Elaboration et caractérisation chimique physico-thermo-mécanique des briques de terre stabilisées/comprimées à charges de noyaux de *Canarium schweinfurthii* et *Coco nucifera*

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KEYWORDS

Bricks, Canarium schweinfurthii, Cocos nucifera, earth, valorisation, characterization

PROBLEM

valorization of soil in construction and waste management of Canarium kernels and coconut shells

OBJECTIVES

The present project aims to enhance the value of Douala-Cameroon soil and agricultural residues such as Canarium schweinfurthii and Cocos nucifera through their use as additive aggregates for the production of thermally resistant and efficient BTC. The challenge will be to find the optimal formulation of the brick and above all the treatment to be applied to the plant aggregates. This treatment will be important because it will reduce the hydrophilicity of the aggregate and thus improve the durability of the resulting brick.

AUDIENCE

This subject aims to offer a new concept of low-cost mass eco-habitat with advanced thermal comfort for the populations of Douala-Cameroon and thus help building engineers to be inspired by the technical data to be adopted for construction activities.

RESEARCH QUESTION

The research question here is: Can we propose sustainable constructions in earth bricks obtained from the Cameroonian coastal lands and reinforce Canarium and Coco aggregates?

ORIGINALITY

The originality of this work is based on the concept of bio-sourced materials because eco-building materials represent one of the best ways to solve these challenges according to a logic of sustainable development and green and eco-green growth. They make it possible to reduce greenhouse gas emissions, limit energy consumption, and enhance and optimize the use of secondary natural resources. In addition, by offering professionals high-performance and economically viable technical solutions.

METHODOLOGY

The research methodology is purely experimental and defined on the basis of three main topics: resources (clays, shells, stabilizer - steps 1 to 3), manufactured material (mechanical strength and long-term behaviour - steps 4 and 5), building (thermal performance - step 6).

