

# **A Revolution in Sustainable Development: An Analysis on Carbon Footprint and Total Cost of a Residential Home Built Using Conventional Materials, in Comparison to Hemp Biocomposite Materials**



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*The following is an excerpt from a longer piece. For the full text, please visit [https://scholar.colorado.edu/concern/undergraduate\\_honors\\_theses/rx913r48x](https://scholar.colorado.edu/concern/undergraduate_honors_theses/rx913r48x) or scan the QR code.*

## **Abstract**

The way we are currently developing our building structures is unsustainable, with a large amount of greenhouse gas (GHGs) emissions being a direct result of the production and implementation of the materials used in our buildings. The purpose of this honors thesis is to better understand the potential and feasibility of hemp biocomposite materials in construction. A case study will be examined, where a house plan will be utilized in two homes, one constructed with conventional materials such as lumber, and the other with hemp biocomposites. Because the same house plan is used in both homes, we can objectively quantify the carbon footprint and monetary cost of each dwelling, and directly compare them. This side-by-side analysis can allow developers, architects, and hemp-based construction material companies to see the difference in cost and carbon footprint associated with switching to hemp biobased materials.

Using professional journals, peer reviewed literature, and interviews with hemp companies, a building product analysis was conducted. This section shows the advantages and potential drawbacks of current building materials, as well as the benefits and drawbacks of transitioning towards hemp biocomposites. Through the building analysis and case study, this thesis shows the potential of hemp in future residential home construction. The carbon sequestered through hemp biocomposites is nearly double its conventional counterparts, and its higher cost can be justified as its benefits could be argued to outweigh the difference in total cost when it comes to the price of the home.