The objective of this study was to investigate the efficacy of a computer vision system (CVS) with structured light for meat color assessment. Three muscles (longissimus dorsi (LD), semimembranosus (SM), and psoas major (PM)) from eight beef carcasses were obtained at 1 day postmortem, vacuum packaged and assigned to three aging periods (9, 16, and 23 days). After aging, steaks were cut and displayed for 7 days at 3 °C under light. The surface colors were evaluated by using a Minolta, the CVS and trained color panel. In general, the CVS was highly correlated to the sensory scores, and showed an equivalent meat color assessment compared to the colorimeter. The CVS had a significantly higher correlation with the panel scores for the lighter and more color stable samples compared to the colorimeter. These results indicate that the CVS with structured light could be an appropriate alternative to the traditional colorimeter by offering improved precision and accuracy over the colorimeter.