

挤压膨化参数对玉米秸秆纤维成分含量的影响 Influence of Extrusion System Parameters on Fiber Content of Maize Straw

赵凤芹 申德超

沈阳农业大学

关键词: 玉米秸秆 挤压膨化 纤维素 酒精 工艺优化

摘要: 针对秸秆纤维制取酒精过程中纤维利用率低问题, 利用小型单螺杆秸秆挤压机, 采用五因素五水平正交旋转组合试验方法, 研究了挤压膨化系统参数: 模孔环隙 B 、螺杆末端至模板内表面的距离 δ 、套筒温度 T 、螺杆转速 N 和物料含水率 W , 对玉米秸秆纤维(纤维素、半纤维素和木质素)成分比例的影响规律, 得出最优参数组合为: $B=4$ mm、 $\delta=5$ mm、 $T=120^{\circ}\text{C}$ 、 $N=90$ r/min、 $W=20\%$, 纤维成分含量为: 纤维素35.11%, 半纤维素31.83%, 木质素6.77%。研究结果为秸秆纤维制取酒精的挤压膨化预处理工艺提供参考。 With the problem that low fiber utilization in the alcohol process from maize straw, the influence of extrusion system parameters on fiber content of maize straw (cellulose, hemicellulose and lignin) through square combination experiment of five factors and five levels with orthogonal rotation by the single extruder, these parameters include the nozzle's gap(B), distance(δ) between screw end and internal surface of die, the temperature(T) of sleeve, the screw speed(N) and straw moisture(W). The optimum values of parameters of extrusion system were put out. They were as follows: $B=4$ mm, $\delta=5$ mm, $T=120^{\circ}\text{C}$, $N=90$ r/min, $W=20\%$, and on the optimum parameters, fiber content of maize straw were follows: cellulose content is 35.11%, hemicellulose content is 31.83%, lignin content is 6.77%. If the parameters of extrusion system were selected reasonably, the test results could provided certain reference for extruding pretreatment process of producing alcohol by straw fiber.

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