

纯牛奶品牌识别中电子舌传感器阵列优化 Optimization of Electronic Tongue Sensors Array in Identifying the Brands of Pure Milk

吴从元 王俊 肖宏 韦真博 于勇

浙江大学

关键词: 纯牛奶 电子舌 单因素方差分析 主成分分析 逐步判别分析

摘要: 选取伊利、新希望、美丽健、蒙牛和光明纯牛奶作为研究对象,采用电子舌系统对这5个品牌纯牛奶进行了检测。单因素方差分析结果表明,纯牛奶品牌对各个传感器响应信号具有极显著的影响,通过剔除F值和决定系数  $R^2$  较小的传感器变量优化传感器阵列。对原始数据和优化数据(剔除BA传感器,剔除BA、BB传感器,剔除BA、BB、HA传感器,剔除BA、BB、HA、GA传感器)进行的主成分分析结果表明,剔除BA、BB、HA、GA传感器数据在区分纯牛奶品牌方面比其他数据更有效。采用逐步判别分析进行识别,校正集所有数据识别率均达到100%,剔除BA、BB、HA、GA传感器数据和剔除BA传感器数据的预测集识别率均达到90%,但剔除BA、BB、HA、GA传感器数据仅包含3个传感器变量,表明它对纯牛奶品牌具有最佳识别效果。单因素方差分析通过剔除不显著的传感器响应信号能够优化电子舌传感器阵列并且提高电子舌的识别性能。Pure milks, such as Yili, Xinxiwang, Meilijian, Mengniu and Guangming, were selected and detected by an electronic tongue. The results of one-way analysis of variance showed that brands had a very obvious effect on sensors signals of pure milks. Sensors array was optimized by removing sensors variable of small  $F$  and  $R^2$ . Principal component analysis(PCA) was applied to original data and optimized data(without BA sensor; without BA, BB sensors; without BA, BB, HA sensors; without BA, BB, HA, GA sensors). Results indicated that the optimized data without BA, BB, HA, GA sensors was more effective than the other data in distinguishing the brands of pure milks. Stepwise discriminant analysis was used to recognize, the identification rates of all data in the calibration sets were 100%. In the prediction sets, the identification rates of optimized data without BA, BB, HA, GA sensors and without BA sensor were both 90%, but the optimized data without BA, BB, HA, GA sensors only included three sensors variables and showed the best identification effects on the brands of pure milks. One-way analysis of variance could optimize the sensors array of electronic tongue by removing unremarkable sensor signals and improve the recognition performance of electronic tongue.

[查看全文](#) (请使用Adobe Acrobat 6.0版本浏览) [返回首页](#)

[引用本文](#)