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Effect of Marination with Fruit and Vegetable Juice on the Some Quality Characteristics of Turkey Breast Meat

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ABSTRACT

The effect of marination with antioxidant-rich fruit and vegetable juices, including black carrot juice, black mulberry juice, black grape and pomegranate juice, mixed vegetable juice (yellow carrot, tomato, zucchini, pepper, black carrot, cucumber and lettuce) for 24 and 48 hours on chemical, textural and sensorial properties of turkey breast meat was investigated. Moisture content of the samples marinated for 24 hours and cooked varied between 58.85 and 70.51%, with the control sample presenting the moisture highest value. The samples marinated in red grape juice for 48 hours had the highest cooking loss (49.11%), while the lowest cooking loss was recorded in the samples marinated in black carrot juice (40.61%). Moreover, the phenolic content of the samples marinated for 24 hours (250.12-1354.76 mg ga/L) was higher than those marinated for 48 hours (210.56-1156.43 mg ga/L). Reduced hardness values were obtained in turkey breast meat marinated in pomegranate (1.36 kg) and red grape (0.86 kg) juices, suggesting that these juices may potentially to be used as processing ingredients. Marination for 48 hours promoted better sensorial properties than marination for 24 hours.

INTRODUCTION

The association between good health and eating habits have led people to pay more attention to their daily eating habits, or diets, which consist of different components. In this aspect, the consumption of foods that promote good health is preferred, provided that these foods are economically affordable. From this point of view, turkey meat is an attractive source that can be compared with beef in terms of nutritional value (Sipahi, 2006).

Turkey meat is a protein source of animal origin that can be safely consumed by people of different ages because of its highly nutritious content. Since the fat is mainly located under the skin, turkey muscle fat content is low. Therefore, fat intake when consuming turkey meat is not high when the skin is not consumed. While the cholesterol content of beef and lamb is 68 mg/100g and 71 mg/100 g, respectively, turkey breast meat contains 65 mg/100 g cholesterol (İşeri, 2007). Turkey meat contains less unsaturated fat than beef and pork (Stadelman *et al.*, 1988). Amino acids, such as alanine, serine, aspartic acid, methionine, glutamic acid, and tyrosine are present, and lysine content, for which the need of children is 2.5-3.5 times higher than for adults, of turkey meat is high (Masiero, 1993). Moreover, it contains minerals, such as iron, zinc, copper, potassium, magnesium, *phosphorus* and manganese, and vitamins, including ascorbic acid, thiamine, riboflavin, pentatonic acid, B_6, B_{12} and Vitamin A (Özbay, 2009).

Although the nutritive value of turkey meat is high, its consumption is limited. One of the most popular ways to increase the market share of meat products is marination, which enhances aroma and flavor, corrects color defects, improves tenderness, etc. (Barbanti & Pasquini, 2004). Various marination ingredients, such as salts, phosphates, acids, sugar, aroma, flavors, and antioxidants are available in the market (Parks *et al.,* 2000; Barbanti & Pasquini, 2004; Lyon *et al.,* 2005; Goli *et al.*, 2006; Alvarado and McKee, 2007; Smith and Young, 2007).

Antioxidants are substances that occur naturally in fruits and vegetables and block free radicals in foods, helping to extend their shelf life and to maintain their quality during their life-cycle and in the body cells, protecting consumers' health and preventing diseases, such as cancer, cardiovascular diseases, diabetes, etc. (Hertog *et al.*, 1993; McLarty, 1997; Weisburger, 1999; Pokorny, 2001; Virgili & Scaccini, 2001).

In recent years, there is growing body of research on natural antioxidant sources, antioxidant compounds, relationship between antioxidants and good health, and effects of antioxidants on food quality. Therefore, the aim of this study was to investigate the effect of marination with mixed vegetable juice, black mulberry juice, red grape juice, black carrot juice and pomegranate juice on the phenolic content, chemical, textural, and sensorial properties of turkey breast meat.

