

# Orange Peels as Biomass in Ethanol Green-production

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Exploring the renewable resources in fabrication of alternative fuels has increased in recent years although involves many polemics that could be overcome by substituting them with agricultural sub-products and/or waste plant materials as resources for a *Cleaner Fuel Production*. Herein, the use of orange peels (OP) as the main biomass source for ethanol production is proposed. Knowing that the Brazil is world's number one orange juice producer, the OP has low or no cost, presents very high content of carbohydrates, and high susceptibility to hydrolysis. The goals of the present work were to evaluate possibility of exploring the OP biomass not only in bioethanol production through fermentative processes, upgrading laboratory to the pilot scale process, but also to explore it as a source of a very valuable essential oil. Upon oil extraction, using the steam distillation, the first commercially interesting product has been obtained. This way, the terpene-like compounds depleted OP biomass was hydrolysed (17%, w/v) into a mixture of 5- and 6-carbons sugars using sulphuric acid (0.5 – 1 %, v/v, 120°C/15-30min). The obtained sugars (glucose, fructose, arabinose) were fermented in three different processes executed with two new yeast strains (named B and E) that were isolated from the orange peels; and also with commercial *Saccharomyces cerevisiae*. The fermentations with two new yeast strains and commercial one resulted in obtaining the ethanol in high yields (20.2; 23 and 46 g.L<sup>-1</sup>, respectively) and without any residues. This study demonstrates the use of a simple process with minimal environmental impact using hydrolysis and yeast for the production of ethanol from this potent lignocellulosic biomass.

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