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# DESIGN OF A METHODOLOGY TO MONITOR THE ORGANIC MATTER IN INDUSTRIAL CERAMIC WASTEWATERS AND SEWAGES

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## Abstract

A rapid, simple, and accurate methodology for the control of the organic matter present in the industrial ceramic wastewaters and sewages reused in the ceramic industry was designed by studying the relationship between COD value and the carbon at 490ºC content. The presence of organic matter in wastewater and sewages used in the ceramic industry is undesirable as it can result in the appearance of black core in the final product when these waters and sewages are reused in the spray-drying process. That is the reason why the organic matter content present in the wall and floor tile compositions is an important variable to be considered. The actual method for the determination of organic matter implies a prior treatment of the sample, which make it time-consuming to be used as a control method. The setting up of the methodology has been undertaken by studying the relationship between carbon at 490ºC (organic matter) and COD and by modifying the current COD test to make it faster (reducing the digestion time) and more environmentally friendly (eliminating hazardous chemicals from the determination process).

Keywords: wastewater, sewage, organic matter, COD content

## 1 Introduction

In the ceramic process, the preparation of wall and floor tile compositions destined to pressing can be done either by wet or dry processing. In the “wet process”, clays and other raw materials are mixed with water and milled in order to achieve an appropriate particle size distribution for their subsequent spray-drying process.

If organic matter is contained in these tile compositions, dark zones, known as black core, can appear in the interior of the fired ceramic tiles. This phenomenon is related to the organic carbon concentration present in the compositions used in tile preparation. The occurrence of black core during the firing process is favored by short firing cycles or the production of large pieces whose compactation is increased and whose diffusion coefficient is, consequently, decreased.

Black core is undesirable as it can produce a reduction in mechanical strength, swelling of the fired ware, pyroplastic deformations, color changes in the body and/or the glaze, etc. Therefore it is necessary to find a way of elimination or prevention. That is the reason why, apart from controlling process variables such as temperature, firing cycle, apparent density, etc., the organic carbon content present in the wall and floor tile compositions is an important variable to be considered (Gazulla et al., 2002; Negre, 1989).

Wall and floor tile composition preparation by spray-drying involves the use of water. Growing water demands for industrial use and stricter pollution control regulations have led to a constant rise in industrial water supply and effluent treatment costs. This led to consider