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# Nix Pro Color Sensor Provides Comparable Color Measurements to Hunterlab Colorimeter

C. Schelkopf[1]*, J. Swenson[1], A. Hess[2], K. E. Belk[1], and M. N. Nair[1]

[1]Department of Animal Sciences, Colorado State University, Fort Collins, CO, USA
[2]Department of Statistics, Colorado State University, Fort Collins, CO, USA
*Corresponding author. Email: con4711@rams.colostate.edu (C. Schelkopf)

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## Objectives

Meat color is the most important quality attribute that influences consumer purchase decisions. Monitoring color to maximize shelf life and consumer acceptability is routinely used in meat science research. The HunterLab MiniScan EZ (HunterLab) colorimeter is the widely used industry standard for objectively measuring meat color. This device can collect tristimulus values of CIE $L^*$ (lightness), $a^*$ (redness), and $b^*$ (yellowness) for color measurements based on the light reflectance from the meat surface. While the HunterLab colorimeter serves as an accurate measure of meat color, it is relatively expensive and bulky. The Nix Pro Color Sensor (Nix) colorimeter is a less expensive and smaller handheld device that can capture the CIE $L^*$, $a^*$, $b^*$ values which can be downloaded to a smartphone app. However, limited research has been performed to compare the efficiency of these colorimeters for measuring beef color. Therefore, the objective of this study was to investigate the capabilities of the Nix colorimeter as an additional resource for objective fresh beef color measurements.

## Materials and Methods

The *longissimus dorsi* muscle from one side of A maturity beef carcasses ($n$ = 200) were evaluated using the HunterLab and Nix colorimeters. Carcasses were allowed approximately 1 h to bloom after being ribbed (between the 12th and 13th rib) prior to color measurements. Three (technical replicate) scans were obtained using the HunterLab colorimeter (illuminant A and 10° standard observer) and the mean readings were recorded. A series of independent technical replication (3, 5, 7, and 9) scans were obtained using the Nix colorimeter with illuminant A and 10° standard observer as well. The differences in color measurements between colorimeters were analyzed by using the Bland Altman Limits of Agreement and CORR (correlation) procedure of SAS with $\alpha < 0.05$.

## Results

Correlation between the HunterLab and Nix was highest for $a^*$ value (redness) with 3 scans ($r$ = 0.85, $P <$ 0.01), followed by 7, 5, and 9 scans ($r$ = 0.84, 0.82, and 0.82, respectively; $P < 0.01$). Additionally, $L^*$ values (lightness) were highly correlated for all the scanning series ($r$ = 0.79–0.81; $P < 0.01$). Similar to $a^*$ values, 3 scans with the Nix for $b^*$ values (yellowness) demonstrated the best correlation with HunterLab ($r$ = 0.83; $P < 0.01$), whereas the 5, 7, and 9 scans were still highly correlated ($r$ = 0.79–0.82; $P < 0.01$). The Bland Altman Limits of Agreement analysis indicated that the mean difference in $a^*$ values using 3 scans of both colorimeters was –1.68, whereas it was –0.91 for $L^*$ values and 0.25 for $b^*$ values. Moreover, the analysis indicated good agreement between the Nix and the Hunterlab colorimeters for all the color parameters.

## Conclusion

Three replicate scans using the Nix was highly correlated with color measurements using the HunterLab colorimeter and can serve as an acceptable additional resource for objectively measuring beef color. The Nix provides an opportunity for a less expensive, more mobile, and multipurpose device. Although these colorimeters are not equivalent, the Nix could be an adequate method for objective beef color measurements and is comparable to the HunterLab.