MATERIALS AND METHODS

Sampling

Boneless turkey breast meat was obtained from a commercial poultry processing plant (Bolca Hindi, Bolu, Turkey). The turkey breast meat was cut into 1.5-cm thick, 13-cm long slices weighing 200 g. A commercial mixed vegetable juice (Sunpride Co., Bursa, Turkey), consisting of seven different vegetable juices (carrot, tomato, zucchini, black carrot, cucumber and lettuce) was purchased. Pure black mulberry juice, red grape juice, black carrot juice, and pomegranate juice were obtained from a local manufacturer (Targid Food and Agricultural Prods. Inc, Mersin, Turkey) and contained no additives. Distilled water was added to pure juices to produce marinades adjusted to 14° brix.

Marination

Meat slices were randomly immersed in the marinade solutions at the ratio of 1:1 (meat:marinade) in plastic bags, and stored at +4 ˚C for 24 hours or 48 hours. The control treatments contained only distilled water.

Phenolic content

The phenolic content of the marinades and of the turkey breast meat after marination was analyzed using Folin Ciocalteu Calorimetric Method (Singleton and Rossi, 1965), and read at 765 nm wave length in a spectrometer (Shimadzu UV-1601, Kyoto, Japan).

Meat pH

The pH of the turkey breast meat and of the marinades was measured before and after marination (Landvogt, 1991). The pH was measured in a homogenate prepared by blending 10 g of sample with 90 mL of distilled water for 30 s. Readings were made using a WTW, model pH 521, digital pH-meter and a WTW, type E56, combination electrode (WTW - Wissensehaftlich-Technische Werkstaetten GmbH, Weilheim, Germany).

Moisture content

Moisture content (%) of the samples was determined according to standard procedures pf the AOAC (1990).

Cooking loss

After marination for 24hours or 48 hours, samples were allowed to drain for 10 minutes at room temperature and then placed on trays lined with aluminum foil. Samples were cooked for 30 minutes in a convection oven (Beko, Istanbul, Turkey) at 150 ˚C. Cooking loss was calculated as the weight difference before and after cooking.

Color measurement

After marination and cooking, samples were placed into the clear petri dishes, and then Hunter Lab parameters (L*, a*, and b*) were measured on the surface of the samples using a colorimeter (Minolta, model CR 400, Osaka, Japan).

Texture profile analysis (TPA)

TPA parameters of the samples, including hardness (peak force on first compression), adhesiveness (the time that the samples remained adhered to the probe), cohesiveness (positive force ratio between the second and first compression cycle), and chewiness (energy needed to chew a solid sample to a steady state of swallowing) were determined according to the procedures suggested by Bourne (1978) and Ruiz de Huidobro *et al.* (2005). TPA tests were performed

using a Texture Analyzer (TA-XT plus, Stable Micro Systems Ltd., UK) and following specifications were applied: cylindrical probe with 35-mm diameter, 50-kg maximum cell loading, 1 mm/s velocity before the test and 5 mm/s velocity during and after the test, 5 g trigger force. Samples measuring 1x1x1 cm^3 were analyzed and five replicate measurements were carried out for each sample.

Sensory evaluation

Sensory panel was performed in two steps. The pre-trial panel and the experimental panel consisted of 10 trained panelists from Afyon Kocatepe University, Food Engineering Department. Each marinated sample was cut into 2.00×2.00×2.00 cm pieces and randomly identified with three-digit-codes. The samples were served to the panelists under artificial light (incandescent) at room temperature (22°C) in a random order on the same occasion. Apple juice and bread were offered between samplings to neutralize the residual flavor under fluorescent light. Samples were scored as follows: 7-8 very good, 4-6 good, and 1-3 very bad.

Statistical analysis

Data were analyzed by one-way analysis of variance using the software SPSS 8.0 for Windows. Means were compared by the least significant difference (LSD) test (p<0.05).

