Rhodia shares its experience in vanillin manufacture in China

Rhodia acquired in 2000 the existing business of the Chinese company Xuebao Fine Chemicals Co. Ltd, one of the most recent vanillin plant at that time, and formed a new subsidiary named Ruohai Fine Chemicals Co. Ltd.
The plant is located in Haining City (Zhejiang province) and was operating the standard ONCB route (starting from orthonitrochlorobenzene), which originated in Russia in the 60's and nowadays operated only in China.
What Rhodia found was a disastrous HSE track-record, compared to the ex-catechol process that Rhodia has been operating for decades in the US (Baton-Rouge, LA), and in France (Saint-Fons, Lyon) :

- **higher toxicity of the raw materials involved**
- **unfavourable ecobalance** (3 to 5 more tars and COD - Chemical Oxygen Demand, and 5 times more VOC - Volatile Organic Compounds, 1/3 of which benzene)
- **non compliance with environmental standards**
- **high health & safety risks**
- **unacceptable standards for a flavour : no Product Stewardship policy**

The plant dumped untreated effluents into a nearby river, toxic tars were stockpiled in unmonitored landfills. And worst of all, **benzene was used as an extraction solvent** in different steps of the process, especially for the extraction of vanillin ! Due to high toxicity, benzene is classified as carcinogen R45.
According to Food regulations, if benzene is used as an extraction solvent, the derived vanillin can not be used in Food applications.

ONCB process is only operated in China, and nowhere else. But due to unfavourable ecobalance, lower performance and raw materials toxicity, it's an unsustainable method of production. Under regulatory and economical pressure to raise their operating standards, three out of the five major Chinese vanillin producers have shut down since 2000.

In Europe, flavours are considered as food ingredients since 2002 (178/2002/EC) and Directive 93/43/EC requires for the manufacture of food ingredients :

- general hygiene principles
- risk management according to HACCP methodology (Hazard Analysis Critical Control Points)
- staff training to hygiene
- health compliance of the products

The application of the HACCP methodology is therefore mandatory for the international trade of foodstuffs. And vanillin, the most widely used flavour in the world, should be produced and put on the market in compliance with those consumer safety standards.
A mere certificate of analysis is not sufficient to reflect the reality of the process and its full compliance with Food Regulations, especially when the product is traded by a number of intermediaries.

Since its acquisition, **Rhodia has largely overhauled Ruohai** : a biological plant for the treatment of aqueous effluents as well as an incinerator to burn tars on site, were built.
In addition, consistent with its sustainable development commitment, Rhodia decided, as a first priority, to modify the process (suppression of the benzene as a solvent and move to ex-catechol guaiacol) (see chart 1).
This vanillin, marketed mainly in China and some of Asian countries under the brand name of "Snow Orchid", offers superior standards of quality and product safety (no chlorine impurities) compared to any other local source in the country.
However this modified process, has still not achieved the level of excellence of the one of Saint-Fons and Baton-Rouge, **where the unequalled Rhovanil® Extra-Pure vanillin is produced.**

Rhodia

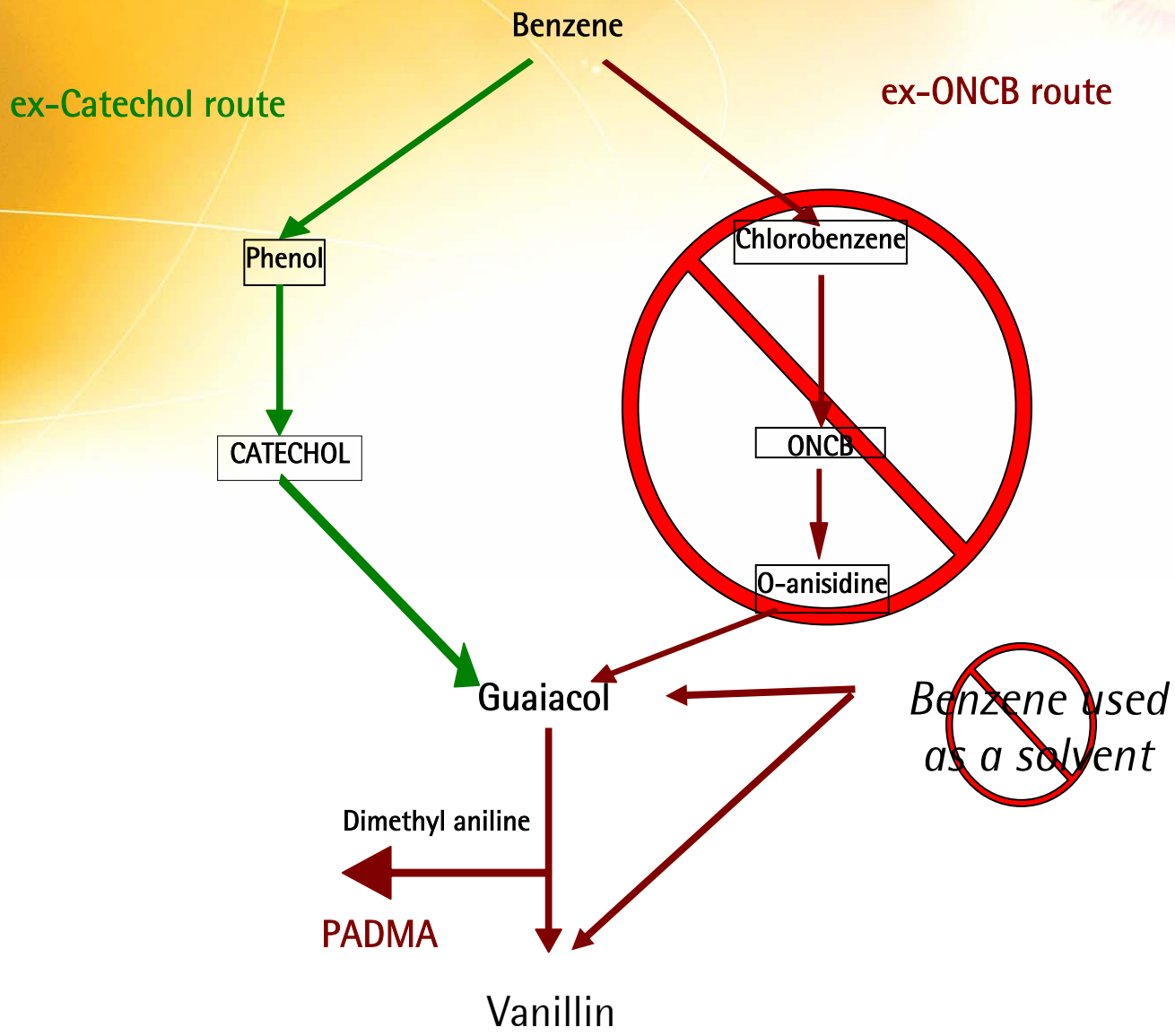

Chart 1 : suppression of the benzene as a solvent and move to ex-catechol chlorine-free guaiacol at Ruohai plant.

November 2004

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