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水稻秸秆纤维制取工艺参数优化

Optimization of technical parameters for preparing fiber from rice straw

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中文摘要:

采用五因素二次回归正交旋转中心组合设计试验方法,以秸秆长度、浸泡时间、套筒初始温度、主轴转速和喂入量为影响因子,以纤维得率、纤维长宽比和抗张指数为响应函数,利用秸秆纤维制取专用试验台,对水稻秸秆纤维制取工艺进行了试验研究,得到了工艺优化参数组合:当套筒初始温度为25℃、主轴转速为70 r/min、喂入量为60 g/min、秸秆长度为10~14 cm和浸泡时间为12~24 h时,可得到纤维得率大于85%、长宽比大于40并且抗张指数大于10 N/m²、的水稻秸秆纤维。

英文摘要:

A central composite rotatable orthogonal experimental design of response surface methodology (RSM) was employed to find the optimum technical parameters combination for preparing fiber from rice straw by the straw extruder testbed. Obtainable fiber percentage, the ratio of length to width of the fiber and anti-tensile index were selected as responses, and five factors, such as the length of rice straw, soaking time of straw into water, initial temperature of extruding press, screw rotary speed and feed rate were selected as input variables with five levels respectively. The results indicated that under the condition of an optimum combination that the length of rice straw being 10~14 cm, soaking time being 12~24 h, initial temperature of extruding press being 25℃, screw rotary speed being 70 r/min and feed rate being 60 g/min, the ratio of length to width of the fiber was over 40, anti-tensile index was more than 10 N/m² and obtainable fiber percentage attained was more than 85%.

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