A Comprehensive Comparison Between Different Mathematical Models for Inter-instrument Agreement of Reflectance Spectrophotometers

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Abstract Summary

In color-related industry, reflectance spectrophotometers are one of the most popular equipment for evaluating the color quality and color difference. Nowadays, different manufacturers claim that the color difference between different models spectrophotometer was lower to 0.1 CIELAB ΔE units. But in our investigation, the color difference values range from 0.5 to 0.8 CIELAB ΔE units. This investigation shows that the correction models must apply to correct such errors.

In the mean time, "Berns and Petersen's Model" is one of the useful mathematical models in correction of the color measurement results. But such model involves many complex mathematics calculations. After that Luo further evaluate "Berns and Petersen's Model" and more accurate result can be obtained. In our investigation, two models were also developed, so call "Lab Model" and "R-Model". These two models only involve simple regression calculation and the measurement also shows a delight improvement result.

In this paper, a comprehensive comparison between those models is reported. The comparison involve the BCRA-NPL Series II tiles as the calibration data and the testing is based on the Color Curve Paper Samples. And the results show a very important direction for the inter-instrument agreement.