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Effect of Fruit Size on Skin Color and Juice Constituents in White Peaches Produced in Okayama

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Skin color and juice constituents in large (L), medium (M), and small (S) fruits of four peach cultivars, Hashiba-hakuho (early maturing), Hakuho (early-medium maturing), Shimizu-hakuto (medium maturing), and Hakurei (late maturing), were analyzed to elucidate the effect of fruit size on the quality. The fruits containing higher soluble solids than 12°Brix were sampled at a commercial packing-house located in southern Okayama. They were stored at 25°C until fully ripened. The skin color on the cheeks (yellowish) was dark in S fruits of Hashiba-hakuho and the color at the fruit top (reddish) was dull and dark yellowish in L fruits of Shimizu-hakuto and Hakurei, respectively, compared to the fruits of other sizes. The sucrose+fructose content in juice, the major source of the sweetness, was higher in S and M fruits in Hakuho, Shimizu-hakuto, and Hakurei, while the malic+citric acid content, the major sour constituent, was lower in L fruits in those cultivars, although no significant difference was found in Hashiba-hakuho. Asparagine, the biggest amino acid fraction and thought to deteriorate the fruit taste at high levels, was higher in L fruits than in S fruits in Hashiba-hakuho and Hakuho. The content in Shimizu-hakuto and Hakurei fruits was generally low and not affected by fruit size. The content of γ-decalactone, the major peachy aromatic substance, was higher in L fruits in Hashiba-hakuho, in M fruits in Hakuho and Shimizu-hakuto, and in S fruits in Hakurei, than in those of other sizes. Sensory tests revealed that the L fruits of Hakuho and S fruits of Hakurei were poor in flavor. These results suggest that the larger fruits of Hakuho, Shimizu-hakuto, and Hakurei, the representative white peach fruits in Okayama, have rather flatter tastes than medium size fruits because of their lower sweetness and sourness and weaker aroma, as well as poorer texture.

Key words : peach, skin color, juice constituents, flavor, Okayama Prefecture

Introduction

Peach fruits, produced in southern Okayama, are famous for their white skin color, resulted by covering with a colored paper bag until harvest time. The ground color in the uncolored portion of the fruits, as well as the reddish color at the fruit top, has significant importance for their appearance. In addition, superior fruit taste and flesh texture, thought to be caused by shallow sandy soil and dry and hot summer conditions in the area, enable Okayama peaches to get the highest market prices in Japan[13]. In general, larger-sized peaches are usually purchased at higher prices, so farmers make an effort to produce larger fruits. However, Jia *et al.*[4,5,6] has shown that large-sized Hakuho peaches, produced in over-fertilized trees, have poorer flavor and less pleasant aromas than those in normally fertilized trees. For several kinds of table grape cultivars, it is well known that large-sized berries tend to have lower sugar contents and accumulate insufficient fruit aromas[2,12]. In 1999, a new packing-house, furnished with a computerized fruit sorting system, was established in Ichinomiya, Okayama City. The peaches collected from growers are efficiently graded into several categories depending on the fruit size, sugar content, and external appearance. However, the detailed fruit quality or palatability of the fruits in each category and each cultivar has not yet been sufficiently elucidated.

In this study, using four representative peach cultivars in Okayama, we compared the skin color, juice constituents, and sensory quality among the

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fruits of various sizes in order to understand which fruit size has the best quality.

Materials and Methods

Tested peach cultivars and fruit sampling

Peaches of Hashiba-hakuho, Hakuho, Shimizu-hakuto, and Hakurei (*Prunus persica* Batsch) were used for this investigation as representative early-, early to medium-, medium-, and late-maturing cultivars in Okayama, respectively. The fruits were harvested in commercial orchards located in the Ichinomiya area, Okayama City, and carried to the JA Ichinomiya Fruit Packing-house in the early morning. The fruit sampling was carried out in the middle of the harvesting period for each cultivar, July 5th for Hashiba-hakuho, July 16th for Hakuho, July 30th for Shimizu-hakuto, and August 10th for Hakurei in 2001. Only "Gourmet"class fruits, guaranteed to contain 12° Brix or higher soluble solids in juice, were sampled. Twenty to twenty-four fruits belonging to each category of three fruit sizes, L (12 or 13 fruits/4 kg-box), M (15 or 16 fruits/box), and S (18 or 20 fruits/box) were sampled at 2-3 PM and carried soon after to Okayama University by car. They were put into cardboard boxes and stored at 25°C in an air-conditioned laboratory. When the fruits became fully ripened, indicated by easy peeling by hand, they were weighed and divided into two groups. Half of them were peeled and juice was obtained by squeezing the flesh through double gauze by hand. The juice was kept at −20°C until the constituents were analyzed. The other half of the fruits were immediately used for measuring flesh firmness with a penetrometer (TOYO -Boldwin STM-T) and for sensory tests.

