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Abstract

The aim of this work is to study the influence of selected treatments on the behaviour of hemp fibres when used as insulation material in building envelopes, with particular regard to construction in the Mediterranean Area. In particular, the effects of treatments with salicylic acid and a natural monoterpenes phenol, for enhancing the resistance to degradation of hemp fibres to microbial attacks, were evaluated. Several types of hemp mats were prepared and contaminated with two fungal microorganisms and then subjected to accelerated weathering cycles in a climatic chamber, together with a hollow brick whose some holes were filled with chemically treated and untreated fibres. The experiment pointed out that, within the duration of the two-months long accelerated weathering test, simulating one year of service life in Mediterranean Area, neither fungal contamination nor significant changes in mass, colour and visual appearance, as well as structural properties and morphology, were observed for both the treated and untreated fibres. Nevertheless, the trend of temperatures and relative humidity realized inside the filled holes of the hollow brick underlined that the treated fibres showed a lower capacity to adsorb and desorb moisture with respect to untreated fibres. This behaviour is considered favourable, because it reduces the risk of moisture retention giving, in principle, advantages in terms of deterioration and resistance of the fibres to fungal attack. The differences of behaviour between treated and untreated hemp mats were investigated through XRD and FTIR analysis which revealed that the former had higher crystallinity and therefore lower capacity to uptake water.