

## **The green revolution for chemistry: actuality and perspectives**

*F. Trifirò\**, *C. Gessa\*\**

\*Dep. of Industrial and Materials Chemistry, University of Bologna, Italy

\*\*Dep. of Agro-environmental Science and Technology, University of Bologna, Italy

The availability of cheap feed stocks has been always the driving force for strong changes in the chemical industry and the same development of chemistry. Now we are in the era of petrochemicals and notwithstanding the chemical industry use only a small fraction of oil and for the next thirty years no shortage of raw material for chemical industry can be foreseen, big changes are yet occurring in the nature of feed stocks used. Lower alkanes present in natural gas are becoming interesting feed stocks for their direct transformation to functionalised products. Renewable raw materials have been proposed in a significative way as chemical feed stocks under the pressure of environmentalists and farmers of industrialized countries which are encouraged to substitute traditional crops with non food ones or to set aside soils. Besides there is the need of industrialisation trough agricultural products of the developing countries in particular those ones which have enough sun, water and land.. There are five methods of renewable resources transformation :

- 1) physical methods which separate and isolate the several components keeping unchanged their structure There are several examples of this type of production (cellulose, pectine, agar, chitin, alginate, amide);
- 2) chemical or biochemical transformation in one stage of natural products which are obtained by physical methods( ethanol, citric acid ,lactic acid by fermentation of fructose and glucose;
- 3) modification in more stages of natural products ,by example the further transformation of ethanol, the production of sorbitol ,the synthesis of vitamin C in more stages from glucose;
- 4) pyrolise : decomposition at temperature between 500-800C in absence or with low amount of oxygen in order to obtain the same fractions derived from oil
- 5) gasification :controlled combustion around 1000C to produce CO and H<sub>2</sub>.

The advantages to use renewables is both in the simplification of processes and on the obtaining of products more acceptable from an environmental point of view. But it is necessary to select and develop new crops which present higher yields in the desired compounds, new chemio-.bio technologies to transform in a more economical way the natural raw materials to the final product and also new legislation which favours the use of products with lesser environmental impacts.