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Our study focuses on the characterization of sludge from the Mila Algeria wastewater treatment plant with a view to their agricultural recovery or their use in the manufacture of refractory materials and cements. Several analyzes have been carried out by: XRF, DRX, FTIR, TG-DSC, DCO, pH, NO_3^-, MO, COT, CE, ρ_r, $\rho_a$and porosity. Analysis by X-ray fluorescence spectrometry indicates the presence of fertilizing elements such as: K, P, S, Mg. A relatively large proportion of Fe, Ca, Si, Al is present. The sludges studied also contain metallic trace elements. They are the following elements: Cu, Cr, Zn, Ni, Pb with contents lower than the maximum values allowed by the Algerian standard NA 17671. However, the Zn and Ni concentrations respectively represent 85% and 75% of the standard. So Zn and Ni are factors that can create risks during their agricultural application. The pollution parameters of the sludge studied determined by COD, NO3–, TOC, pH and conductivity show that the values of these parameters do not present any danger with regard to their reuse in agriculture. The spectral study by RX and FTIR diffraction indicates the presence of important phases such as calcite, quartz, portlandite and sellimanite in the mud studied. The results of the DSC-TG thermogravimetric analysis are very encouraging. According to the DSC-TG curve, decarbonation takes place between 700C° and 1000C°, it ends with the release of lime in a particularly reactive state. The final combinations between the lime obtained and SiO2, Al2O3 and Fe2O3 give very interesting minerals in the field of construction, which are the four main minerals of the clinker Ca3SiO5; Ca2SiO4; Ca3Al2O6, Ca4Al2Fe2O10. The statistical study confirms that the chemical composition of seasonal sludge seems similar. At the same time, the analysis of calcined sludge at 550, 700, 750, 800, 1000, 1100°C shows the presence of the following elements Ca, Si, Fe, Al, K, Mg, P, S, Cr, Cu, Ni, Zn , Pb. Thus, there is a stagnation with a slight decrease in the Ca, Fe and Mg contents after the calcination procedure, coinciding with a notable decrease in SO3, Na2O and K2O and the remarkable rise in the silica content SiO2 which led to the increase in aluminosilicates, the sum of which is greater than 35% in all the ashes. The percentage of lime (CaO) in the mud ash varies between 33.6% and 36.2%, it plays the role of pozzolanic reaction activator or binding agent. The crystalline phases highlighted in the ashes after calcination are: Calcite; Quartz; Hatrurite(alite) and Hedenbergite. Sludges calcined at 1000°C have a Hatrurite (Ca3SiO5) structure. Hatrurite, or alite for its industrial equivalent, is the main constituent of clinker with a proportion generally exceeding 60 – 65%. Confirmed by FTIR. The optimum temperature is that of 750°C where the pH of the ashes obtained is very basic and the ashes are rich in soluble salts, thus the crystalline phases obtained are essential in the field of cement manufacturing. Finally, a characterization of sludge from sewage treatment plants in eastern Algeria (Constantine, Annaba, Jijel, Khenchela, BBA, Setif, Batna, Guelma, Souk Ahrass, Ferdjioua, Athemania) followed by a perspective of recovery of this sludge .

***Keywords**: Sludge, calcination, ash, recovery, wastewater treatment plant, building materials.*