**Natural fibers reinforcement for earthen building components: valorization of a low-quality sheep wool fiber**

Monica C.M. Parlato1\*, Simona M.C. Porto1, Francesca Valenti1

1 Department of Agriculture, Food and Environment (Di3A) University of Catania.

Via Santa Sofia, 100 – 95123 Catania, ITALY.

\*monica.parlato@unict.it, francesca.valenti@unict.it, simona.porto@unict.it

**Keywords.** green building, natural fibers, sheep wool fiber, raw earth material.

**Abstract.** Worldwide, building sector is the leading cause of environmental degradation, global warming, and climate change with the 50% of carbon emissions, 20–50% of consumption of energy and natural resources, and 50% of total solid wastes production. Several studies were carried out by investigating eco-friendly materials that could be involved and integrated into building process with the aim of replacing traditional building materials, e.g., concrete, steel, plastic components. Totally in accordance with the circular economy statements, sustainable materials could be obtained by the reconversion of wastes, e.g., solid wastes coming from urbanized area and agricultural wastes. This research stems from the need to exploit wastes coming from livestock processes, i.e., sheep wool fibers (SWF), and their potential reuse as reinforcement for rammed earth building components. To this aim, experimental trials were performed to get useful information on the mechanical properties of SWF in wet environments like those present in lime mixes. Then, compressive and flexural tests have been performed on raw earth adobes by incorporating SWF. The obtained results encourage the use of sheep wool fiber as reinforcement for raw earth composite materials.