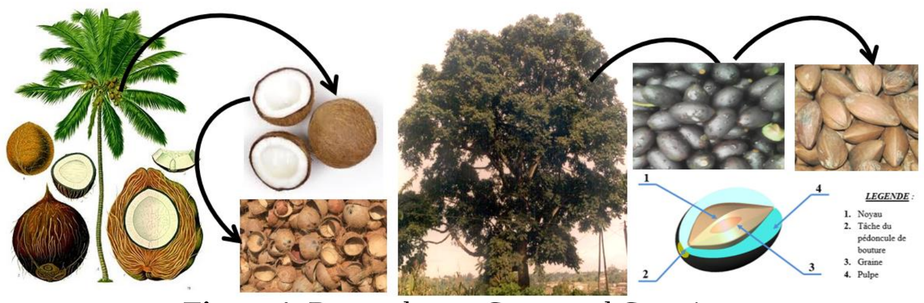

Figure 1: By-products : Cocos and Canarium

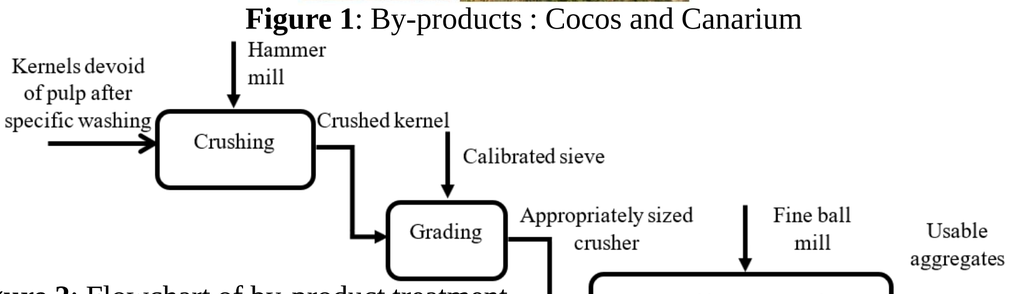

Figure 2: Flowchart of by-product treatment

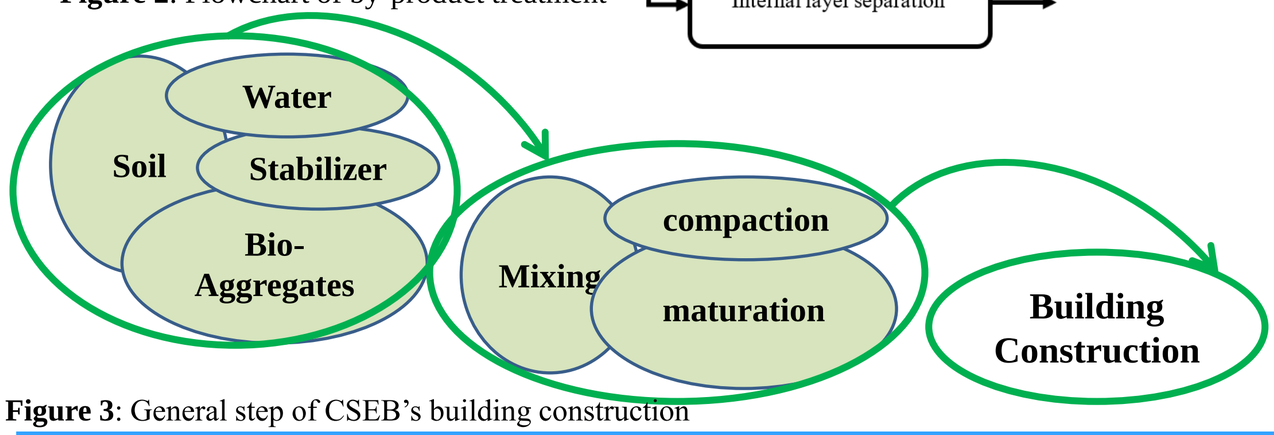

Figure 3: General step of CSEB's building construction

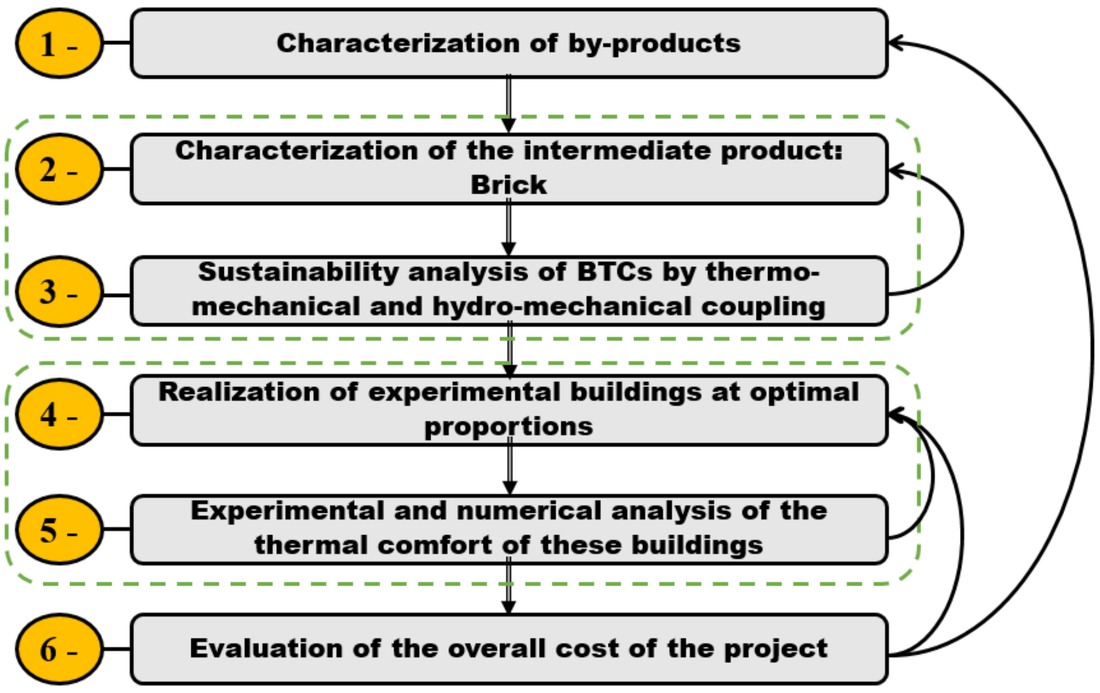

Figure 4: Chartflow of methodology

EXPECTED RESLUTS

Table 1: Expected results step by step

STEPS	Items
1	Soil: identification, BTC adequation criteria Canarium schweinfurthii and Cocos nucifera :physical, chemical and mechanical characterisation
2	Brick : formulation, physical and mechanical characterisation
3	Durability with thermo-mechanical and hydro-mechanical test
4	Cell test construction with optimal formulation of bricks
5	Building: performance analysis, simulation of thermal comfort
6	Financial evaluation of overall project.

CONCLUSION

This work focuse on the development and characterization of compressed and stabilized earth bricks with CS and CN core particle. These aggregates will be combined in a soil matrix of the Littoral in Cameroon. Tests will be carried out on soil and aggregate by-products. For soil, the identification tests will be done: sedimento-granulometric analysis, consistency analysis, determination of the blue value, calcium carbonate and organic matter content, elemental analysis in FTIR and FX, mineralogical composition by DRX combined with the analysis of the clay fraction and thermal conductivity. The option to use a stabilizer (cement or lime) is established to improve the performance of the soil used. The obtained BTCS_CS-CN will be tested on a hot plane to assess thermal conductivity; mechanical tests are also performed: 3-point bending and compression. The optinal formulation of brick will allow us to build cell test to simulate and monitor the building performance of proposed housing. The last part of this work will be focuse on financial cost of Lowest cost housing.

RESSOURCES

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