Measurement of skin color

Ten fruits for each size category, showing the average ground color, were chosen for each cultivar at the full ripe stage. The skin colors, '*L*', '*a*', and '*b*', were measured both at uncolored and colored portions using a color difference meter (Nihon Denshoku 1000DP and NR-3000). The measurements were replicated three times for each fruit.

Measurements of juice constituents

1) Total soluble solids (TSS), titratable acidity (TA), and pH

TSS and pH values of the sample juices were directly measured using a hand refractometer (ATAGO N-1) and a pH meter (HORIBA B-211), respectively. TA contents were determined by titrating the juice with 0.1 N NaOH and calculated as malic acid equivalent. All the measurements were replicated three times for each juice sample.

2) Sugars and organic acids

Two ml of the juice samples, mixed with 1 ml of 3% pentaerythritol as an internal standard, were loaded onto a column of Amberlite CG-120 (H^+) ion-exchange resin. The column was eluted with 50 ml of water to release sugars and acids. A 2 ml aliquot was freeze-dried, the residue was re-suspended in 0.5 ml of pyridine, and silylated with 0.25 ml of hexamethyldisilazane and 0.25 ml of trimethylchlorosilane at 60°C for 2 hours. One μl aliquot was injected into a GC (SHIMADZU GC-14A) equipped with FID. The determination was replicated three times for each juice sample.

3) Amino acids

A 0.05 ml aliquot of sample juice was added to 1 ml of water and 0.5 ml of 40% TCA, then stirred. After standing at 5°C for 1 hour or more, the mixture was centrifuged at 7,000 rpm at 4°C for 20 minutes. The supernatant was washed with 2 ml of diethylether 3 times to remove excess TCA. After removing the diethylether from the mixture *in vacuo*, the sample solution was filtered through a cellulose acetate membrane filter (ϕ0.45 μm), then applied to an automated amino acids analyzer (JEOL JLC-300). The determination was replicated three times for each juice sample.

4) Lactones

According to the modified SPEM method by Jia[7] 7.2 g of NaCl was added to 45 ml sample juice and sealed into a separatable flask. The flask was put into an incubator kept at 37°C and the sample juice was agitated with a magnetic stirrer. The SPEM extraction was carried out for 15 minutes, then the sampled headspace gas was applied to a GC (SHIMADZU GC -14A) equipped with a FID. The analytical conditions were as follows; column, CBJWAX-S30-050; column temperature, raised from 70 to 220°C (5°C/min); carrier gas, N_2 at 40 ml/min. The determination was carried out three times for each sample of juice.

5) Sensory tests

Ten fruits with average size and appearance were used for the sensory evaluation tests for each size category in each cultivar. Flesh blocks of 3.0×3.0×1.5 cm were excised from the cheek of each sample fruit. They were further divided into 4 pieces to serve the test. Sweetness, sourness, bitterness, firmness, fine texture, aroma, and total palatability were scored between 4 (best or strongest) and 1 (worst or weakest). The data were compared by a rank test. Each panelist sat at a separated booth in an air-conditioned (26°C) room under fluorescent lamps.

Results and Discussion

1. Fruit size and fruit weight

Average fruit weight and diameters of L, M, and S fruits in four peach cultivars are shown in Table 1. The fruits of Hashiba-hakuho were the smallest and those of Shimizu-hakuto were the largest in each size. The fruit shape, represented by a ratio of the fruit height and the cheek diameter, was slightly flatter in Hakuho and Hakurei than in other cultivars, especially in L fruits.

