LAMBIOTTE, PREMERY, FRANCE: AN INDUSTRIAL PYROLYSIS BIOREFINERY OPERATED DURING 120 YEARS

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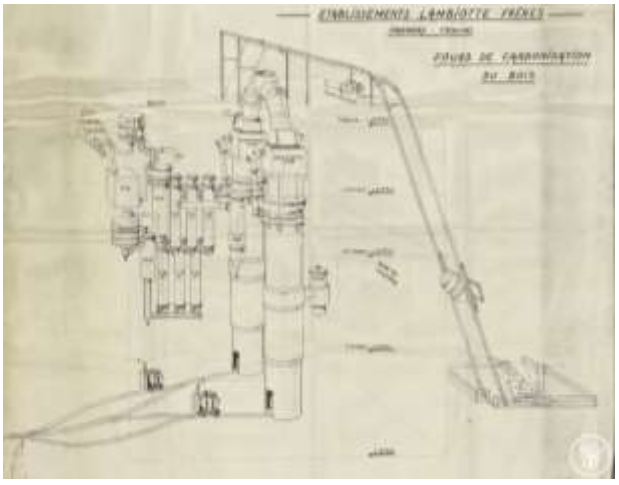
The Lambiotte process is a well-known process for the continuous carbonization of wood. It is also sometimes called as the “CISR” process which is still in operation in Belgium, France, etc. [1, 2]. But this process is the small and simplified “son” of a much more advanced process (sometimes called as “SIFIC”) developed by the Lambiotte company in France (in Premery). The CISR reactor is smaller than the SIFIC one and burns the condensable products to produce mainly char. The SIFIC process was an integrated forest-refinery. It was operated in Premery to produce about 20000 tons per year of char from about 100000-120000 tons of wet wood (~45% moisture content, before drying in mobile vertical beds) but also to produce various chemicals from the carbonization bio-oils. The carbonization oil was fractionated and purified in an advanced process combining solvent extraction, distillation (more than 40 distillation columns) and catalytic reactions. In the beginning of the 20th century, the factory was able to produce: methanol, formol and their derivatives, acetates and solvent (from acetic acid), creosote, guaiacol, (wood) pitch, various medicines (such as antiseptics). Then even food aromas have been produced.

This talk will present the historical development of this industry from 1886 to its end in 2002 based on our perusal of old (unpublished) manuscripts. We will present the technological development, from batch retort to the continuous mobile bed process (invited by Charles Coutor) and implemented in 1947. We will discuss the main process units and the industrial mass and energy balances. For instance, in 1981, the products were: 20000tons of char, 3000t of acetic acid, 100t of formic acid, 1200t of “methylene” (methanol with impurities), 1000 t of sodium acetate, 200t of various solvents, 80t of tanning products, 14t of methylcyclopentenolone (caramel and licorice aroma for coffee and tobacco), 2t of maltol (wild strawberry aroma), 15t of diacetyl (butter aroma for margarine) and propionic acid (additive for biscuits), etc.

This factory has employed more than 300 people and brought important economical and social profits as the main industry of the rural area of Premery. But this industry has also led to important environmental impacts (air, soil and water pollution). We will conclude on our (personal) analysis of the success and decline of this industry. This story may help us to build a sustainable forest-based industry.



A human story

Lay out (1964) of the carbonization process presenting the 2 vertical moving beds in parallel (installed in 1947 and 1953) and part of the condensation system of bio-oil

[1] Gronli, M., Industrial carbonisation processes, PyNe Subject group report, 2003.
[2] Klavina, Energy Procedia, 95, 208-215, 2016.