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## **Development of a laboratory testing concept for whole bio-based wall components against fungal colonisation.**

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Preformed modular walling units are becoming an established building method. These utilise a composite structure including sheathing and insulation materials which may include a range of bio-based materials such as timber, wool or straw. This method of production and building has a number of advantages and disadvantages over traditional building methods. For example it is well known that organic materials may be susceptible to attack from a range of fungal organisms and any biobased material used in locations where there is the possibility of microbiological activity must be expected to be able to withstand or prevent such attack. There are a wide range of test methods and standards in place to test susceptibility although most of these test individual components such as the wall panel material. There have been investigations into the performance of wall designs on a large scale in service and in large chamber tests, though the large chamber investigations rarely test for decay.

One necessary condition for fungal colonisation is the level of water present – generally in wood for example a minimum of 18-20% moisture content is required for fungal growth. A great deal of work has looked at durability of natural materials but again generally as individual samples. Little work has been done to determine whether combining materials may have an effect on the ability of fungi to colonise them.

Vapour sorption testing gives good data on the moisture profile of materials under range of relative humidity conditions. Data for wood panels for example (see figure 1) shows that even at high RH values the moisture content (17%) is unlikely to be high for fungal growth. Under the

same conditions however, the moisture content of a wood based fibre insulation is much higher (30-40%) and easily within the range at which fungal growth is likely.

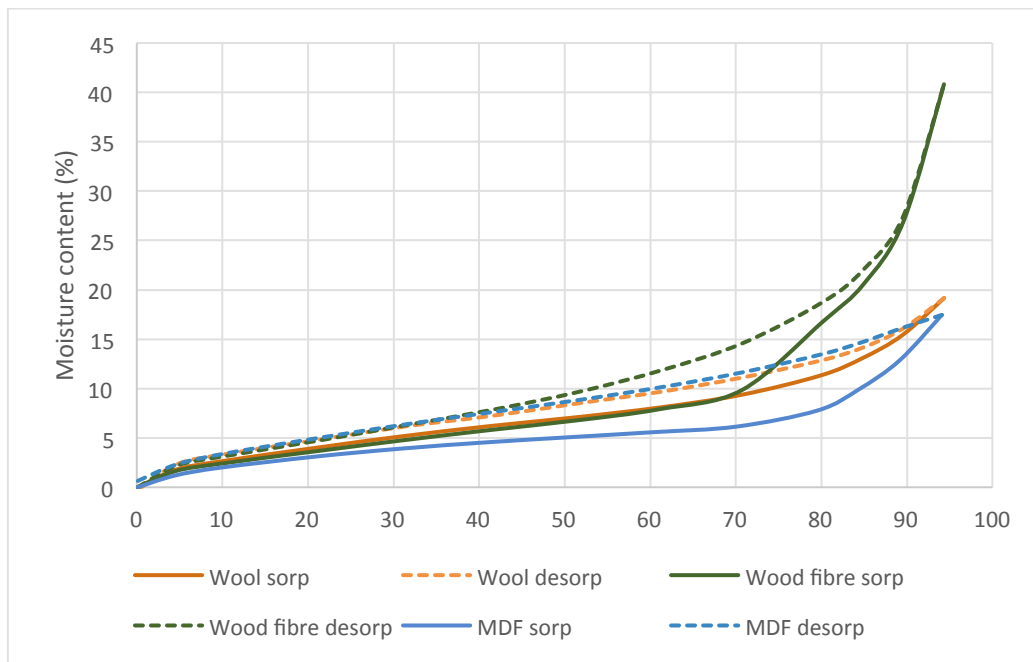


Figure 1: Relative humidity dependent Isotherm moisture content of MDF, Wool and wood fibre insulation.

Another factor may be the ease in which water is able to move through a material. Whilst generally the addition of insulation does not increase the incidence of microbiological it is possible to envisage scenarios where not only is the insulation material itself susceptible to attack but it may also act as a moisture reservoir or feeder strip for the sheathing and/or structural components. As part of the development process of new wall component systems a method of testing materials together could be useful in identifying susceptibilities which may later arise.

This presentation details hygric and moisture based studies of some building materials and explores the development of the concept of laboratory testing of samples of whole wall components.

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