2. Skin color

The '*L*' value in the uncolored skin portion, showing the brightness of the fruit, was highest in L fruits and lowest in S fruits in Hashiba-hakuho (Table 2). However, it was significantly higher in S fruits in Hakurei and not different between fruit sizes in Hakuho and Shimizu-hakuto. The '*b*' value, the degree of yellow tint, showed an opposite trend to the '*L*' values, indicating that the ground color of S fruits of Hashiba-hakuho and L fruits of Hakurei had a dark yellow tint. The '*a*' value in colored portions, showing the degree of redness, tended to be higher in L fruits, except for Shimizu-hakuto where the '*a*' value was generally much lower than other cultivars. Reddish coloration in bagged peach fruits is usually restricted to the top, where the fruit receives solar radiation through the opening of unclosed fruit bags at their top. The much lower '*a*' values in Shimizu-hakuto may be a cultivar specificity.

3. Sugar and acid contents

TSS contents in juice of all fruit sizes of each cultivar were higher than 12°Brix, which proved that the computer system for rating the fruits by TSS levels had been effective. The major sugar constituent in peach fruits is sucrose[17] and the content in the juice has a significant effect on the sweetness of the fruit[7]. Fructose is the second major sugar in peaches and has a stronger sweetness than glucose and inositol. The sucrose and fructose contents were lower in L fruits than in M and S fruits in Shimizu-hakuto and Hakurei, although the TSS content did not differ significantly (Table 3). These facts indicate that 'large-sized' fruits, exceeding 340 g in weight, are too large to accumulate sufficient concentrations of sucrose and fructose.

The malic acid contents were also lower in L fruits than M and S fruits in Hakuho, Shimizu-hakuto and Hakurei. Although malic acid when contained at higher than 0.6% deteriorates the flavor of peach fruit[4,5], extraordinarily low levels such as 0.2% or lower analyzed in those large fruits may produce a weak or flat taste. It is generally known that fruit maturation in larger fruits is usually slower than in fruits with a normal size of each cultivar[9,10,11].

4. Amino acids

The biggest fraction in juice amino acids was asparagine (ASN) in all the cultivars tested here (Fig. 1). The fruits in all size categories in Hashiba-hakuho and those in L and M sizes in Hakuho contained ASN at higher than 20 mmol/l. Jia *et al*.[5] reported that higher applications of fertilizers caused such higher contents of ASN in Hakuho peach juice, and this weakened significantly the sweetness and increased

Table 1 Fruit weight and diameters in each fruit size category of Hashiba-hakuho, Hakuho, Shimizu-hakuto, and Hakurei peaches[a)]

Cultivars and sample date	Fruit No./box[b)] and size category	Fruit weight (g)	Fruit height (mm)	Cheek diameter (mm)
Hashiba-hakuho/Jul. 7	13 (L)	293.0 ± 17.2	74.7 ± 3.1	86.8 ± 3.1
	16 (M)	243.5 ± 9.1	71.5 ± 1.0	80.3 ± 2.0
	20 (S)	178.0 ± 8.6	64.2 ± 1.7	72.1 ± 1.5
Hakuho/Jul. 16	13 (L)	326.7 ± 14.6	80.7 ± 3.5	89.9 ± 1.9
	16 (M)	258.8 ± 12.8	75.4 ± 2.0	81.2 ± 2.0
	20 (S)	197.2 ± 4.3	71.2 ± 2.1	73.7 ± 1.1
Shimizu-hakuto/Jul. 30	12 (L)	344.7 ± 9.2	80.4 ± 9.2	92.8 ± 9.2
	15 (M)	283.3 ± 9.0	75.8 ± 1.3	86.9 ± 1.4
	18 (S)	224.3 ± 12.3	71.3 ± 2.1	78.7 ± 1.9
Hakurei/Aug. 10	13 (L)	341.0 ± 9.3	83.9 ± 2.0	87.8 ± 1.2
	16 (M)	261.9 ± 13.9	76.2 ± 2.6	81.0 ± 1.9
	20 (S)	194.1 ± 6.3	70.3 ± 1.8	72.1 ± 1.5

[a)]Average weight ± SD, n = 10～20.
[b)]Holding about 4 kg.

