Development of better insulation bricks by adding mushroom compost wastes

Velasco P.M.

Ortiz M.P.M.

Giro M.A.M.

Castelló M.C.J.

Velasco L.M.

This paper studies the application of spent mushrooms compost (SMC), as a new additive to produce bricks with better insulation and in a more sustainable way. The aim is to determine how SMC adding varies properties of fired clay bricks (FCBs), specially the thermal behavior, and whether it is a viable solution for recycling SMC. Clay was mixed with different percentages of SMC (0-17 wt.%) and formed by pressing. Samples were fired at the facilities of the partner's factory up to 950 °C. The influence of SMC on FCBs was related to its thermal conductivity (TC), compressive strength (CS), water absorption (WA), bulk density (BD), linear shrinkage (LS), apparent porosity (AP) and weight losses during firing (WL). As a result, a blend of clay with up to 17% SMC, limited by minimal CS and WA, may be used for masonry works with an enhancement on thermal behavior. Addition of 17% of SMC leads to a 26.17% decreasing in TC compare to those without SMC, achieving a minimum TC of 0.55 W/m K. This implies a reduction of 10% on the equivalent thermal transmittance, that means a better insulation of the buildings and thus this is an important energy saving.

Compressive breaking stress

Lightweight bricks

Spent mushroom compost

Thermal conductivity

Waste revalorization

Brick

Composting

Compressive strength

Thermal insulation

Brick

Composting

Compressive strength

Energy conservation

Insulation

Thermal insulation

Water absorption

Apparent porosity

Breaking stress

Equivalent thermal

Fired clay bricks

Lightweight brick

Revalorization

Spent mushroom compost

Thermal behaviors

Mushroom compost

Thermal conductivity

Thermal conductivity