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To cite this article: Ansarullah *et al* 2018 *IOP Conf. Ser.: Earth Environ. Sci.* **126** 012036

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Utilization of waste of chicken feathers and waste of cardboard as the material of acoustic panel maker

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Abstract. In The existence of chicken fur is a waste of chicken slaughterhouse Which is produced daily and still not widely used. Likewise cartons everywhere we can see its being because its function is so great in all human activities In the fulfillment of the need for storage and packaging of goods for human purposes such as electronic goods, commodity, Because it has a relatively large thickness of paper. Several studies have proven that Quill and cardboard can be used for acoustic materials. This study aims to identify the potential of chicken fur and cardboard to be created as panel materials Which acts as an acoustic panel. . This study uses an experimental method by combining two materials, Including waste Quill and carton waste by performing several stages in the formation of panels, Such as the selection of chicken fur material and cardboard cleaning process, drying process, enumeration process, panel modeling process. The result of this research is acoustic panel model with size 20x20cm² with thickness 9 and 18 mm, The study also produced a Ø9,8 cm diameter-shaped panel model with 1.5cm, 2.5cm, and 5cm thickness for use in testing absorption coefficients using impedance tubes.

1. Introduction

Chicken Fur Wastes from Chickens that we often consume each day contain keratin and proteins that we usually encounter on the hair, nails, horns and wool, making it strong, tough and lightweight. The waste of chicken fur is very easy to find as the consumption of chicken meat continues to increase. Which can be seen from the many sales of chicken meat, ranging from modern markets, traditional markets, markets kagetan located on the roadside, until the peddler. Increased demand for broiler meat due to chicken meat prices can be reached by consumers with the middle economic level to the upper economic level. Thus the demand for chicken meat tends to increase (10).



The problem that arises in chicken slaughtering is the waste of chicken fur, which is part of the remaining processing of chicken meat. The results of this poultry slaughter resulted in average featherweight of 4 - 9% of the weight of life (2). Quill contain about 91% protein (keratin), 1% lipid, and 8% water. Disposal technologies and methods are needed to reduce threats to the environment (12).

Potential Chicken Feather basically has begun to be utilized among them is a pillow filler, making duster and accessories materials. In addition, chicken fur are also a waste that attracts many researchers in the development of science and technology.

Along with the advancing technological progress and the development of chicken slaughtering industry will bring positive impact and negative impact for both environment and human. The rapid growth of the industry also means more waste is released and causes complex problems for the environment (7).

In general, cardboard used to wrap goods and human needs such as electronic goods, merchandise because it has a relatively large thickness of paper, cardboard will be a material that has a pretty good absorption power. In addition, cardboard also has the advantage of high shelf power so it is very unfortunate if less used, because cardboard is very easy to get in various places as waste or residual use (garbage).

In big cities or in rural areas, many boxes are wasted because they are not used anymore, so it becomes a waste of waste that is very detrimental to the cleanliness of the environment. If cardboard is processed into an acoustic panel it will be more useful than wasted waste so it becomes waste and can reduce waste.

The quality is a good acoustic environment is one of the fundamental needs in a building, especially the room a place of human activity. Acoustic quality in the room affects the comfort, productivity, and health of residents or users. In fact, the quality achievement is often neglected due to high confectionary costs, especially in building non-commercial public facilities including classroom facilities.

This experiment is part of a series of research on the Utilization of Chicken Fur Waste material as Acoustic Panel Material. In previous research it has been disclosed that the wasted chicken feather that has been cleaned and finely chopped by mixing with the melted paste glue can be formed into acoustic panel, which results enough Dense, lightweight and textured so that it can be used as an acoustic panel for entry in the nature and character of the acoustics itself.

In Indonesia the problem of building acoustics has not yet developed, even the ways of development today are generally worse with sound insulation than the ancient houses that used to wear the walls and construction of heavier and bigger doors and windows (9).

The noise control technique has an important role in creating a comfortable acoustic environment. This can be achieved when the sound intensity is lowered to levels that do not interfere with human hearing. Achieving this comfortable acoustic environment can be obtained by using a variety of techniques. One such technique is to absorb sound (3).

