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# Comparative study of the characteristics of three types of sludge from wastewater treatment plants

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**Abstract**

whatever the adopted treatment system, the wastewater treatment is accompanied by production of large amounts of sludge which must be disposed. Several pathways exist for the disposal of sewage sludge, but the choice must depend on the cost of installation, the result as an added value of the product and the possible impact of the chain retained on the environment

To justify the choice of sludge recycling in agriculture, we will have to estimate the fertilizer value of sludge through the analysis of physico-chemical and microbiological parameters complying with regulations. Considering these parameters will determine the worth of sludge, the environmental impact and precautions for use. For this purpose, we have to compare the sludge characteristics from three wastewater treatment plants (WTP) in the wilaya of Mascara (west of Algeria), Mascara, Tizi and Ghriss. The results show that our overall sludge is rich in nutrients (N, P, K) but contains a hight concentrations in Nickel (Ni) of about 8.6 mg / kg probably due to industrial waste. To enhance the fertilizing power of the sludge in an agricultural field we recommend an additional treatment



**Keywords :** wastewater, sewage sludge, physico-chemical, microbiological, industrial waste, wastewater treatment plants .

## 1. Introduction

The sludge production increases with the development of (WTP), a major problem is to find a solution to eliminate these residues in the most economical conditions while respecting the constraints of environmental protection and sanitation. Sludge from (WTP) are formed by sediment waste derived

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from sewage treatment. Each inhabitant generates about 50 g of dry sludge per day and these residues are approximately 850 000 t of dry matter per year [1]. The organic matter tenor and nutrients (nitrogen, phosphorus) promotes their usual state as an agricultural fertilizer, or treated, or composted with garbage or other organic waste, The microorganisms contained in the sludge permit by anaerobic fermentation a production of methane which is not despised in these times of energy crisis in Algeria, either that the incineration of dewatered sludge whose a calorific value is far to be negligible [09].

Incineration of sludge is prohibitively expensive and present a risk related to the impact of toxic gases on the environment such as dioxin. Energy recovery (biogas yield as a source of heat and power), biological enhancing and agricultural (production of fertilizers and compost) are green technologies permit to transform the sludge into a product of high value added by minimizing the risk of pollution. Recycling or agricultural use of sludge after composting contributes to the reintegration of minerals and organic in soils, which allows to approach natural cycles [4].

Since the importance acquired to the sludge and the danger surrounding its use, our contribution in this area is a comparative study, Physico-chemical and bacteriological parameters of sludge from three (WTP) in the wilaya of Mascara.

**Nomenclature**

| | | | |
|---|---|---|---|
| EN | European norms | NOS | National Office of Sanitation |
| WTP | wastewater treatment plants | HBA | Hydrographic basin agency |

## 2. Presentation of selected stations

In the light of data provided by the Hydrographic basin agency (HBA) Chott-Chergui and the National Office of Sanitation (NOS), we note a counting difference of (WTP) from wilaya to another. The wilaya of Mascara takes the first place in the west of Algeria standings on the number of (WTP) by 09 stations, then Ain Témouchent with 06 stations, followed by the wilayas of Saida and Tlemcen with 03 stations, after the wilaya of Oran and Mostaganem with 02 stations, finally the wilaya of Sidi Bel Abbes with 01 station. From this set of collected data, it appears that the sewage treatment remains below expectations.

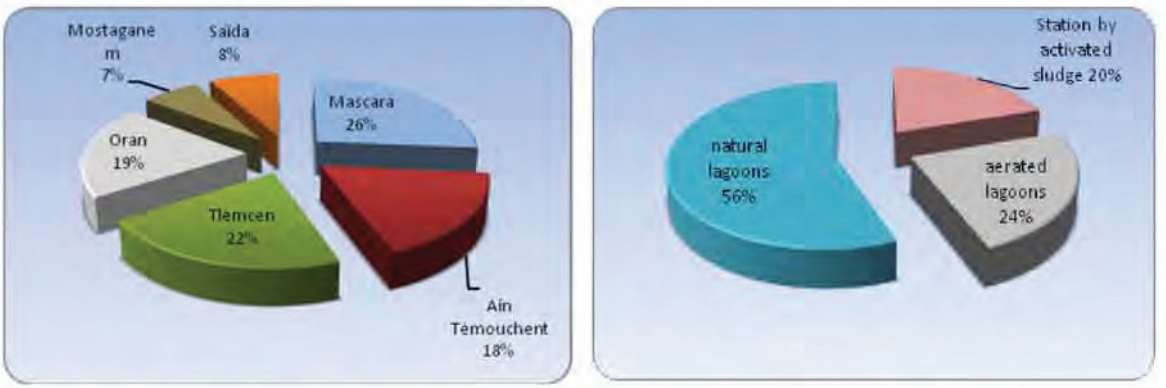


**Fig.1:** (a) Distribution of capacities (Inhabitant equivalent) (b) treatment processes in west of Algeria (HBA)