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## 相变蓄热砌块墙体在日光温室中的应用效果

### Application of brick wall with phase change rice husk in solar greenhouse

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中文关键词: [温室](#) [室内气温](#) [DSC](#) [相变砌块](#) [番茄生长](#)

英文关键词: [greenhouse](#) [indoor temperature](#) [differential scanning calorimetry \(DSC\)](#) [phase change material bricks](#) [tomato growth](#)

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中文摘要:

日光温室墙体的保温蓄热性能直接影响温室内气温和作物的生长。该文选用石蜡与硬脂酸正丁酯按质量比为5:5制成复合相变材料,以稻壳为载体采用自然吸附法进行吸附得到相变骨料。相变骨料与建筑材料混合制成相变蓄热砌块,并以其为墙体建造相变蓄热温室。采用差示扫描量热法测试复合相变材料和稻壳骨料DSC(热流-温度)曲线,相变温区为15~45℃;复合相变材料的熔解潜热为116.2 kJ/kg,凝固潜热为118.5 kJ/kg,相变稻壳的凝固潜热值为70.63 kJ/kg,熔解潜热值为58.14 kJ/kg。用多点温度计测量相变温室和普通温室室内外气温和墙体内外表面温度,相变温室室内气温波动幅度比对照温室小4.1℃,最低气温比对照高1.7℃,而最高气温则比对照低2.4℃。通过在温室内栽培金鹏一号番茄试验,表明相变温室中番茄的生长状况明显优于普通温室。因此,该文采用的相变蓄热砌块墙体建成的日光温室比普通温室具有更好的蓄热保温性能,更有利于冬季作物生长。

英文摘要:

The heat storage characteristics of solar greenhouse wall can affect the indoor temperature and crop growth environment. Paraffin and n-butyl stearate mixed with mass ratio 5:5 was chosen as compound phase change material (PCM). The compound PCM was absorbed by rice husk to be stabilized PCM. Two greenhouses were built with the PCM bricks and normal bricks respectively. From differential scanning calorimetry (DSC) analysis, the transition temperature was about from 15°C to 45°C, while the melting and freezing latent were 58.14 and 70.63 kJ/kg. The indoor temperature and wall surface temperatures were measured. The temperature fluctuation in PCM greenhouse was 4.1°C lower than that in normal greenhouse. The lowest temperature in PCM greenhouse was 1.7°C higher than that in normal greenhouse, while the highest temperature in PCM greenhouse was 2.4°C lower than that in normal greenhouse. The Chaoguan NO.1 tomato was cultivated in two test greenhouses. The growth status was better in PCM greenhouse. The conclusion is that the PCM wall has good effects on the indoor temperature and the crop growth.

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