Recycling of olive pomace bottom ash for fired clay bricks

D. Elieche-Quesada 1

1 Department of Chemical, Environmental, and Materials Engineering, Higher Polytechnic School of Jaen, University of Jaen, Campus Las Lagunillas s/n, 23071 Jaen, Spain

Tel.: +34953211561; Fax: +34953212141

E-mail: delieche@ujaen.es

The common disposal of biomass ash is landfill in sites next to the power plants, but this alternative is the least attractive in the environmental management. Dry olive pomace ash are being mainly used as fertilizer due to its high content in potassium. Other studies describes potential used of olive pomace ash as soil amendment [1], as adsorbent to remove copper (Cu²⁺) ions from aqueous solutions [2], as raw materials for cement based products [3], and building materials [4]. Biomass ash present a potential applicability in the construction sector, where the current scarcity of natural resources and regulatory requirements favour the search for new materials that include the possibilities of waste from industrial processes that are capable of the constructive technical needs within a framework of sustainable.

Objectives

Characterization and possible use of olive pomace bottom ash, focussed in the determination, by means of laboratory scale tests, of the technological properties of raw materials in the preparation of clay bricks optimizing the quantity of residue to added, checking the physical, mechanical y thermal properties of the new materials, compared with those obtained using only clay (control bricks).

Samples Preparation

The bulk density of the fired brick increased with an increase in the proportion of residue, decreasing this value between a 6.9 % when it is added by 10 wt % of waste until a 27.3 % with the addition of 50 wt % of olive pomace bottom ash.

Results and discussion

The thermal conductivity of the clay was 0.99 W/mK and decreases with the addition of the waste.

The maximum amount of OPBA to be added is limited to 20 wt %, higher proportions of waste (30-50 wt %) resulted in bricks with very high water absorption and low compressive strength that do not fall within the standard of the conventional bricks. Bottom ash is a water absorbent material that increased the water absorption capacity of hardened matrix when recycling in it.