RESULTS AND DISCUSSION

The phenolic content of the marinade solutions and the turkey breast meat after marination for 24 or 48 hours are presented in Table 1. Samples marinated in pomegranate juice presented the highest phenolic content (1354.76 mg ga/L), whereas mixed vegetable juice (2150.6 mg ga/L) and samples marinated in mixed vegetable juice (250.12 mg ga/L), the lowest phenolic content (p<0.05). The phenolic content of the samples after marination was lower than that of untreated marinade solutions. The decrease in phenolic content of the meat samples after marination may be explained by the conversion of phenolic substances from insoluble into soluble forms due to oxidation reactions, as suggested by Bravo (1988). The phenolic content of the samples marinated for 24 hours was higher than of those marinated for 48 hours, possibly because it is difficult to analyze insoluble phenolic substances as marination time increases.

Table 1 – Phenolic content of the marinate solutions and turkey breast meat after marination for 24 and 48 hours (mg ga/L).

Marinade	Marinade solution	24 Hour	48 Hour
Mixed Vegetable	2150.56^{e}	250.12^{e}	210.56^{e}
Black Mulberry	10895.16^{b}	1210.45^{b}	1022.16^{b}
Red Grape	9600.50^{c}	1120.16^{c}	985.15^{c}
Black Carrot	4800.12^{d}	368.14^{d}	318.97^{d}
Pomegranate	12232.66^{a}	1354.76^{a}	1156.43^{a}

Means within a column with different letters are significantly different (p<0.05).

The pH values of the marinade solutions before and after marination for 24 and 48 hours are shown in Table 2. The pH values of the marinades were between 3.80-7.10, with the lowest pH measured in pomegranate juice and the highest in the control solution (p<0.05). Similarly, Obuz & Cesur (2009) found that the chicken breast meat marinated in pomegranate juice presented the lowest pH value. The pH values of the marinade solutions, except for the control solution (distilled water), increased after marination (p<0.05).

Table 2 – pH values of the marinade solutions before marination and after marination for 24 and 48 hours.

Marinade	Marination time		
	0 Hour	24 Hour	48 Hour
Control	7.10^{a}	6.42^{a}	6.32^{a}
Mixed Vegetable	4.80^{b}	5.16^{c}	5.22^{c}
Black Mulberry	4.50^{b}	4.81^{e}	5.17^{c}
Red Grape	4.30^{c}	5.67^{b}	5.86^{b}
Black Carrot	4.83^{b}	4.89^{d}	5.01^{d}
Pomegranate	3.80^{d}	4.51^{f}	4.81^{e}

Means within a column with different letters are significantly different (p<0.05).

The pH values of the marinated turkey breast meat before marination, after marination and after cooking are shown in Figure 1. A significant decrease of the pH values of the samples marinated for 24 hours was observed, except for the control sample. Marination with acidic fruit juices decreased pH values of turkey breast meat (p<0.05). Similarly, Serdaroğlu *et al.* (2007) recorded a decrease in pH values of turkey breast meat marinated in grapefruit juice and citric acid. Moreover, Ergezer & Gökçe (2011) concluded that the turkey breast meat marinated in acids had the lowest pH values. After 48 of marination, the control sample presented the highest pH value, while samples marinated in the pomegranate juice had the lowest pH value (p<0.05). In samples marinated for 24 h and cooked, pH values increased, except for control sample (p<0.05), which may be attributed to the loss of free acidic groups during cooking (Lawrie, 1979). Ergezer & Gökçe (2011) reported a similar increase in pH values

of marinated turkey meat after cooking. On the other hand, marination for 48 hours followed by cooking reduced the pH values of all samples, except for the control sample and the sample marinated in red grape juice.

