

PFAS IN POPULATION

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VENETO

The largest amount of PFAS pollution in Europe is found in the three Venetian provinces of Padua, Vicenza and Verona. The discharge of the multinational Miteni, located on a recharge area of the aquifer that supplies this area, has contaminated over 150 square kilometers of land with PFAS since the 1960s. The polluted water from the groundwater was used for the water network that served about 350 thousand people from the 1960s until 2013, when, following a study by the IRSA-CNR, the Istituto Superiore di Sanità imposed to the Veneto Region to filter public waters and a new water supply plan.

Thanks to this research which highlighted the serious exposure to PFAS due to drinking water, the resident population had been a victim for many years, the Veneto Region has divided the polluted area into three zones, highlighted with the colors red, orange and yellow, depending on the severity of exposure for the resident population. Furthermore, for the population residing in the red zone only, the region has launched a health surveillance plan with the aim of monitoring the main health indicators of over 90,000 residents, as well as carrying out the blood dosage of 12 molecules of PFAS on all the participants in this plan.

Many studies have been conducted since 2016 on the health of residents in the red zone: E.N.E.A. and I.S.D.E. published in 2017 a study that demonstrates a significant increase in mortality in the red zone, compared to residents of other areas of the Veneto not polluted by PFAS, for the following pathologies: cerebrovascular pathologies, heart attack, diabetes, Alzheimer's disease and in women only: kidney cancer, breast cancer, Parkinson's disease. In addition to the contamination of drinking water, the source of pollution was, and still is, food. A study conducted by the National Institute of Health in 2019 listed milk, pig liver and eggs as the most contaminated foods.

The current health situation lacks monitoring of the orange and yellow areas and the impossibility for citizens outside the red area to analyze PFAS levels in blood.

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Risk to human health related to the presence of perfluoroalkyl substances in Italy

Per- and polyfluoroalkyl substances (PFAS) are a diverse group of human-made chemicals used in a wide range of consumer and industrial products. First substances have been developed and produced since 1936 in USA by 3M; in the following decades different PFAS have been used and the family is now including up to 5000 substances. In Italy, PFAS production was started in the '50s by Montecatini.

Their unique water repellency and temperature resistance drove an intensive use in cookware, soaps, paper products, thermal jackets, shoes and cosmetics.

They are impossible to decompose in the environment due to a chemical structure whose characteristic is the Fluorine-Carbon covalent bond, an indestructible union that makes them

persistent in the environment, accumulating in living and ubiquitous organisms driving to consider them “forever chemicals”.

An American report based on 3M former employees highlighted plasma half-life values of the best known compounds (Pfoa, Pfos) of 3.8 years (Pfoa) and 5 years (Pfos); 5/7 years in the vegetable forms.

The main sources of emissions into the environment are discharges of the industries that produce these compounds (industries of fluorocompounds or fluoropolymers) or that use them in their processes in considerable quantities (eg tanning industries, paper industry). Another relevant source is represented by urban and industrial waste which can release substantial quantities. In 2005, 3,500 West Virginia citizen filed a class action against the multinational Dupont that produced the Teflon compound, based on PFOA, in its plant on the banks of the Ohio River. Blood tests on the population had shown a high rate of this compound in the blood. In 2012 the group of scientists (C8 Science Panel) appointed by the court to verify whether PFAS are harmful to human health, after having studied about 70,000 citizens residing in areas close to the plant and who had been drinking more or less polluted drinking water for years, established a probable correlation between PFOA and 6 diseases: hypercholesterolemia, hyperthyroidism, hypertension in pregnancy, ulcerative colitis, kidney and testicular cancer.

The International Agency for Research on Cancer (IARC) of World Health Organization classified PFOA as *"possibly carcinogenic to humans".(group 2b)kidneys and testicles.*

In Europe, in 2002 the PERFORCE project was launched driving to the issue, in 2007, of a study measuring these compounds levels in the main European rivers where Po resulted as the most contaminated from PFOA.

Later, a study from the Joint Research Centre of the European Union and the Water Research Institute of Italian National Research Council (IRSA-CNR) recognized as PFOA main exposure source in Po basin the discharge of the chemical pole in Spinetta Marengo, in the town of Alessandria.

The European Food Safety Authority (EFSA) states that there is a cause-and-effect relationship between dietary exposure to PFAS and 4 health effects: hypercholesterolemia, hypertransaminasemia, decreased antibody response to vaccinations and decreased birth weight. In its 2020 publication, EFSA indicates the maximum quantity of 4 PFAS, understood as the sum of PFOA, PFOS, PFNA, PFHxS, which can be assumed with foods without damages to health in 0.62 ng / kg of weight / day (4.4 ng / kg / week).

// OTHER SITES PFAS IN ITALY

PIEMONTE

Currently, in Italy, PFAS are produced only in the industrial center of Spinetta Marengo, a suburb of Alessandria. The various chemical companies that have exploited the site since the early 1900s have contaminated the aquifer below the site and the Bormida River, a tributary of the Tanaro River which in turn flows into the Po with various toxic substances. A contamination condemned in 2019 by the Turin Court of Appeal for culpable environmental disaster.

In 2007 the PERFORCE research measured PFOA values in the Po in Ferrara with values of 200 nanograms per liter. Following this first alarm, the Ministry of the Environment asked IRSA-CNR for monitoring all the PFAS presence..

The absence of limits on discharges for these substances had resulted in a discharge of PFOA of 2.5 tons.

Following the international ban on the production and use of PFOA, included in the list of hazardous substances in the Stockholm Convention in 2009, Solvay introduced a short-chain compound (6 carbon atoms) registered as cC6O4, moving production to Veneto at the Miteni and without reporting its use to Spinetta Marengo until 2019.

A further PFAS, produced since 1989 by the previous company Ausimont and continued by Solvay, patented with the name ADV7800, is also produced by Solvay exclusively in Spinetta plant.. It is a long-chain compound, over 8 carbon atoms that characterize the ability to persist in organs and the environment.

Contamination from cC6O4 and ADV7800 reached the groundwater under the plant, a water well that supplies the municipality of Montecastello a few kilometers from the industrial center and is present in high concentrations in the eggs of sedentary wild birds collected near the industrial site.

These findings clearly indicate how these compounds are mobile and can easily reach the groundwater but at the same time are bioaccumulative reaching high concentrations in the blood and organs of the organisms residing around the industrial site.

In December 2019, the data of the unique health study on the population, the morbidity and mortality rates in the Fraschetta district, which develops within 3 kilometers of the plant, were published.

The data confirmed in the inhabitants exposed to air emissions, a high mortality rate from kidney, lung and mesothelioma tumors but also a possible increase in neurological diseases in children. No haematological screening was conducted, Solvay also banned the use of the standard of its substances for blood tests.

In September 2021 permanent table was opened between ASL Piemonte and ARPA to conduct a biomonitoring of residents. Environmental data is currently being collected.

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