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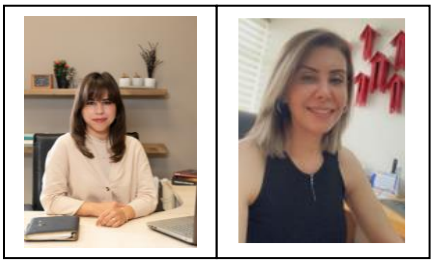
Kerpic'26 – Earth – Based Architecture
15th International Conference
N.Cyprus, 22-24 May / 2026

Compressed earth blocks: An examination of bio-based solutions



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ABSTRACT
Soil-based materials are readily available and have high recyclability. Compared to industrial materials, they promise lower environmental impact and embodied energy potential, and are considered a more sustainable and environmentally friendly building material. Compressed earth blocks are soil-based building materials that are considered to offer many benefits when used in the construction industry due to their accessibility, good environmental performance, and cost-effectiveness. Despite these advantages, they have certain limitations such as sensitivity to water and moisture and low strength. The use of chemical stabilizers such as lime or cement in compressed earth blocks aims to improve performance. Such applications lead to increased carbon emissions and a decrease in the material's environmental performance. Environmentally friendly and sustainable alternative solutions with the potential to improve material performance, such as bio-based stabilizers, fiber reinforcement, and additives, are being researched for compressed earth blocks.
The study aims to analyze the scientific literature on the use of bio-based stabilizers, fiber reinforcement, and additives in the development of compressed earth blocks. Within this scope, the potential for material development will be examined, and evaluations of the scientific literature on this subject will be conducted. With this objective, the keywords ["compressed earth block" and "bio"] were searched in the Scopus and ScienceDirect databases on February 13, 2026. This search was conducted in the article titles, abstracts, and keywords of the studies. As a result of the search, 22 studies were listed in the Scopus database and 14 studies were listed in the ScienceDirect database. In order to perform an up-to-date evaluation of the literature, it was planned to include papers, book chapters, and articles published between 2016 and 2026 in the analysis. When the results were examined without any filter based on the year of publication, it was seen that all of the listed studies were published between 2016 and 2026. At this stage, the studies listed were reviewed under their respective headings to assess their relevance to the subject. Studies identified as related to the use of bio-based materials in compressed earth blocks and for which full-text access was available through these databases were included in the analysis. Studies found in both the Scopus and ScienceDirect databases were identified. The studies included in the analysis were also evaluated in terms of their content. Studies determined to be about the use of bio-based materials in compressed earth blocks will be analyzed, and the current situation will be presented. It is planned to present the current situation on the subject, and it is thought that the study will contribute by providing researchers in this field with an up-to-date framework on the subject.

KEY WORDS
Compressed earth block, stabilizer, fiber additive, bio-based additive.