

## 稻谷干燥含水率在线检测装置设计与试验

李长友

华南农业大学

**关键词:** 稻谷 干燥 含水率 在线检测装置 设计 试验

**摘要:** 为了解决稻谷的形状、厚度、密度、温度波动以及内部水分分布不均等因素影响含水率测量的问题,实现单粒稻谷水分在线精确测量,研究了稻谷干燥水分在线检测技术及装置。利用多路复选测量方案与解析计算相结合的方法,解决了稻谷含水率测量非线性问题。将动态过程中的转换电压时序曲线图峰高作为含水率在23.5%以下时的测量属性;当含水率在23.5%以上时,测量属性采用时序曲线峰面积。分别在夏季高温、高湿、大水分域和冬季低温、高粉尘作业条件下现场在线应用,验证了检测技术和装置的可靠性和实用性,在线检测误差在 $\pm 0.5\%$ 范围内。 In paddy drying process, the moisture content measurement is disturbed by the shape, thickness, density and temperature fluctuation of paddy, the ununiformity of interior moisture content distribution and etc. In order to get an accurate moisture content of the test single kernel paddy drying process, a kind of on-line moisture content metering technology and device was developed. Based on multi-channel relection circuit and analytical calculation, the non-linear problem of moisture content metering in drying process was resolved. The curves of voltage transferred from the resistance of paddy with different moisture contents to the time sequence, were obtained in dynamic process. And from them, it is concluded that the height of wave peak can be the measurement property when moisture content is less than 23.5%, and the curve boundary area can be measurement property when it is more than 23.5%. That is very helpful to promote detection accuracy. The reliability and practicality of the detecting technology and device was validated in different working conditions: the state of high temperature and high humidity in summer, and the state of low temperature, high dust and wide moisture distribution range in winter. The on-line measurement error is less than  $\pm 0.5\%$ .

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