The moisture content of the turkey breast meat after marination and cooking is presented in Figure 2. After 24 and 48 hours of marination, the moisture content of the samples marinated in juices decreased and then increased. On the other hand, the moisture content of the control samples increased during marination and then decreased. Cooking reduced the moisture content of the samples (p<0.05) possibly due to the breakdown of proteins caused by heating (Huang 2010). Obuz & Cesur (2009) and Serdaroğlu *et al.* (2007), evaluating chicken and turkey breast meat, respectively, indicated that the moisture content of the marinated samples was higher than that of marinated + cooked samples.

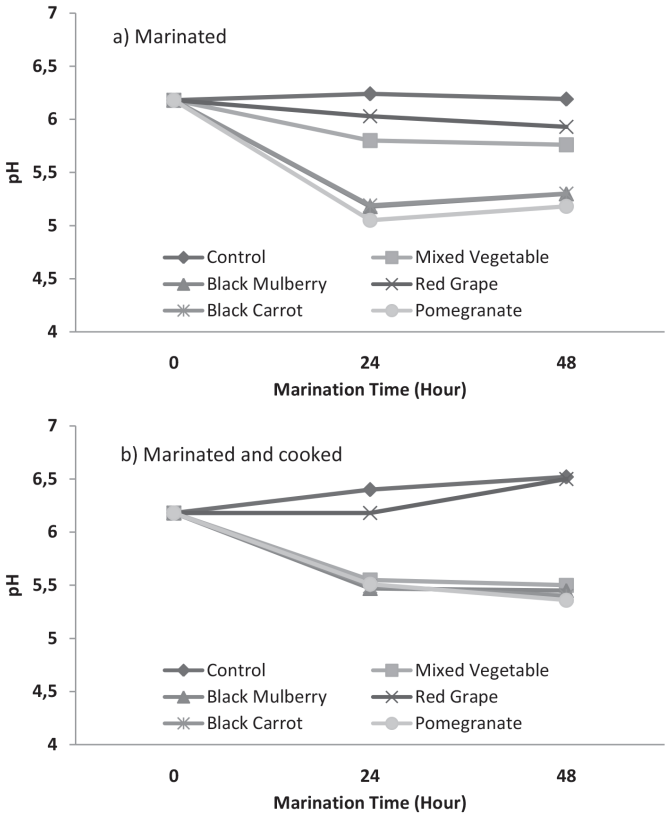

Figure 1 – pH values of turkey breast meat: a) before marination and after marination for 24-48 hours; b) after cooking.

The moisture content of the samples marinated for 24 hours and cooked varied between 58.85% and 70.51%, with the highest valued obtained in the control samples (p<0.05) (Figure 2). A similar value was reported cooked chicken meat marinated in water by Obuz & Cesur (2009). After marination for 48 hours and cooking, the control sample presented the lowest moisture content, while the samples marinated in pomegranate juice presented the highest moisture content (p<0.05).

