基于随机共振的电子鼻系统构建及在谷物霉变程度检测中的应用

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摘　要：

谷物霉变不但给世界各国带来巨大的经济损失，同时也严重的危害着食用者的健康甚至生命安全。目前我国的谷物霉变检测技术具有一定的滞后性，因此研制一套检测谷物霉变程度的电子鼻系统具有重要价值。本文开发了一种基于半导体气敏传感器阵列的便携式电子鼻系统，采用非线性双稳态随机共振系统处理霉变谷物检测信号，不但可提取谷物霉变特征信息，同时可以克服气敏传感器的基线漂移难题。使用该系统检测了黑芝麻、大米、燕麦、荞麦四种谷物的12个样本，结果表明该电子鼻系统能够区分谷物的霉变程度。该系统具有响应速度快、灵敏度高、体积小、经济耐用等特点，具有很高的实际应用价值。

关键词：电子鼻，气敏传感器阵列，随机共振，谷物霉变

Establishment of an electronic nose system using stochastic resonance and its application in moldy corn status detection

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Abstract:

Moldy procedure of corn not only causes financial losses to many countries, but also does great harm to human health and life safety. At present, moldy corn detecting technique of our country drops behind other countries, so it is of great importance to develop an electronic nose system for moldy corn detection. In this paper, an electronic nose system using semiconductor gas sensor array and stochastic resonance has been established. The sensor array responses to moldy corn are processed by non-linear bistable stochastic resonance system, which can not only extract the features of moldy corn, but solve the baseline drift problem of the semiconductor gas sensors. Four kinds of corn samples have been adopted and detected by the proposed system. The electronic nose system can distinguish the moldy corn status. The system presents fast responses, high sensitivity, small architecture, low cost, and owns good practical application value.

Keywords: electronic nose, gas sensor array, stochastic resonance, moldy corn

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