

Innovation in Pulp Production from Rice Straw and Bagasse for Biodegradable Food Packaging Utilization

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DETAILS OF TARGETED RESEARCH PLAN

Project title:

Innovation in Pulp Production from Rice Straw and Bagasse for Biodegradable Food Packaging Utilization

Researcher team:

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IMPORTANCE AND PROBLEM SOURCE FOR PROMOTED AND SUPPORTED RESEARCH ACTIVITIES

Thailand has burned rice stubble and straw of 29.12 million tons/year. Previous research investigated the chemical composition of rice straw which was mainly cellulose and hemicellulose for capable raw materials in paper and packaging industries. However, utilization of rice straw pulp for paper and packaging production was not widely spread among farmers. Researcher teams of Kasetsart Agricultural and Agro-Industrial Product Improvement Institute and Biodegradable Packaging for Environment Public Co., Ltd. have realized utilizing rice straw pulp for the production of environmentally friendly paper and packaging. Therefore, the creation idea of a model farmer group for pulp preparation and preliminary improvement of pulp properties in order to commercially deliver of pulp to the packaging industry was realized in this research. It can be seen that this project helped to promote the development of agricultural by-product management potential to be able to compete in the world market according to the industrial policy, increase income for community enterprise group, and promote the connection between farmers and the packaging industry. It may also result in the development of potential and ability to manage utilization of other agricultural by-products in the future as well.

RESEARCH OBJECTIVES

This research aimed to study the production of rice straw pulp for mixing with bagasse pulp for forming biodegradable food packaging for commercial scale and to create a prototype model of pulp producer by community enterprise group.

METHODOLOGY

To study the production of rice straw pulp for mixing with bagasse pulp for forming biodegradable food packaging for commercial scale and to create a prototype model of pulp producer by community enterprise group.

ABSTRACT

This research aimed to study the production of rice straw pulp for mixing with bagasse pulp to forming biodegradable food packaging for commercial scale and to create a prototype model of pulp producer by community enterprise group. Ban Thung Pho Community Rice Center led by Mr. Sakhon Pakkred, Subdistrict Headman of Ban Thung Pho, Uthai Thani Province was selected for technology transfer to prepare rice straw pulp from this research. The rice straw pulp produced from Ban Thung Pho group was evaluated for standard values which were Canadian standard freeness, base weight and average mechanical strength of rice straw pulp. The results of rice straw pulp evaluation passed following the standard pulp testing and were accepted in the production system of Biodegradable Packaging for Environment Public Co., Ltd. After that, rice straw pulp was mixed with bagasse pulp at ratios of 100 : 0, 70 : 30, 50 : 50, 60 : 40, 30 : 70, 20 : 80 and 10 : 90 and formed for biodegradable food packaging in commercial scale. It was found that all formulas were waterproof and oil resistant packaging following acceptable standards of this company production.



RESEARCH RESULTS

After the rice straw pulp production by the Ban Thung Pho Community Rice Center, the standard values were tested to be used as a preliminary value in the next rice straw pulp production. The rice straw pulp was found that the drainability was 440 CSF. The retention value was 90.12, which was classified as having less pulp loss than the target value in the system. The tear strength index of the paper was 2.1343 mN.m²/g. The tensile strength index was 0.5449 N.m/g. and the burst strength index was 1.8100 kPa.m²/g. This is an acceptable value for the company's production system. From the preliminary forming experiment, the rice straw pulp was possible to manufacture packaging that made from fiber or rice straw on an industrial scale. The packaging obtained from the production by using the company's production formula showed waterproof and oil resistant. Transferred technology to community enterprise target groups under the Kasetsart Agricultural and Agro-Industrial Product Improvement Institute.

DRAINABILITY



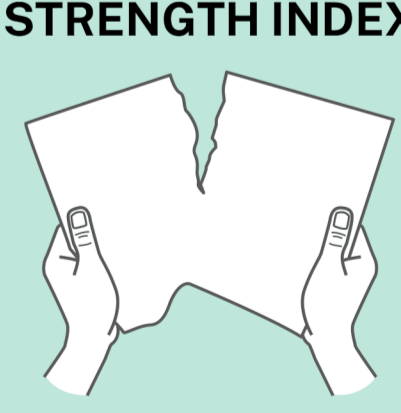
440 CSF

RETENTION VALUE



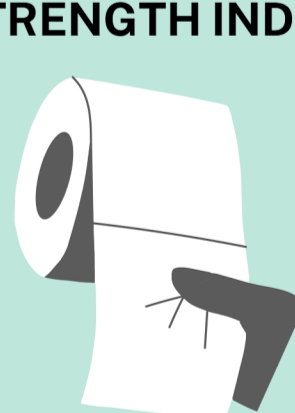
90.12 %

TEARING STRENGTH INDEX



2.1343 mN.m²/g

TENSILE STRENGTH INDEX



0.5449 N.m/g

BURST STRENGTH INDEX



1.8100 kPa.m²/g.



SUGGESTION

Due to the Covid-19 situation, it makes the researcher team work quite hard for working with community groups and going on site to follow up. The research team has an opinion on the part of sending samples for follow-up analysis of rice straw pulp standards in every 1 month to control the standard.

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