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ABSTRACT: Despite of significant research on the mechanical properties of fibre-reinforced polymer composites made of natural fibres, long-term performance of the natural fibre composites against moisture and other environmental conditions is not well-known. In this paper, accelerated durability tests were conducted in order to investigate the long-term performance of flax fibre composites in comparison with glass fibre composites. A total of 490 tensile specimens were prepared and exposed to four different environmental conditions namely dry heat, water (distilled), salt water (3.5% by weight), and alkaline (pH=12.5) solutions. The temperature of the solutions was controlled at 20, 50, and 60 degrees of Celsius (°C). Tensile tests were performed after 21, 42, 83, and 125 days exposure to the environmental conditions. Overall, the tensile strength of both flax and glass composites significantly decreased with increasing temperature and exposure time, however initial elastic modulus of both materials was not affected. Flax composites showed a bilinear stress-strain behavior and the secondary slope of the curve become slightly softer after the environmental conditionings, although glass composites almost retained their linear behavior. In terms of tensile