淀粉基完全生物降解材料的研究

Preparation of fully biodegradable starch-based materials

投稿时间：2003-10-8　　最后修改时间：2003-12-23

稿件编号：20040344

中文关键词：淀粉基材料； 生物降解性； 吸湿率； 生物降解塑料

英文关键词：starch-based material; biodegradability; moisture absorption; biodegradable plastic

基金项目：福州大学科技发展基金项目(XKJ(QD)-0101)

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中文摘要：

将淀粉与大豆渣、PVA等复配制备完全生物降解材料，考察了大豆渣、PVA用量对淀粉基完全生物降解材料力学性能的影响，发现拉伸强度随大豆渣、PVA的增加呈先升后降的趋势，断裂伸长率随大豆渣的增大而逐步下降，随PVA的增加则先升后降。同时还对添加纸粉或碳酸钙对材料力学性能的影响进行了考察，发现两者对材料的增强均不明显，但却显著降低断裂伸长率。当淀粉：豆渣：PVA：甘油：碳酸钙的比例为60：10：6：10：2时，所得的淀粉基生物降解材料具有较好的力学性能，其拉伸强度和断裂伸长率分别达到3.5 MPa和60%。所得淀粉基生物降解材料在100%湿度环境中的吸湿率测试表明，加入菜油或硬脂酸单甘酯可使吸湿率有所降低，而试样表面涂覆胶乳层吸湿率降低明显。将所得材料试样在腐殖土上放置7～8 d，试样表面微生物大量生长，菌覆盖率达60%以上。

英文摘要：

Biodegradable starch-based materials were prepared by blending starch with polyvinyl alcohol (PVA), soy dregs and glycerol as plasticizer. The effects of the amount of PVA and soy dregs on the mechanical properties of materials prepared were investigated. The results showed that the tensile strength of starch-based materials increased first and then decreased with increasing of soy dregs and PVA. And the elongation at break decreased when increasing soy dregs, but first increased then decreased with increasing of PVA. The effects of paper powder and $CaCO_3$ on the mechanical properties of materials prepared were also investigated. The results showed that both paper powder and $CaCO_3$ enhanced the tensile strength in some degree, but decreased the elongation obviously. The tensile strength and elongation attained 3.5 MPa and 60% respectively while keeping starch：soy dregs：PVA：glycerol：$CaCO_3$ as 60：10：6：10：2. Moisture absorption measured under 100% relative humidity showed that rape oil and glyceryl stearate could reduce the moisture absorption of the starch-based materials and the moisture absorption of starch-based materials coated with latex decreased obviously. The samples of obtained material underwent microbic growth on humus soil for 7～8 d, and the coverage of microorganism on sample surface was above 60%.

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