

Quality Evaluation of Meat Cuts

N.A. Valous, L. Zheng

University College Dublin (UCD), National University of Ireland, Dublin, Ireland

D.-W. Sun

South China University of Technology, Guangzhou, China; University College Dublin (UCD), National University of Ireland, Dublin, Ireland

J. Tan

University of Missouri, Columbia, MO, United States

7.1 Introduction

A general definition of noncontact and nondestructive testing is the evaluation performed on any object, eg, meat cuts, without changing or altering that object in any way, in order to determine the absence or presence of conditions that may have an effect on certain characteristics (Hellier, 2003), eg, quality. Nondestructive quality evaluation has been a subject of interest to researchers for many years (Chen and Sun, 1991) and has seen significant growth. It can be considered one of the fastest growing technologies from the standpoint of uniqueness and innovation. The sophistication of nondestructive methods has evolved rapidly with modern technologies (Mix, 2005). The foremost underlying drivers for using nondestructive technologies are automation and improved rapid operations. Certain visual characteristics that are commonly used to describe quality are size, shape, color, texture, and appearance (Fig. 7.1). These quality characteristics are linked to features that are measurable by nondestructive techniques (Becker, 2002).

Meat quality encompasses chemical, microbiological, sensory, and technological attributes (Rosenfold and Andersen, 2003; Otto et al., 2004; Pathare et al., 2013). Meat has varied commercial value due to the perceptual attributes that consumers expect to be present. The most important are tenderness, juiciness, and flavor (Warriss, 2000). The variability in raw meats leads to highly variable products being marketed without a controlled level of quality. A means of reliably gauging consumer opinion before distribution is vital, as presenting high-quality meat in the low-end market is wasteful, and low-quality meat in the high-end market is damaging to a merchant's reputation. All meat products have at least one observable quality indicator that can be measured before distribution, allowing reliable evaluations. Commonly occurring indicators are color and surface texture, while marbling and morphological features are also important. These are properties that are intuitively obvious and convenient to measure, featured regularly in expert grading guides (Jackman et al., 2011).

Visual inspection has been serving the meat industry for many years, but it may lead to inconsistencies and variations despite the professional training of the graders (Brosnan and Sun, 2004). Manual inspection is tedious, laborious, and costly, while easily influenced by physiological factors inducing subjective and inconsistent evaluation results. The variability associated with human