Effects of Various Cooking Methods on Quality Characteristics of Korean Boiled Pork (Soo-yuk)

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Abstract

This research was conducted to evaluate the effects of cooking conditions on quality characteristics of Soo-Yuk, a traditional Korean food. The cooking conditions were as follows: boiled until the core temperature of a sample in 20°C cold water reached at 75°C (T1); boiled until the core temperature of a sample in 90°C boiling water reached at 75°C (T2); and boiled with sample from 20°C to 100°C and kept at 98°C for 25 min (T3, Korean traditional method). The sample cooked at 90°C water (T2) had the fast cooking time, and the highest cooking yield and moisture content. Soo-yuk boiled in 100°C water (T3) showed the longest cooking time, the lowest cooking yield and moisture content, and the highest shear force. The instrumental color showed a significant difference among the cooking conditions. The sarcomere length of soo-yuk boiled in 100°C water (T3) was the shortest, but the myofibrillar fragmentation index and thiamine content of the sample cooked at 90°C (T2) were the highest. In sensory evaluation, the evaluation of soo-yuk boiled in 98°C water (T3) was of superior flavor and overall acceptability.

Key words: soo-yuk, boiled pork loin, cooking method, eating quality

Introduction

Korean boiled pork, soo-yuk, is one of the popular foods in Korea. This cooking method tenderizes the texture of meat by dissociating connective tissue such as collagen and decrease a nutrient loss, especially vitamin B1. Over the past few years, several studies have been made on boiled pork in Korea. Moon et al. (2001) reported that as the internal temperature of pork increased, cooking loss and hardness increased. Oh (1994) found that cooking loss increased in the studies of both conventional and microwave methods as heating temperature and power increased. Choi et al. (2006) improved quality properties of boiled pork loin using tumbling methods. Also, Park and Kwon (1998), and Jung et al. (2004) conducted the studies about the quality change of soo-yuk such as Korean boiled pork using bark (Morus alba Linne) and mugwort powder.

Abroad, there have conducted many researches on cooking conditions of meat. Many researchers conducted the studies about the effect of heating period to meat quality (Dube et al., 1972; Laakkonen et al., 1970; Machlik and Draudt, 1963). Forrest et al. (1975) recommended the appropriate temperatures: 77°C for end point for most fresh pork, 77 to 82°C for poultry, 58 to 60°C for rare beef, 66 to 68°C for medium rare, 73 to 75°C for medium and 80 to 82°C for well done. Steak and chop like tender cut are well matched with dry heat cooking methods for a short time. In case of meat cut with many connective tissue, the moist cooking method is suitable for braising for a long time at low temperature. Especially, Buck et al. (1979) found that pork roast had the best quality at internal temperature between 71.1°C and 76.7°C in the treatment that the oven at 21°C was roasted right after setting to 163°C. Additionally, the research of Moss et al. (1983) on terms of heating methods for nutrient composition and Bower et al. (1987) on terms of heating temperature at 55 to 85°C for broiling at 290°C and roasting at 149°C said that the heating method was one of main factors that affect meat quality. Obuz et al. (2003) emphasized that we needs to monitor the temperature of all the cooking process to satisfy eating quality for consumers.

However, the food service industry still uses color or other visual observation methods to diagnose meat doneness and there has been no study about the cooking meth-
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ods of Korean boiled pork, soo-yuk. It is only the method that boils for a long time at 100°C with pork and cold water. Therefore, this study was conducted to improve the textural and sensorial quality of soo-yuk using various different cooking methods.

Materials and Methods

Sample preparation

Pork loin (M. longissimus dorsi) was purchased from a local processor at 48 h postmortem. All subcutaneous and intermuscular fat and visible connective tissue were removed from the fresh muscles, and then the pork loin was sliced at thickness of 2.5 cm and in the weight of 100±10 g and packed in Nylon/Polyethylene film at the temperature of 8±1°C. The cooking conditions of samples are as follows (Fig. 1): boiled until reached to 75°C at core temperature with sample in 20°C cold water and immediately cooled for 30 min (T1); boiled until reached to 75°C at core temperature with sample in setting 90°C hot water and immediately cooled for 30 min (T2); and boiled with sample from 20°C to 100°C and held at 98°C for 25 min (T3, Korean traditional method). The change of internal temperature was measured, using a digital thermocouple (KM330, Kane-May, Germany). After cooking, the samples were taken from the water and cooled for 30 min at room temperature.

Cooking yield

The raw samples sliced in 2.5 cm thickness were boiled in three cooking conditions. After each cooked, samples were cooled for 30 min in the room temperature. The yield was calculated by the Eq. (1).

Cooking yield (%) = Weight after cooking/Weight before cooking × 100

(1)

Moisture content

The moisture content (%) was determined by weight loss after 12 h of drying at 105°C in a drying oven (SW-90D, Sang Woo Scientific Co., Bucheon, South Korea), using AOAC (2000) method.

Shear force

For the determination of shear force, samples were cooked individually in plastic bags immersed in a 75°C water bath for 30 min. The cooked meats were cooled and sampled at room temperature using a 12.7 mm circular core to determine shear force. Four sample cores were sheared from each sample across the length of the core with a Warner-Bratzler shear attachment (V-type blade set) on the texture analyzer (TA-XT2i, Stable Micro Systems, England) under cross head speed of 2 mm/sec. Texture Expert for the WINDOWS™ operation system was used to analyze the data. The shear force value was the

Fig. 1. Experimental design using various cooking conditions.