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温室吸湿剂喷淋除湿降温系统的影响因子分析

Anaysis of influencing factors of dehumidifying and cooling system with moisture absorbent spraying for greenhouse

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中文关键词：温室,降温系统,氯化钙,除湿,液体除湿剂

英文关键词:greenhouses cooling systems CaCl2 dehumidifying liquid desiccant

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中文摘要:

为了解决湿热地区夏季温室的降温问题，提出了利用CaCl2溶液除湿降温系统对温室进行降温的方法。在CaCl2溶液除湿降温系统运行条件下，确定了以喷淋室出口空气相对湿度为试验指标，分析了进口空气流量、除湿剂流量、除湿剂浓度和温度、进口空气温度和湿度等因子对试验指标的影响。通过影响因子的单因素试验和多因素正交试验，得出了系统运行时影响除湿效果的显著因素是除湿剂浓度和温度、进口空气温度和湿度。通过回归分析建立了CaCl2 溶液喷淋除湿的数学模型，并通过试验验证了该模型的最大相对误差小于5%。该文为中国南方高温高湿的温室夏季降温提供参考。

英文摘要:

In order to solve the cooling problem for greenhouse in the humid and hot area in summer, liquid dehumidifying and cooling system with CaCl2 liquid was proposed. Under the condition that the dehumidifying and cooling system was operated in greenhouse, the experimental target about the relative humidity of the air on the spray room exit was determined, and the factors affecting on the experimental indexes were analyzed, such as inlet air flow, liquid desiccant flow concentration and temperature, inlet air temperature and humidity and so on. By the single factor and multi-factor orthogonal experiment, when the system was operating, the significant factors included desiccant concentration and temperature, inlet air temperature and humidity. Through the regression analysis, the mathematical model of spraying and dehumidifying with CaCl2 was established and verified, and the maximum relative error of model was less than 5%. This paper provides a reference for greenhouse cooling under high temperature and high humidity condition in summer in the South China.

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