The water of river Frigido

Analysis

The water is a resource that must be protected whatever their use is carried out safeguarding the expectations and rights of future generations.



The Frigido

The Frigido is a short river in Tuscany - Central Italy, whose course of 17 km is entirely included in the province of Massa-Carrara. It starts from two branches, one having its source in the Monte Sagro and Monte Rasore (Apuan Alps), the other near the village of Forno. After running into a deep valley in the Apuan Alps, it receives the waters of the Renara and Fosso d'Antona, and then flows in Massa before reaching the Ligurian Sea near Marina di Massa. ie.

Chemical and physical parameters of water

Temperature.

- Hardness: quantity of mineral salts dissolved in water.[F]
- Fixed residue: quantity of mineral salts that remain in the water after boiling at 130 Celsius degrees .[Mg/L]

Ph: measurement of the acidity or basicity of a substance.[Ph]

Electrical conductivity: it represents the ability of a substance to let the current flow.

The main constituents and the main water pollutants

Organic chemical contaminants :

- trichlorethylene and tetrachlorethylene: they are products derived from laundries and engineering industries coming from the degreasing of the pieces.
- hydrocarbons: they come from gasolines and lubricants and are very polluting.
 - haloforms: they come from methane, an example is chloroform. The presence of these substances doesn't imply that the water is polluted, these substances are formed by the reaction of chlorine (used to purify water) and organic substances.

The main constituents and the main water pollutants

Inorganic chemical contaminants:

Nitrites and nitrates can be produced in nature by the oxidation of the ammonium ion or derive from the fertilizers used in agriculture, however there are advanced potabilization treatments that completely eliminate these elements.

Other inorganic components can be very toxic, for example "heavy metals" (cadmium, chromium, lead, arsenic, mercury, nickel, etc.). Heavy metals can be present in nature or derive from human activities, in the first case heavy metals are in the form of slightly soluble oxides or sulfides, therefore not very dangerous.

The heavy metals released by man in nature are not always harmless, in fact they have a very low concentration threshold and just a few milligrams are enough to make the water unsafe.

The main constituents and the main water pollutants

- Microbiological contaminants: they are micro-organisms which, if ingested, can cause damage to the health of the consumer. The diseases that can be transmitted by water are numerous.
 - The main microorganisms are:
- Protozoa
 mashrooms
 bacteria
 viruses.
 Drinking water in nature is increasingly rare, only mountain springs far from human settlements can guarantee good quality.

Therefore it is not recommended to drink uncontrolled water.

Water analysis of the Frigido river at its mouth

- Water sampling was done in order to obtain the following parameters:
 - Temperature surface
 - Temperature seabed
 - Nitrite and nitrates analysis
 - Ph
 - Oxygen
 - Chlorides





Analysis procedure

- The temperature at the bottom of the river was measured by lowering a thermometer on the bottom with a string and waiting 5 minutes after which the thermometer was pulled up.
- The surface temperature was measured in the same way, except that the thermometer was lowered to the surface.
- The analysis of nitrites and nitrates was done by adding appropriate reagents in a Petrys capsule together with the water collected from the river. The reaction generates a quantifiable colored product by comparison or UV.

Observations and conclusions

Temperature at the bottom: 13 C
Surface temperature: 17 C
Nitrites: 0,2 mg/L
Nitrates: 9 mg/L
pH: 7,1
O2: 10,8 mg/L
Chlorides: 41,3 mg/L

We know that the temperature is inversely proportional to the concentration of oxygen and carbon dioxide. The presence of few nitrates indicates that Frigido is a short river, in fact nitrates take time to form. In addition, we deduce that being Frigido a fast river, it does not allow salt water to rise.

Final conclusions

Examining the data collected, we can say that the water at the mouth of the river is not potable since there is *salmonella* and pollution from domestic sources although the health of the river is generally acceptable.

Heavy metal analysis









ErasmusPlus Project Let's Help Our Precious Planet

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