

Characterization of the clay of SEHOUE - MASSI used for chemical purification: case of the ponds of GBAGO (Porto-Novo. Republic of Benin)

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Abstract

1. Introduction

Clays constitute a rock of geological origin secondary coming from the deterioration of other rocks (metamorphic, magmatic, etc.) under the action of the phenomenon of erosion and chemical processes. The nature of clay thus formed will depend on that of the bed rock and the climatic conditions of its formation. The properties of plasticity and adsorption due to the presence of fine particles of size lower than 2 μm were noted during the levigating of the components of clays according to their sizes.

The clay of SEHOUE - MASSI was used as adsorbents for the elimination of the chemical pollutants of the water samples of the ponds.

Diffraction with x-rays is a technique for the mineralogical characterization of the crystallized substances. It arises from work of Wiewiora (1985) of Brewster (1990) then of Robert (1991), that the incidental rays are diffracted by the reticular plans of more or less crystallized minerals.

The diffraction of x-rays remains the first method for the mineralogical characterization of argillaceous minerals. It is usually used as well for the identification of the type of clay as for their quantitative semi evaluation (Robert and Al, 1991).

The mineralogical study was carried out by diffraction of X-rays on powder of the total or rough rock, finely crushed and on the fine fraction (< 2 μm) purified or normal. This normal fraction made it possible to prepare directed pastes which underwent the specific treatments (Ethylene glycol, Hydrazine, Heating with 490C during 4H and others) (E. Sagbo, 2015)

The diffractograms were recorded using a Philips diffractometer equipped with a generator PW 1800 with graphite monochromator, using the radiation of cobalt and functioning under 40 Kv, 40 mA. The spectra were treated by the software X' PERT & IDENTIFY and X' PERT HighScore (E. Sagbo, 2015).

2. Results

According to the results obtained, the major crystalline phases contained in all the samples are the following minerals:

- la kaolinite (K) : $\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$ (7,14Å ; 3,56Å)
- le quartz (Q) : SiO_2 (3,33Å ; 1,81Å ; 4,26Å ;) (Calliere., 1982).
- la smectite (S): (Ca, Mg) (Al, Fe)₂ (Si ,Al)O₁₀(OH)₂ (14-15 Å) (Holtzapff T., 1985.)

and as phase traces anatase (A) : TiO_2 (3,52Å ; 1,89Å).

The samples resulting from the same site present same minerals thus showing the homogeneity of each site.

This clay made it possible to chemically cleanse the water samples of the studied ponds: MoyNT (CE50) = 22,33% and MoyT (CE50) = 26%

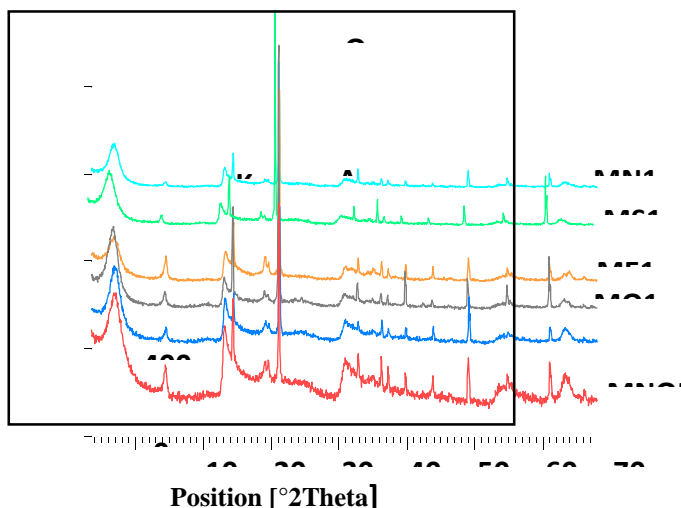


Fig.1: Diffractogrammes des échantillons totaux de SEHOUE-MASSI

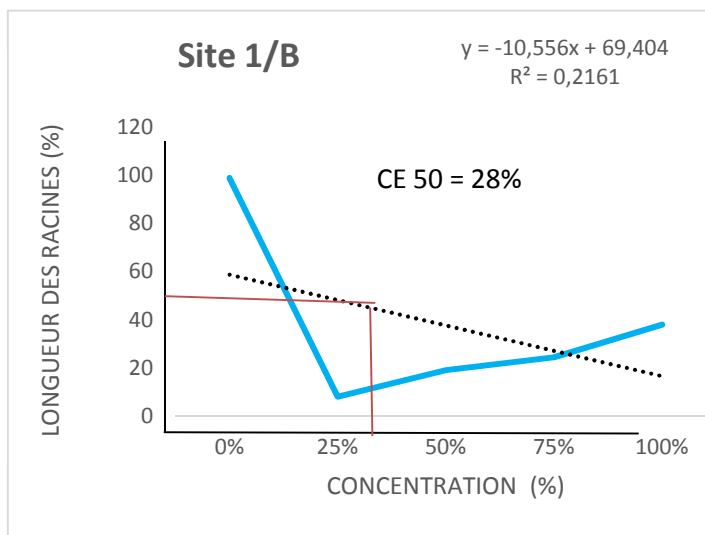


Fig.2 : Inhibition de la croissance des racines des oignons des échantillons d'eau du site 1

3. References

- [1] E. Sagbo. Caractérisation et valorisation de quelques argiles du bassin sédimentaire côtier du Bénin. (2015)
- [2] O.B. Samuel, F. Osuala, P.G. Odeigah. African Journal of Environmental Science and Technology vol4 (1)