Table 2 Fruit skin color at uncolored and colored parts in various cultivars and sizes of peach fruits at full ripe stage[a)]

Cultivar	Days after harvest	Fruit size category[b)]	Skin positions					
			Uncolored			Colored		
			L	*a*	*b*	*L*	*a*	*b*
Hashiba-hakuho	3	L	69.7a	0.80	15.1b	48.27	15.6b	2.7b
		M	67.5ab	0.26	16.9a	48.20	19.0a	4.8b
		S	65.7b	0.39	17.9a	47.14	17.8ab	8.0a
Hakuho	4	L	75.40	−5.95	31.49	56.20	22.30	19.49
		M	76.78	−4.54	31.42	58.77	21.23	19.21
		S	76.53	−5.72	31.02	55.10	24.32	20.04
Shimizu-hakuto	4	L	76.12	−5.53	34.29	66.7b	11.3a	26.03
		M	75.42	−4.62	34.13	73.4a	2.2b	28.05
		S	76.54	−5.73	34.45	69.8ab	2.3b	29.17
Hakurei	4	L	75.2b	−2.36	30.22	68.19	7.1b	27.9a
		M	73.7c	−1.25	30.76	64.05	14.3ab	21.6b
		S	77.6a	−3.01	30.56	65.63	16.3a	24.7ab

[a)]Measurements for Hashiba-hakuho was by Nihon-denshoku 1000DP, for other cultivars by Nihon-denshoku NR-3000. Means are separated by Duncan's multiple range test at $p = 0.05$, n = 10.
[b)]Refer to Table 1.

Table 3 Juice total soluble solids (TSS), sugar, titratable acidity (TA), and organic acid contents in various cultivars and sizes of peach fruits at their full ripe stage[a)]

Cultivar	Fruit size category	TSS (°Brix)	Sugar (g/100 ml)				TA[b)] (g/100 ml)	Acid (g/100 ml)	
			Sucrose	Fructose	Glucose	Sorbitol		Malic	Citric
Hashiba-hakuho	L	12.9	9.6	0.76	0.62	0.11	0.22	0.23	0.11
	M	12.9	9.5	0.80	0.66	0.12	0.24	0.21	0.09
	S	13.1	9.0	0.87	0.69	0.09	0.24	0.22	0.09
Hakuho	L	12.1	7.9	0.93	0.75	0.14	0.29	0.19b	0.08b
	M	11.9	7.9	0.99	0.77	0.12	0.25	0.21a	0.10a
	S	12.4	8.8	1.02	0.80	0.18	0.25	0.21a	0.10a
Shimizu-hakuto	L	12.7	7.9b	0.96b	0.85b	0.15	0.17	0.16b	0.08
	M	12.9	9.6a	1.17a	1.02a	0.18	0.17	0.21a	0.11
	S	12.6	9.0a	1.27a	1.07a	0.19	0.17	0.19ab	0.09
Hakurei	L	14.8ab	10.0	0.99b	0.81	0.43b	0.15	0.22b	0.04
	M	13.8b	10.5	1.21ab	0.98	0.37b	0.16	0.22b	0.04
	S	15.5a	11.2	1.25a	1.00	0.62a	0.18	0.28a	0.04

[a)]Means are separated by DMRT ($p < 0.05$), n = 3.
[b)]Calculated as malic acid contents.

the sourness. The higher ASN levels detected in Hashiba-hakuho and L Hakuho fruits may result from over-fertilization by growers who intended to produce larger fruits for greater profits. Serine (SER) and alanine (ALA) were contained at comparatively higher levels in L fruits than M and S fruits in Hashiba-hakuho and Hakurei, although the trend was reversed in Hakuho. SER and ALA are sweet amino acids in peach juice but the sweetness is noticeable when they are contained at about 3 mmol/l and 0.4 mmol/l or higher, respectively[5)]. Therefore, the higher ALA content could be effective in increasing the sweetness of the L fruits in Hashiba-hakuho, while the lower ALA content in L fruits in Hakuho might decrease the sweetness. The low amino acid contents in Shimizu-hakuto and Hakurei fruits may be a cultivar specificity. The amino acids in fruits of those cultivars may not play an important role on the fruit taste.