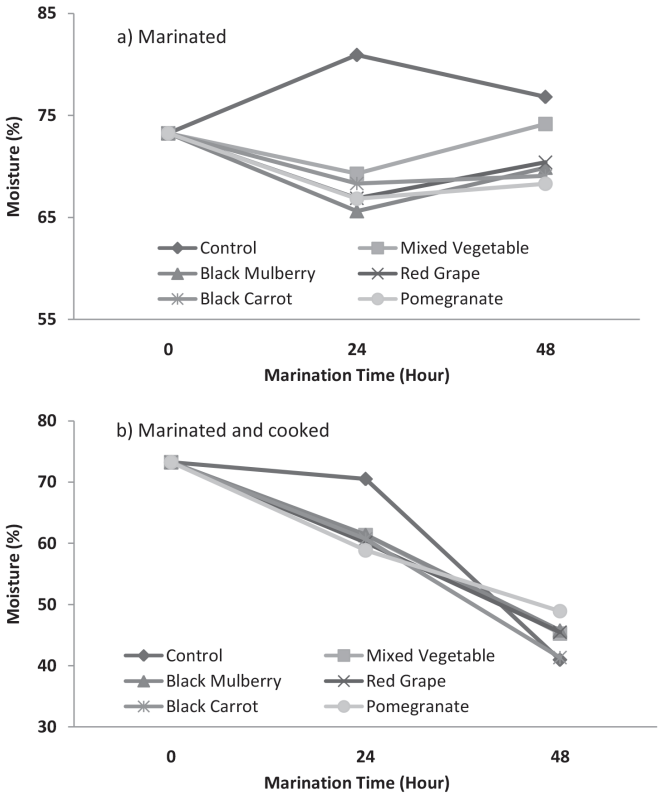

Figure 2 – Moisture content ofturkey breast meata) before marination and after marination for 24-48 hours; b) after cooking.

Figure 3 shows the cooking loss results of the turkey breast meat samples marinated for 24 and 48 hours.

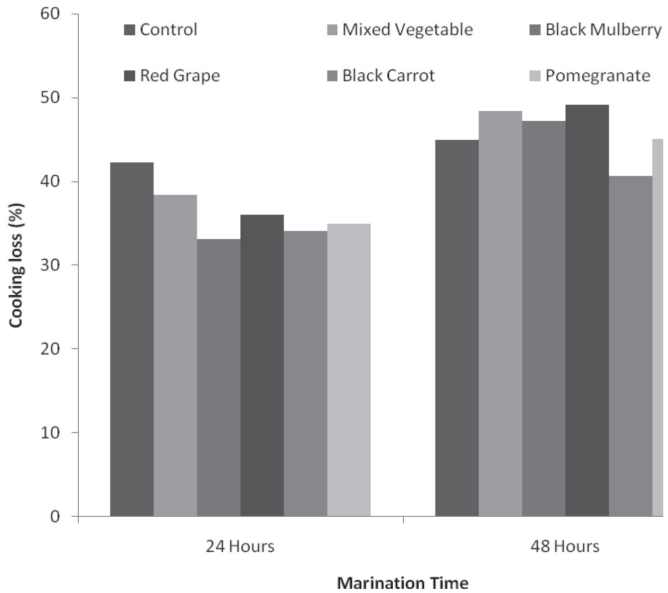

Figure 3 – Cooking losses of turkey breast meat after marination for 24 and 48 hours marination.

Cooking loss increased with increasing marination time. The samples marinated in red grape juice for 48 hours presented the highest cooking loss (49.11%), and the lowest was recorded for the samples marinated in black carrot juice (40.61%). Higher cooking loss values were obtained in the present study than those reported by Serdaroğlu *et al.* (2007) in turkey meat and Yusop *et al.* (2010) and Qiao *et al.* (2002) in chicken meat, and may be attributed to differences in the marination methods and marinade composition.

Color parameters of the samples after marination for 24 and 48 hours are shown in Table 3. Marination significantly affected L*, a*, and b* values of the turkey breast samples (p<0.05). After 24 hours of marination, L* values of the samples decreased, except for the control sample. On the other hand, Serdaroğlu *et al.* (2007) reported that L* values increased when turkey meat samples were marinated in grapefruit juice or citric acid. According to those researchers, one possible reason for increased L* values is that muscle proteins swell and light reflection alters at low pH and ionic strength, resulting in lighter color. The L* values of the control samples and of those marinated with mixed vegetable juice and black carrot juice for 48 hours increased, and decreased in all other samples.

The a* values were affected (p<0.05) by marination. Marination in mixed vegetable, black mulberry, black carrot and pomegranate juices increased a* values as compared to the control sample, whereas red grape juice marination did not affect a* values (p>0.05). Similarly, Obuz & Cesur (2009) reported an increase in a* values after chicken meat was marinated in fruit juice. On the other hand, Serdaroğlu *et al.* (2007) indicated that a* values were not affected by marinating turkey breast samples in grapefruit juice and citric acid. After 48 hour marination, the highest a* values were determined for black carrot, which is rich in natural pigments. The b* values of the samples marinated in red grape and black mulberry juices were higher than that of the control sample. Carroll *et al.* (2007) did not detect any differences on b* values in turkey breast, while Cadun *et al.* (2008) reported decreased b* values in shrimp.

