PREPARATION OF ACTIVATED CARBON FROM AGRICULTURAL AND FOREST WASTE BY MICROWAVE IRRADIATION

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Although manufacturing of activated carbon from agricultural by-products by conventional heating has been investigated [1~3], yet, preparation of activated carbon from agricultural and forest waste by microwave irradiation has been scarcely reported. In this paper, the method of preparing activated carbon from 11 kinds of agricultural and forest waste such as sawdust, sugarcane bagasse, corncob, bamboo, wheat straw □ stem of beans, bean shell, sunflower shell, rice straw, waste materials of tannin extract with zinc chloride by microwave irradiation was studied. The results are shown in Table 1.

According to the experimental data, four stages, preheating, drying, carbonization and activation in conventional processing can be completed only 6-13 min by microwave irradiation. The microwave processing is 23-50 times as fast as the conventional processing, and metylene blue decolorizing ability, pH, the amount of total Fe, chloride and ash of product come or exceed the first grade of powder activated carbon specified in standard (LY216-79).

Keywords: microwave irradiation, agricultural and forest waste, activated carbon

References

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Table 1 Characteristics of activated carbon prepared by microwave irradiation

Green materiasl	Microwave irradiation (min)	Yield of activated carbon (%)	pH	Total Fe (%)	Chloride (%)	Ash (%)	Metylene blue decolorizing ability (ml/0.1g)
Sawdust	8	41□00%	6	0□03	0□10		18
Sugarcane bagasse	8	22□60%	7	0□03	0□08		15
Corncob	6	21□30%	7	0□03	0□08		16
Bamboo	9	22□50%	7	0□03	0□08		13
Wheat straw	8	17□27%	7	0□03	0□08		17
Stem of beans	8	20□00%	7	0□03	0□08		18
Bean shell	8	20□00%	7	0□03	0□08		17
Sunflower shell	10	18□00%	7	0□03	0□08		16
Rice straw	8	22□13%	7	0□03	0□08		15
Waste materials of tannin extract	13	24□18%	7	0□03	0□08		13
The first grade standard (LY216-79)			5-7	≤0□05	≤0.2	≤3	≥12