Corn Cob Particleboard: Ecological Product Manufactured with Corn Cob and Husk Residue

de Melo Ramalho, Marcelo

da Costa Dantas, Beatriz

Corn is the world's largest cereal crop with approximately 960 million tons produced last season. Brazil produces 82 million tons and is the third largest producer in the world. However, 18% of this production is composed of husk and cob, materials considered waste that are usually burned, generating air pollution. The goal of this project was to propose an economical and environmental viable alternative by developing a particleboard produced with maize production residue. The new product named CCP (Corn Cob Particleboard) was produced by mixing, in different proportions, cob particles, corn husks and thermoplastic synthetic adhesive and by applying cold manual pressing. The board was kept in a mold during different air drying periods. The first produced panels were composed by the husk/cob ratio of 1:4 and 400 ml of adhesive and were then dried for 48 hours. Those panels did not present the desired physical properties and were not submitted for further testing. A second batch of CPPs panels was produced with husk/cob ratio of 1:2 and 100 ml of adhesive, and then dried for 2 hours. The boards formed with this composition had their physical and mechanical properties evaluated and were compared to other commercial engineered wood boards. CPP boards presented linear expansion and thickness swelling values similar to MDF (Medium-Density Fiberboard) and MDP (Medium Density Particleboard) boards, demonstrating good dimensional stability. The mechanical strength of the CCP was higher than the commercial MDF, being able to withstand a higher applied load. The CCP has proven to be a potential new, technically viable product with low production cost. It is environmental friendly, since it uses waste from agricultural production and reduces the demand for wood.

Awards Won:

U.S. Agency for International Development: USAID Global Development Innovation First Place Award of $3000