The effect of cooking on L* values was inconsistent (Table 4). After cooking, the L* values of the samples marinated in mixed vegetable, black carrot, and pomegranate juices and the control samples increased, whereas reduced L* values were recorded in those marinated in black mulberry and red grape juices (p<0.05). While similar results of cooking were reported by Obuz & Cesur (2009) in chicken breast, they are not in line with the findings of Serdaroğlu *et al.* (2007) in turkey meat and Qiao *et al.* (2002) in chicken meat, who reported higher L* values with cooking. Moreover, Smith and Young (2007) found lower L* values in another study with chicken breast fillets.

After cooking, a* values increased, except for the samples marinated in black carrot juice (p<0.05) (Table 4). Ergezer & Gökçe (2011) attributed similar increase to the formation of lactate and phosphate during cooking. The L* value (lightness) was largely influenced by the color coming from the marinating fruit. In a previous study, we determined that marination in

Table 3 – Color parameters of turkey breast meat after marination for 24 and 48 hours.

Marinade	L*		a*		b*	
	24h	48h	24h	48h	24h	48h
Control	61.95^{a}	63.08^{a}	7.12^{e}	7.69^{f}	1.37^{d}	2.87^{d}
Mixed Vegetable	20.36^{f}	20.42^{f}	13.99^{b}	12.50^{b}	-1.05^{f}	-1.91^{f}
Black Mulberry	59.85^{b}	56.48^{b}	8.62^{d}	8.65^{e}	15.05^{b}	11.17^{b}
Red Grape	56.95^{c}	52.01^{c}	6.77^{f}	9.62^{c}	23.83^{a}	19.27^{a}
Black Carrot	36.50^{e}	42.22^{e}	22.73^{a}	16.50^{a}	0.68^{e}	1.29^{e}
Pomegranate	52.39^{d}	49.98^{d}	9.35^{c}	8.90^{d}	4.83^{c}	2.98^{c}

Means within a column with different letters are significantly different (p<0.05).

Table 4 – Color parameters of turkey breast meat after marination for 24 and 48 hours and cooking.

Marinade	L*		a*		b*	
	24h	48h	24h	48h	24h	48h
Control	70.43^{a}	73.31^{a}	10.29^{e}	9.65^{b}	12.17^{d}	9.32^{d}
Mixed Vegetable	25.25^{f}	21.80^{f}	14.36^{d}	12.00^{ab}	-0.84^{f}	-0.9^{f}
Black Mulberry	58.53^{b}	59.53^{c}	20.05^{a}	15.60^{ab}	32.14^{a}	21.25^{b}
Red Grape	43.65^{e}	49.03^{d}	16.13^{c}	12.75^{ab}	25.67^{b}	26.80^{a}
Black Carrot	48.29^{d}	39.62^{e}	17.17^{b}	17.05^{a}	10.18^{e}	8.03^{e}
Pomegranate	57.17^{c}	61.93^{b}	14.41^{d}	13.30^{ab}	18.33^{c}	10.70^{c}

Means within a column with different letters are significantly different (p< 0.05).

pomegranate, grape, or sour cherry juices decreased L* values of the chicken breast samples as compared to control, whereas orange or apple juice marination did not affect L* values (p>0.05).

While the highest lightness values (L*) were obtained in the control samples, black carrot marination resulted in the highest a* values before cooking. Differences in L* values after cooking were not significant, as reported by Cadun *et al.* 2008, Ergezer (2005) and Carroll *et al.* (2007). Qiao *et al.* 2002 reported higher L*values after cooking. In another study, Smith and Young (2007) detected lower L* values in marinated raw chicken breast fillets. On the other hand, Northcutt *et al.* (2000) did not report any significant differences in L* values between marinated and non-marinated raw and cooked chicken fillets.

