# The geochemical and microbiological features of the sediments of "Sacca di Goro" coastal lagoon (Po River Delta)

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**Introduction:** "Sacca di Goro" is a coastal lagoon, south of the Po River Delta, and it is one of the most important aquacultural systems in Italy. That area has a strong environmental value for its large biodiversity and it is inserted in SCI (Site of Community Importance) and SPAs (Special Protection Areas) areas. This paper reports the data of geochemical and microbiological characterization of sediments carried out in the 2003, 2004 , 2005 and 2006 years.

**Methods:** All samples were collected from the surface sediment (20 cm) on the entire extension of the lagoon. Sediments were analysed after oven drying at 50°C for 48 hrs, except microbiological parameters. The major elements (expressed in percentage of oxide) and the trace elements (expressed in ppm) were carried out by X ray Fluorescence. The granulometric classification was carried out according to Shepard diagram in order to estimate the granulometric variations in the time. Carbon and nitrogen elemental measurements were performed by aqueous acidification procedure to remove carbonate [1]. Samples were then analysed by a Carlo Erba CHNS-O 1108 elemental analyser configured for C and N analysis. Polycyclic aromatic hydrocarbons (PAHs), were determinated by an Agilent GC (6890N)/MS (5973) after extraction, clean up and chromatographic separation according to EPA methods (3500B, 3540C 3600C 8000B). The microbial analyses were performed within 18-24 hrs and include: total coliforms, faecal coliforms, faecal streptococci by MPN methods [2, 3], Salmonellae by the enrichment and selective media [2]; spores of solfate reducing bacteria [4].

**Results:** The heavy metal concentration in the sediments of "Sacca di Goro" is similar to the Po river alluvional plain sediments near the city of Ferrara ("background leve"). The range of the quality of "Sacca di Goro" sediments is from poor to medium – good as a grain size function of that kind of sediments [5].
Total Organic Carbon ranged from 0.14 to 1.40 % (dry weight). PAHs concentration ranged from 89 to 326 μg/Kg (dry weight). The values of total and faecalis coliform ranged from 1 to 49 and from 1 to 33 MPN (g), respectively. The content of faecalis streptococci was generally low ranging from 1 to 33 MPN (g) except two samples (1400 and 8800 MPN (g)). Spores of solfate reducing bacteria were not present. Salmonellae was present only from the samples collected in the year 2005. Moreover near the coastal arrows and the lagoon mouth an increase in the coarse grain fraction is observed and the sediments quality improve.

**Discussion:** The research individualities Sacca areas with low quality sediments located in internal areas near the shore. These areas are not fit to aquaculture system. The work shows moreover the good quality of the sediments present in coastal arrows and in the zones near the lagoon mouth. Litologically sediments features are not variable during the experimental time and the work shows the correlations between the tessiturally-structural characteristics of the sediments and the kind of pollution. The sediments in the lagoon area extending from the shore nearly 1 Km on shore, show an high percentage of fine grain fraction with an increased heavy metal content, exceeding the values of the Italian laws.

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