Wall paneling panels for the purpose of muffling noise and improving sound quality in private studio rooms are increasingly needed. However, the availability of such a panel is very low, due to the high selling price so it is not reachable by most people. Raw panel panels made from low-priced raw materials are expected to reduce the selling price of acoustic panel items. In the early stages has been investigated the possibility of using waste as panel raw materials. The waste selected is chicken feathers, considering that this material has characteristics as the ingredients for acoustic purposes, such as high elasticity and contain air cavities. Preliminary research shows that chicken feathers are very potential to be used as raw material panel (Haisa, 2015). However, further research on the capability of the panel referred to as acoustic panel material is necessary. Testing is done by pasting the chicken feathers with water and glue mixture as the material of the acoustic panel.

Adhesive (adhesive) is a substance that can unite two or more objects through a surface bond. The adhesive is divided into two, namely thermosetting adhesive and thermoplastic adhesive. Houwink and Solomon (1965) argued that adhesion is an event of attraction between the molecules of two bonded

surfaces. The attachment of two sealed objects occurs by the pulling force between the adhesive and the adhesion material and the pulling force (cohesion) between the adhesive and the adhesive and between the bonded material.

2. Method

This research concerning the potential of chicken feather waste and cardboard waste as material of acoustic panel material, this research is very early research. For starters, research is done with using experimental methods on the initial process of combining chicken feather waste materials with cardboard waste in the process of making panels that will be used as wall panel acoustic material.

1. Materials

- a. Waste chicken feathers that have been cleaned and chopped.
- b. Trash cardboard that has been cleaned and chopped.
- c. The adhesive used is glue fox.
- d. Water as a glue diluent.

2. Tools

- a. Machine pressing material.
- b. Open LIstrik
- c. Measuring cup.
- d. Plastic container.
- e. Digital scales.
- f. Mold specimen of steel plate steel size 20cm × 20cm and iron pipe diameter 9.8 cm.
- g. Spoon stirrer.

How to make panels by doing some stages, including:

- Collection of waste material for chicken feathers and cardboard waste from slaughterhouses and shop houses, markets (traditional and modern markets).
- Selection of waste materials for chicken feathers and cardboard wastes.
- Cleaning process of fur and cardboard from some dirt attached to the material.
- In order not to cause fishy bolts, especially on the waste material of chicken feathers, chicken feathers that have been brewed soaked with formalin for one night that serves to prevent contamination of microorganisms such as bacteria and viruses, as well as to kill or reduce the number of microorganisms and germs and other diseases.
- In the drying process the feathers dry out evenly every 2-3 hours stirred or rolled, and dried for several days.
- Process of enumerating the two materials by editing a small range of 2 to 5 mm to facilitate a more evenly mixing process.
- Process of incorporating both the feather and cardboard materials in a panel model, with several steps including:
 1. Determine the comparison between chicken feathers and cardboard in three levels, namely: A1: (50% chicken feather: 50% cardboard), A2: (60% chicken: 40% cardboard), and A3: (70% 30% Cardboard).
 2. Decide Comparison of paste and water glue in three levels, namely: B1: (paste glue 30%: water 150%), B2: (paste glue 40%: water 150%), and B3: (paste glue 50%: Water 150%). The glue used is glue pox Because it is easy to get and the price is affordable.
 3. After all materials have been weighed with the above provisions, then the basin is prepared as a dough in the union of the material elements keemapat above.
 4. Prepare the mold pattern that has been prepared according to the dimension of the impedance tube circle that is 9.8 mm in diameter to measure the absorption value and 20 x 20 cm, prepared to measure the taim refrization.

5. After the material has been stirred with the provisions of the above size then put into all the molds that have been prepared and then pressed with press tool with maximum compressive strength.

6. Once pressed the material is inserted into the open electricity and the mold so that the material is already in the press will not widen.

7. The process of heating the material with the open is done at a temperature of 100 degrees with a time of 60 minutes, to avoid the burning of the material.

8. After the diopen then the panel material removed from the mold then winded and dried for 2 days to produce a solid mold and dry and lightweight.

9. After the dry panel then prepared the next study to measure the acoustic value of the panel merging the material of chicken feathers and cardboard.

3. Results and Discussions

The result of this research is acoustic panel model with size 20x20 cm² with thickness 9 and 18 mm. The study also produced a Ø9,8 cm diameter-shaped panel model with 1.5cm, 2.5cm, and 5cm thickness for use in testing the absorption coefficient using impedance type 4206 tube.