TPA parameters (hardness, adhesiveness, cohesiveness, and chewiness) of the turkey breast meat samples after marination and marination+cooking are shown in Table 5. Marination with fruit juices and vegetable juices affected hardness, adhesiveness, cohesiveness and chewiness (p<0.05). Mixed vegetable juice marination for 24 hours resulted in higher (p<0.05) hardness values. The lowest hardness values were detected in the samples marinated in pomegranate and red grape juices. Serdaroğlu *et al.* (2007) also reported lower hardness values in turkey meat marinated in citric acid and grapefruit juice. While the highest hardness value was recorded in the control samples, those marinated in red grape juice presented the lowest value (p<0.05). Cooking increased hardness values (p<0.05). Denaturation of meat proteins and structural changes, such as destruction of cell membranes, shrinkage of meat fibers, aggregation and gel formation of myofibrillar and sarcoplasmic proteins, and shrinkage and solubilization of the connective tissue during heating, result in increased hardness (Tornberg, 2005). Marination reduced adhesiveness values of the samples marinated in pomegranate and red grape juices, while increased values were recorded for those marinated in mixed vegetable, black mulberry, and black carrot juices (p<0.05). Lower chewiness values are directly correlated with higher meat tenderness, and contributes for better consumer perception of the final product. Contrary to results after 24 hours marination, chewiness values of the samples marinated for 48 hours were lower than those of the control sample. Marination for 48 hours positively affected hardness and chewiness values. Obuz & Cesur (2009) also reported decreased chewiness values of chicken breast meat after marination (p<0.05).

Sensory analysis results of marinated turkey breasts are given in Table 6. Marination affected (p<0.05) the appearance, odor, juiciness, flavor, tenderness, and general acceptability of the samples as judged by the sensory panel. On a given marination time, turkey breast meat marinated in mixed vegetable juice and in the control solutions were given the highest (p<0.05) appearance scores (Table 6). The flavor scores of turkey breast samples marinated in all marinade solutions were higher than those of control (p<0.05). The lowest odor score was given to control samples, whereas the highest tenderness score was given to samples marinated in mixed vegetable juice. In terms of flavor and general acceptability scores, turkey breast meat marinated in mixed vegetable and red grape juices were given the highest scores by the sensory panel in our study (Table 6).

The samples marinated for 48 hours were the most preferable (p<0.05). Ergezer & Gökçe (2011) reported higher juiciness and flavor scores after marination. According to Obuz & Cesur (2009), lower flavor

Table 5 – Textural properties of turkey breast meat after marination for 24 and 48 hours and cooking.

	Marinade	Hardness							
		24h	48h	24h	48h	24h	48h	24h	48h
Marinated	Control	1.43^{c}	3.32^{a}	0.44^{d}	0.90^{a}	0.24^{c}	0.32^{b}	0.35^{c}	1.06^{a}
	Mixed Vegetable	2.78^{a}	2.54^{b}	1.02^{a}	0.72^{c}	0.25^{b}	0.32^{a}	0.68^{a}	0.84^{b}
	Black Mulberry	1.23^{d}	2.31^{c}	0.69^{c}	0.78^{b}	0.23^{d}	0.26^{c}	0.29^{d}	0.61^{c}
	Red Grape	1.22^{d}	0.81^{f}	0.38^{e}	0.36^{e}	0.23^{d}	0.25^{d}	0.28^{e}	0.19^{f}
	Black Carrot	2.38^{b}	1.01^{e}	0.81^{b}	0.31^{f}	0.25^{a}	0.24^{e}	0.60^{b}	0.26^{e}
	Pomegranate	1.24^{d}	1.36^{d}	0.36^{e}	0.42^{d}	0.21^{e}	0.23^{f}	0.27^{f}	0.31^{d}
Marinated and Cooked	Control	6.34^{c}	6.40^{a}	3.70^{c}	8.83^{b}	0.17^{d}	0.21^{a}	1.09^{a}	1.31^{a}
	Mixed Vegetable	4.57^{d}	4.91^{c}	2.46^{f}	7.77^{c}	0.20^{b}	0.18^{d}	0.87^{b}	0.89^{c}
	Black Mulberry	5.79^{e}	3.81^{e}	3.30^{d}	7.70^{c}	0.18^{c}	0.19^{b}	1.05^{a}	0.74^{e}
	Red Grape	8.25^{a}	3.96^{d}	4.90^{a}	6.63^{e}	0.21^{a}	0.19^{c}	0.94^{b}	0.74^{d}
	Black Carrot	6.36^{c}	5.84^{b}	2.92^{e}	10.65^{a}	0.21^{a}	0.19^{b}	1.36^{a}	1.14^{b}
	Pomegranate	7.38^{b}	4.03^{d}	3.82^{b}	6.91^{d}	0.19^{b}	0.18^{e}	1.42^{a}	0.71^{f}

