

# Present Utilization Conditions of Waste Agricultural and Forestry Fiber in China



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## Abstract

In this article, it mainly discusses present utilization conditions of waste agricultural and forestry fibers in China. It concludes five utilizing modes, including energy utilization mode, material utilization mode, fertilizer utilization mode, feed utilization mode, and cultivation base utilization mode. And it also analyzes three main problems in the comprehensive utilization waste agricultural and forestry fiber.

**Keywords:** Comprehensive utilization; Agricultural and forestry; Fiber resources; Energy utilization; Material utilization; Fertilizer utilization; Feed utilization; Cultivation base utilization

## Introduction

In 2016, the amount of waste agricultural and forestry fibers is 2.02 billion tons in China. Among them, 1.078 billion tons belong to waste agricultural fibers and 0.924 billion tons belong to waste forestry fibers. Moreover, there is a big developing potential of agricultural and forestry fibers in China since the area of forest are quite big. There are 44.03 million hectares of suitable forest and 7.1 million hectares of non-stumpage forest. If 20% of these lands is used to grow energy plants, the production of biomass can reach 0.1 billion tons with the expectation that one hectare of land can produce 10 tons energy plants. Energy storage of these plants is equal to that of 50 million tons of standard coal. There are also 76.49 million hectares of marginal land resources. If 20% of these lands is used to grow energy plants, the production of biomass can reach 0.152 billion tons with the expectation that one hectare of land can produce 10 tons energy plants. Energy storage of these plants is equal to that of 76 million tons of standard coal [1-3].

In recent years, the utilization of waste agricultural and forestry fiber has been well developed on in China. There are mainly five utilizing modes. The first one is energy utilization mode. The main commercial utilization modes of waste agricultural and forestry fibers are biomass power generation, biomass briquette fuel, advanced liquid fuel, bio-gas and other modes. The total capacity is as much as 30 million tons of standard coal [4-7].

The second one is material utilization mode. It mainly refers to the uses of waste agricultural and forestry fiber to produce industrial raw materials, papermaking and building materials,

including paper slurry, bio-plastics, bio-based adhesives, thermosetting resins, wood-plastic composites, furfural, xylose, etc. The total production yield is more than 10 million tons [8,9]. The third one is fertilizer utilization mode. This mainly includes the production of bio-organic fertilizer, and the utilization of waste agricultural fibers via the direct return of crop straw to the field. The production of organic fertilizer output is as high as 20 million tons, and the amount of crop straw that are direct returned to the field is about 100 million tons [10,11].

The fourth one is feed utilization mode. This is mainly referring to the direct utilization, stalk silage (yellow silage), stalk alkalization or ammonization, compressed maize stalk fodder, stalk threading processing and other straw feed utilization mode. The annual utilization is about 200 million tons [12,13].

The fifth one is the cultivation-based utilization mode. This mainly refers to the use of rice straw, sorghum straw, corn cob and other raw materials to plant mushroom, black fungus and other edible fungi products. And the waste residue is used as fertilizer. In this field, the annual utilization is about 30 million tons [14,15].

Great progress has been made on the utilization technology and industrial application for waste agricultural and forestry fiber, but still nearly 250 million tons of agriculture straws are not effectively utilized in China every year. At present, there are three main problems in the comprehensive utilization waste agricultural and forestry fiber in China [16].

The first, there is a lack of awareness of the signification of the utilization of waste agriculture and forestry fiber. The technology has been promoted for a long time but do not get a widely utilization. People do not have enough understanding on the long-term social benefits which new technology utilization can bring. Straw burning that causes seriously polluting the environment and resources wasting have been forbidden several, but it still occurs. The second, investment mechanism is uncompleted. There is a lack of necessary rules and regulations. Moreover, the financial support is not enough. The standardized and efficient modes of storage and transportation have not been formed. The harvesting system has many sectors, resulting in high collection cost.

The third, scientific problems and key technologies on the utilization of waste agriculture and forestry fiber have not been effectively solved. There still existing problems likes: wide variety of source, complexed component, hard to decomposing and biological conversion. The value-added transformation technology research is not systematic. Over all, in order to reduce the waste of biomass resources fundamentally and turn waste into treasure, it is necessary to make an overall planning and fast developing as soon as possible.

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