

## ABSTRACT

This experimental study explores the development of lightweight and sustainable concrete blocks through the partial replacement of fine aggregate with coco peat and the incorporation of foaming agent. The primary aim is to evaluate the impact of these modifications on the physical and mechanical properties of the concrete. A total of six mix proportions were designed using a fixed cement-to-fine aggregate ratio of 1:2 and a constant water-cement ratio of 0.5. The concrete blocks were cast in standard dimensions of  $19 \times 9 \times 9$  cm. A foaming agent, used to enhance the lightweight nature and insulation properties of the concrete, was added at 2.5% of the cement weight in all mixes except the control. Coco peat, an agricultural by-product, was used as a partial substitute for fine aggregate at varying levels of 2.5%, 5%, 7.5%, and 10%. Mix 1 served as the control with no additives, while Mix 2 included only the foaming agent. Mixes 3 to 6 included both the foaming agent and increasing percentages of coco peat. This experimental approach aims to assess the feasibility of incorporating organic waste materials into concrete production, offering environmental benefits while potentially improving thermal insulation, acoustic properties, and reducing the overall weight of the blocks. The study's findings are expected to contribute to the development of eco-friendly building materials suitable for non-load-bearing applications such as partition walls and infill blocks.