Figure 1. Cleaning process



Figure 2. Drying process



Figure 3. Process of Enumerating Feather and Cardboard



Figure 4. Weighing and print media



Figure 5. The process of mixing material and heating material

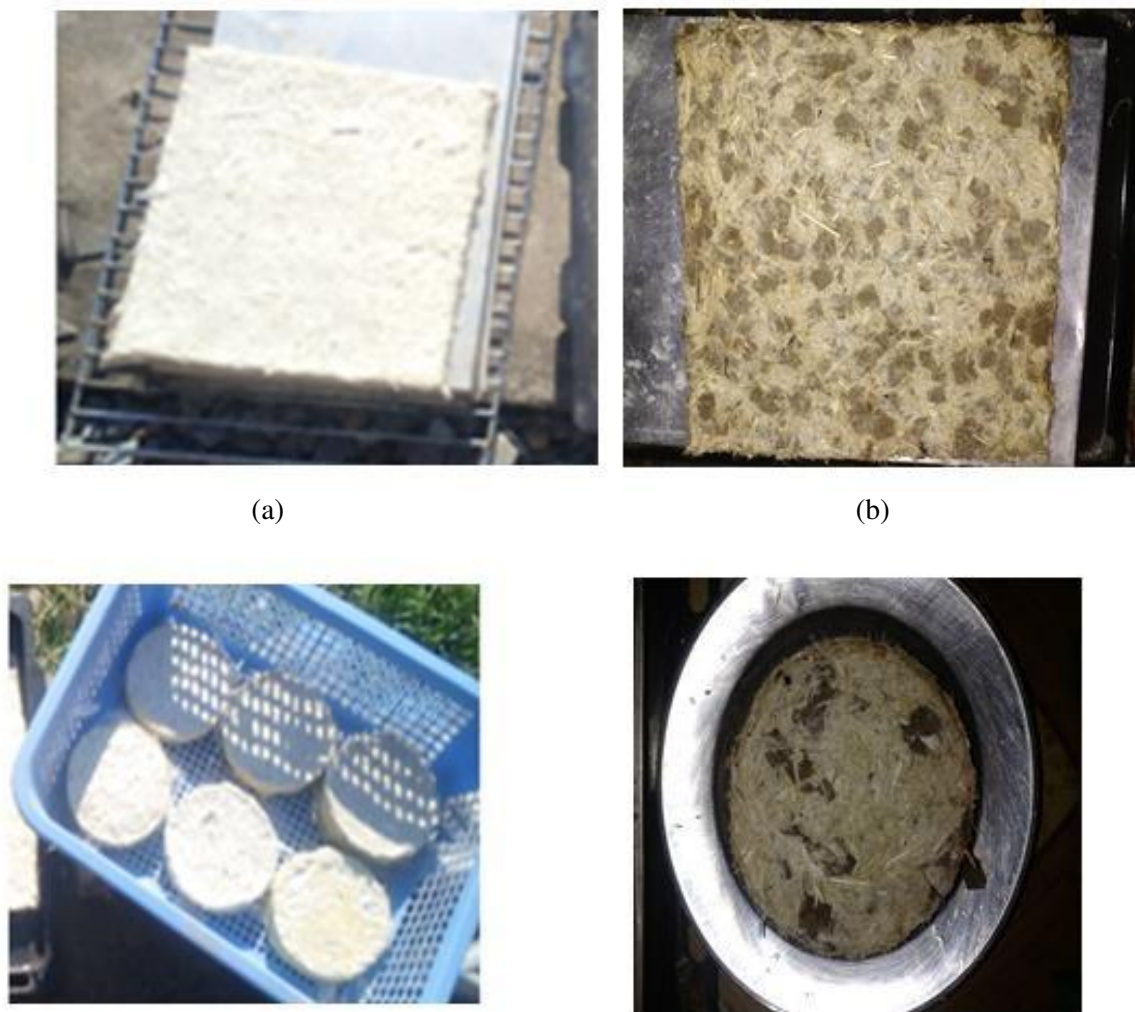


Figure 6. Panel 100% Chicken feather (a) and (b) Panel Merging of chicken feathers and cardboard

4. Conclusions

In this process, chicken feathers and cardboard bins can be formed into acoustic panels. the way with chicken feathers and cardboard finely chopped and dipped with glue paste then melted and compacted on wahdah with size and size prepared. from the results of these initial experiments it can be concluded that the composition of chicken feathers and cardboard, glue, and water can form acoustic panels so it can be recommended in advanced research.

The conclusions are based on panel composition that produces panel form 22 x 22 cm with thickness 9 mm and 18 mm and panel diameter 10 cm with thickness 1,5 cm, 2,5 cm, and 5 cm.

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