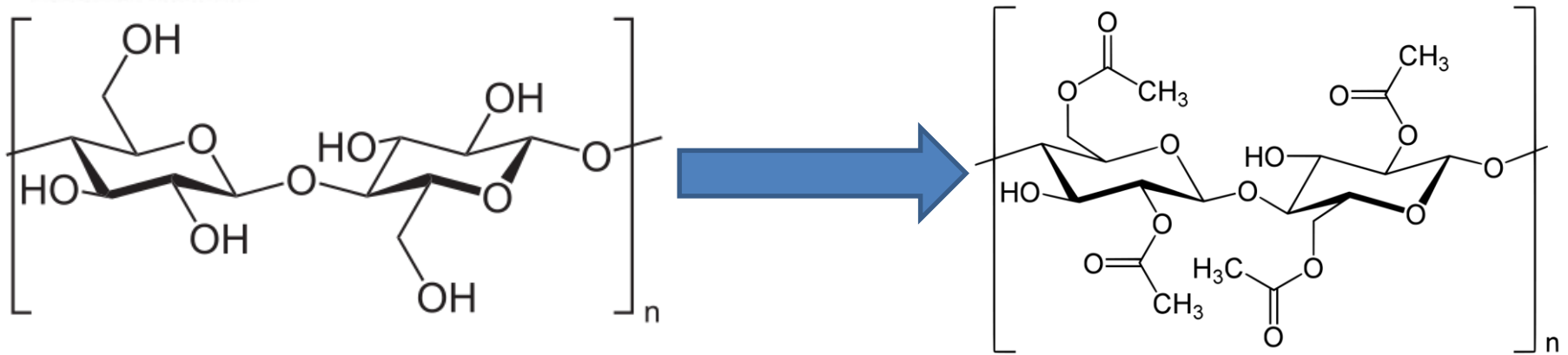
Sieving equipment



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Preliminary results: possibility of derivatization of the biopolymers, such as cellulose, of the fine granulometric fraction by acetylation reaction

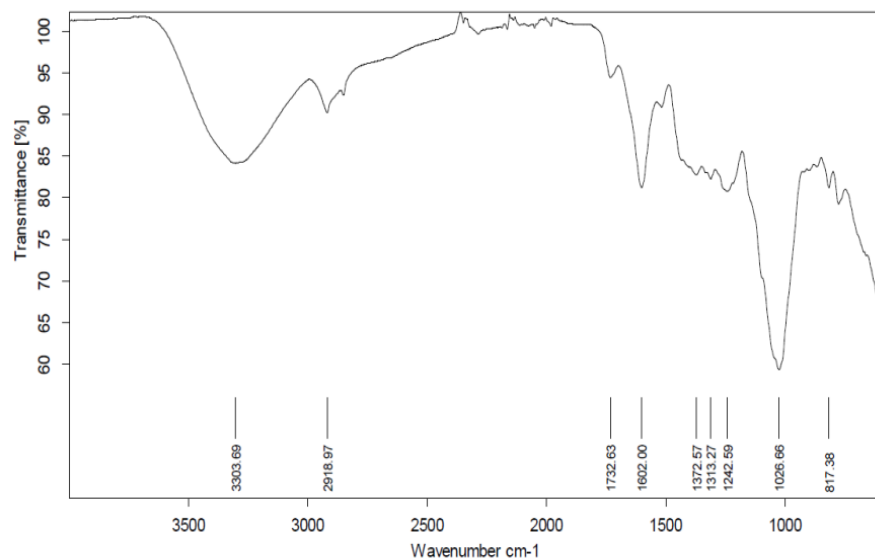


The possibility of derivatizing biopolymers could allow their compatibility with other types of these for the production of composite materials

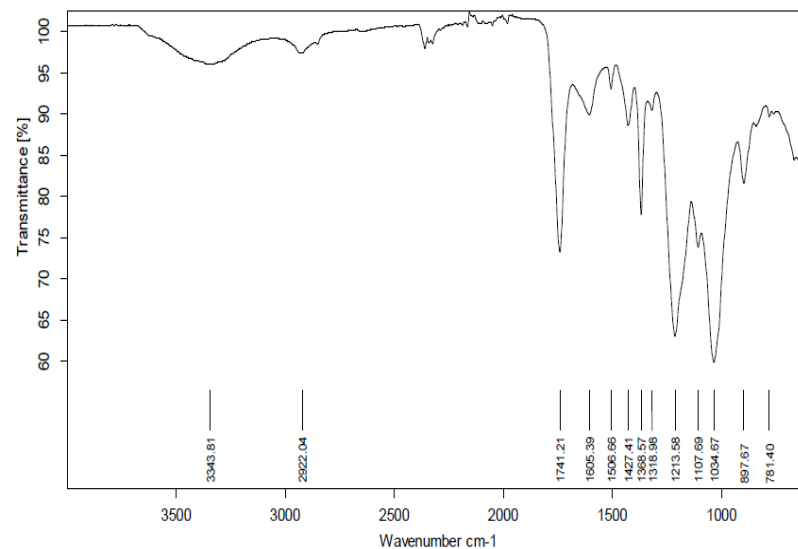


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Preliminary Results: comparison between acetylated and non-acetylated material by IR spectroscopy

