

Renewable bioproducts from agricultural resources

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Today many industries use chemistry and chemical engineering as one of the main tools to increase their economic and market expansion. In the last decades, although chemical industry has enormously contributed to improve the human quality of life, including the set up of suitable technologies for waste treatment and reduction, the chemical industry today is commonly perceived as one of the most important cause of the progressive environmental decline. On the other hand, the strong request for environmentally safe chemical processes and products requires the optimization of new and cost-effective technologies to prevent or reduce pollution. Over these last years, in western countries this approach has supported the use of renewable and sustainable commodities such as those from agriculture in alternative to mineral and synthetic ones; it has reduced or prevented hazardous wastes, as well as costly pollution treatment and disposal. This objective seems to be available by using worldwide-accepted process and materials for identifying friendly potential industrial chemicals and consumer products. It is also true that these products are considered renewable-sustainable-green, according to the general people sentiment and politics at the time of the choice that, however, could also change in coming years. All this considered, the new approach should develop strategies economically sustainable for designing environmentally friendly processes for the production of such innovating environmentally safe products. In this contest, the non-food crop products represent the most important source of renewable products of great economic and social value that include natural fibers, starches, industrial oil, dyes, high value proteins and bioactive derivatives. Beside the use of a suitable innovating extraction technology, these biobased products could represent an economic way to exploit agricultural non-food commodities for producing not only basic compounds such as carbohydrates, oils and fibers but also high value chemicals to be used in fine chemical industry and food technology. One of the best examples of this complete and profitable exploitation of a non-food crop, using an innovative extraction technology, is the case of Brassicaceae oilseeds and crambe seeds in particular. With a proposed new technology from this source it is possible to extract industrial oil, with special physico-chemical characteristics due to its highest erucic acid content, important functional proteins such as enzymes, enzyme inhibitors and cofactors, and high value bioactive secondary metabolites.