MONITORING OF CONTAMINATION BY PAH AS AN AID FOR MANAGING SHELLFISH PRODUCTION SITES ON THE FRENCH ATLANTIC SEABOARD

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ABSTRACT

After the wreck of ERIKA, 18,000 to 20,000 tons of oil were spilled along the French Atlantic coast between Finistère and Vendée. The main contamination events occurred by the end of December 1999, causing greater or lesser damage to the environment from oil slicks, patches and pellets. Shellfish farming areas in the sector, representing an annual production of around 50,000 tons (all species combined), were particularly exposed to the effects of the spill.

The French RNO (National Observation Network), concerned with the quality of the marine environment, studied chronic contamination of the coast by polycyclic aromatic hydrocarbons (PAH) and other pollutants. About fifteen RNO sampling points exist along the Atlantic coast between Finistère and Vendée, and 16 PAH recognized internationally as presenting toxic risks for environment are analyzed once a year (November) in oysters and mussels.

To estimate the initial state of PAH contamination, Ifremer obtained samples from shellfish at some 30 points between Douarnenez in Brittany and Pointe du Payré in Vendée, before the oil slicks reached the coast. The data acquired indicated that chronic contamination of this portion of the Atlantic coast is about 150 $\mu g.kg^{-1}$ dry weight for the 16 PAH combined.

To facilitate rapid management of the situation, a monthly monitoring of shellfish contamination by PAH was performed by Ifremer. The results allowed the Departmental Directorates of Maritime Affairs to take all necessary measures for effective control of the opening and closing of shellfish-farming areas on the basis of the recommendations of the AFSSA (Agence Française de Sécurité Sanitaire des Aliments = French Agency for Food Safety).

The Atlantic coast was affected to different degrees, with closings of shellfish-farming areas varying from a few weeks to several months. Although contamination rarely exceeded the warning value in some sectors, it reached very high levels (3,000 to 5,000 $\mu g.kg^{-1}$ dry weight) at Le Croisic and on the west coast of Noirmoutier Island during several consecutive months. For example, in Loire-Atlantique and Vendée, more than 95% of the shellfish-farming areas and onshore gathering areas (both for professionals and non-professionals) were forbidden between January and March 2000.

Two years after the wreck of the ERIKA, the numerous data acquired during monitoring operations allowed the spatial and temporal development of coastal PAH contamination to be illustrated, relative to levels and contamination patterns. A principal component analysis showed contamination differences among the areas monitored and confirmed the existence of sectors in which chronic PAH contamination was present before the wreck of the ERIKA. In most of areas, the PAH contamination comes back to initial levels in February 2001. Yet, the contamination patterns stayed different from those observed at the initial state, and showed a characteristic fingerprint of ERIKA's oil.