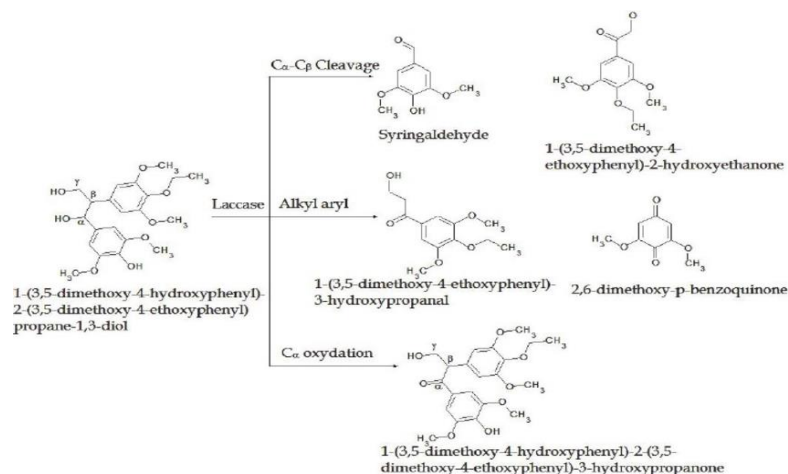


IR Spectrum of non-acetylated material

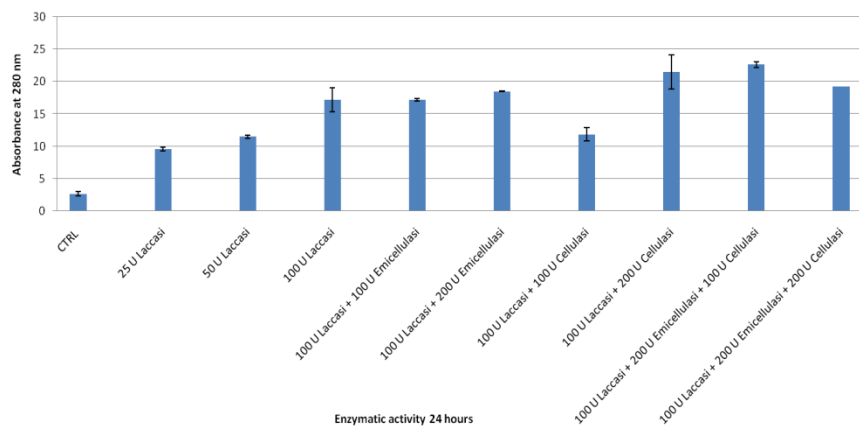


IR Spectrum of acetylated material

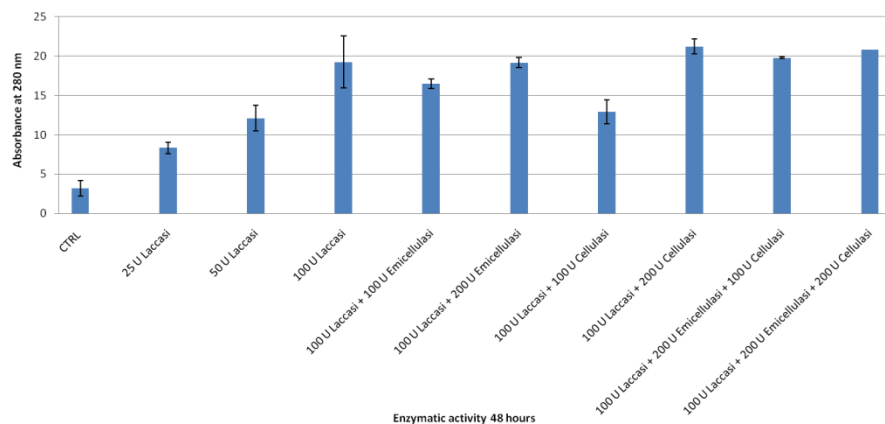
Preliminary Results: possibility of using lignocellulolytic enzymes such as laccase, hemicellulase and cellulase to obtain polyphenolic molecules from the cleavage of lignin



Enzymatic activity of Laccase, Hemicellulase, Cellulase



Enzymatic activity of Laccase, Hemicellulase, Cellulase



Absorbance measurements of enzymatic activity of
the three enzymes at 24 and 48 hours



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**Thank you for your
attention**