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Hardboard Production With Pumpkin Shell

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Nowadays, wood is used in the production of hardboard. However, forests are decreasing around the world every year. This situation brings along important environmental problems and causes the change of ecosystems and climates. If the demand for forests continues at this rate, it is expected that there will be great environmental and climate disasters in the near future, desertification will increase in some regions, and the amount of wood already needed won't be garanteed by natural forests.
Wood is not only used in the production of hardboard and has a wide range of use. Therefore, raw material demand and timber prices are increasing day by day. All these reasons and increasing environmentalist pressures against tree cutting reveal the search for alternative raw materials in hardboard production. The use of agricultural wastes and other fiber sources as an alternative to wood is gaining importance.
Studies on the use of alternative raw material sources in the forest products industry have increased especially in the last twenty years. Studies on the evaluation of non-wood resources in hardboard production show that many agricultural wastes can be used technically in this sector.
In this work, I present a research aimed to produce alternative hardboard from pumpkin shells, which is an agricultural waste. Pumpkin is used for the production of hardboard for the first time.
The reasons for choosing the pumpkin shells for the production of hardboard are:
- Pumpkin contains a significant amount of fiber.
- Pumpkin contains lignin material. Lignin is one of the essential components of wood. Lignin has an adhesive effect. It keeps the cellulose fibers together in the cell wall, making it hard and durable. Lignin protects the wood against pressure and prevents water intake.
The pumpkin shells are dried and crushed. Urea-formaldehyde glue and ammonium sulfate solution are mixed. Pumpkins are placed in a mold and this mixture is sprayed on. The mold is clamped with vices. The mold is pressed at 200 ºC for 10 minutes and it is released to dry at room temperature. Hardboard is removed from mold. Some tests are performed to measure the quality of the hardboard. Durability test, water withdrawal test and keep nails test are performed for hardboard. As a result of these experiments it is observed that the hardboard doesn't take water, its volume doesn't change and it is unbreakable and durable.
The main results reached by students are:
- They will benefit from renewable resources by recycling pumpkin shells;
- They will be able to produce alternative hardboard without damaging the nature;
- They will improve the consciousness of protecting the natural balance;
They will understand that they can contribute to the country and world economy by providing raw materials to the furniture sector.