

Development of charcoal planting bed and environmental materials made from waste paper and forest resources

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Introduction

The recovery of used paper is about 70% in Japan and it is used as raw materials in paper manufacture. However, there are some problems, such as degradation of paper fiber by reusing used paper and the increase of bleaching cost. The forest area of Kochi Prefecture is about 84%, and it holds abundant woody resources. On the other hand, the effective usage of sawdust and bark needs to be developed. We aim at the improvement in a usage of used paper and unused woody resources by exploiting these resources, and the development of highly competitive products. Therefore, the plant cultivation floor and environmental materials made of carbonization mixed of unused woody resources, such as sawdust and bark with used paper is developed.

We already developed the process that the charcoal made from used paper is available for growing plant (Photo.1). In this research, the charcoal is made from not only used paper but also mixture of unused woody resources such as sawdust and bark. The charcoal is used for environmental materials. For this purpose board type charcoal is tried.



Photo.1 Growing plants in the charcoal

Experimental

1) Shape of pot

The crushed used paper and unused woody resources, such as sawdust and bark, are mixed with water and inserted into the automatic machine (Photo.2) for building pots. Fig.1 shows the experimental procedure.



Photo.2 Experimental procedure



Fig.1 The automatic machine for pot

From fig.2, the bulk density of the charcoal pot decreases by the way of adding sawdust and bark. But we can use the pot for planting until 70% of adding sawdust and bulk.

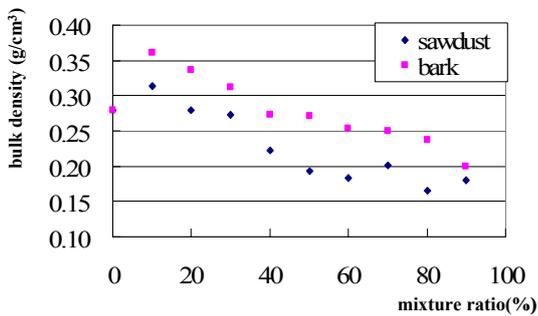


Fig.2 Bulk density of the charcoal by adding sawdust and bark

2) Charcoal board

The charcoal board is developed for environmental materials. Photo.3 shows the automatic machine for board (maximum size:300x300x300mm).



Photo.3 The automatic machine for board and molded products

Photo.4 shows the charcoal board for environmental materials. Lawn is growing on the charcoal board for a roof garden, which means one way of preventing the heat island phenomenon(Photo.5).



Photo.4 Lawn growing on the board

3) Carbonization

The pot and board from used paper and woody resources are carbonized by a new carbonization furnace heated by exhausted gases(hydrogen, carbon monoxide and methane) during carbonization. That means the furnace is not necessary outside energy such as oil, electric power and so on.



Photo.5 Carbonization furnace by using exhausted gases during carbonization

These charcoal are produced economically by using this furnace.

Conclusion

We developed the charcoal for plants and environmental materials from used paper and unused woody resources economically.