

ABSTRACT

Principal component analysis (PCA) was carried out to study the relationship between 24 meat quality measurements taken from beef round samples that were injected with curing brines containing gum arabic (1%, 1.5%, 2%, 2.5%, and 3%) and soy protein concentrate (SPC) (3.5%) at two injection levels (30% and 35%). The measurements used to describe beef round quality were expressible moisture, moisture content, cook yield, possible injection, achieved gum arabic level in beef round, and protein content, as well as descriptive sensory attributes for flavor, texture, basic tastes, feeling factors, color, and overall acceptability. Several significant correlations were found between beef round quality parameters. The highest significant negative and positive correlations were recorded between color intensity and gray color and between color intensity and brown color, respectively. The first seven principal components (PCs) were extracted explaining over 95% of the total variance. The first PC was characterized by texture attributes (hardness and denseness), feeling factors (chemical taste and chemical burn), and two physicochemical properties (expressible moisture and achieved gum arabic level). Taste attribute (saltiness), physicochemical attributes (cook yield and possible injection), and overall acceptability were useful in defining the second PC, while the third PC was characterized by metallic taste, gray color, brown color, and physicochemical attributes (moisture and protein content). The correlation loading plot showed that the distribution of the samples on the axes of the first two PCs allowed for differentiation of samples injected to 30% injection level which were placed on the upper side of the biplot from those injected to 35% which were placed on the lower side. Similarly, beef samples extended with gum arabic and those containing SPC were also visible when scores for the first and third PCs were plotted. Thus, PCA was efficient in analyzing the quality characteristics of beef rounds extended with gum arabic.