Means within a column with different letters are significantly different (p<0.05).

Table 6 – Scores given by the sensorial panel to the marinated turkey breast meat.

Marinade	Marination Time	Appearance	Odor	Juiciness	Flavor	Tenderness	General Acceptance
Control	24 Hour	7.75^{a}	5.40^{c}	5.60^{b}	4.20^{d}	4.20^{c}	4.20^{c}
	48 Hour	6.60^{bc}	5.40^{c}	5.20^{c}	4.80^{d}	4.80^{e}	4.60^{d}
Mixed Vegetable	24 Hour	7.80^{a}	7.20^{a}	6.80^{a}	7.80^{a}	7.20^{a}	6.60^{a}
	48 Hour	7.60^{a}	7.45^{a}	7.60^{a}	8.00^{a}	7.40^{a}	7.60^{a}
Black Mulberry	24 Hour	6.80^{b}	6.80^{ab}	6.40^{ab}	5.60^{c}	6.20^{b}	6.40^{a}
	48 Hour	6.40^{bc}	6.60^{ab}	6.20^{b}	7.00^{b}	6.00^{d}	6.60^{c}
Red Grape	24 Hour	6.60^{b}	7.00^{a}	6.00^{ab}	7.20^{b}	6.00^{b}	6.40^{a}
	48 Hour	7.20^{ab}	7.00^{a}	7.40^{b}	6.80^{b}	7.20^{ab}	7.40^{ab}
Black Carrot	24 Hour	5.60^{c}	6.40^{b}	6.00^{ab}	5.60^{c}	6.20^{b}	6.20^{a}
	48 Hour	5.80^{c}	5.80^{bc}	6.20^{b}	5.80^{c}	7.00^{bc}	7.20^{b}
Pomegranate	24 Hour	5.40^{c}	6.80^{ab}	5.60^{b}	4.60^{d}	5.40^{b}	5.40^{b}
	48 Hour	6.20^{bc}	6.60^{ab}	6.00^{bc}	5.80^{c}	6.80^{c}	6.80^{c}

Means within a row with different letters are significantly different (p<0.05).

scores were related to sourness of chicken breast meat marinated in fruit juice. Other authors (Scanga *et al.,* 2000; Robbins *et al.,* 2003; Hoffman, 2006; Xiong & Kupski, 2000; Frogning & Sackett, 1985) reported that marinated meat products were scored more preferable than the control samples after 24 marination. Increased marination time caused an increase in the general acceptance score of the samples. While the control sample was the least preferred sample, the sample marinated in mixed vegetable juice was the most preferred one.

CONCLUSIONS

As marination of the turkey breast meat in pomegranate and red grape juices decreased hardness values, these juices may be used as natural tenderness agents in marination processes. Marination for 48 hours resulted in better textural quality of the turkey breast meat than marination for 24 hours. Marinated samples were preferred over the control samples, and the samples marinated in vegetable juice were given the highest acceptance score. Marination with different fruit and vegetable juices should be researched to further improve turkey meat quality.

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