5. Volatiles

γ-Decalactone was detected as the most abundant aromatic substance in each cultivar (Fig. 2). This lactone gives a peachy and creamy aroma, which improves the fruit attractiveness[3,4,7,8,16)]. The effect of

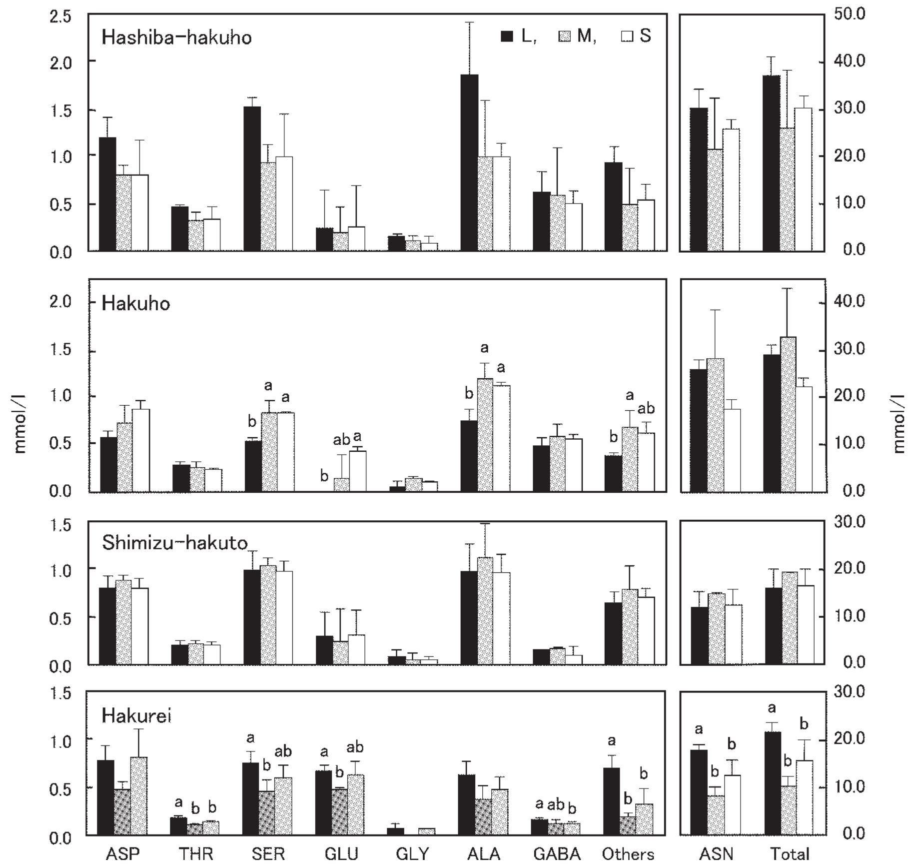

Fig. 1 Juice amino acid contents in various cultivars and sizes of peach fruits at the full ripe stage. ASP, aspartic acid; THR, threonine; SER, serine; GLU glutamic acid; GLY, glycine; ALA, alanine; GABA, γ-aminobutyric acid; ASN; asparagine; Others, glutamine+valine+isoleucine+leucine+lysine. Vertical bars indicate SD. Means are separated by DMRT ($p<0.05$), $n=3$.

the fruit size on the content was significant in Hakuho, Shimizu-hakuto, and Hakurei, showing it was highest in M fruits in Hakuho, in M and S fruits in Shimizu-hakuto, and in S fruits in Hakurei. Here again, the lower content of peachy aromas can also be found in larger fruits of those cultivars.

t-2-Hexenal and *cis*-3-hexanol, an aldehyde and alcohol respectively, are unpleasant volatiles with green and unripe or spicy smells[1,3]. Jia *et al.*[4] reported that those volatiles are contained at higher levels such as 30 and 20 μg/100 ml, respectively, in Hakuho peaches grown under over fertilized conditions. In our present investigation, however, both contents were negligible in Hakuho fruits, maybe resulting from different extraction methods. The higher *cis*-3-hexanol content in L fruits in Shimizu-hakuto and Hakurei might add a greenish smell to the fruits, although the degree of unpleasantness for consumers is unclear.

6. Sensory quality

For Hashiba-hakuho fruits, only flesh firmness was tested, which showed the S fruits had firmer texture (Table 4). In Hakuho, L fruits were unsavory mainly because of insufficient sweetness and higher sourness and bitterness. There was no significant difference in each taste among the fruit sizes, but M fruits were judged to be all round better in taste because of better aroma and fine texture. In Hakurei, S fruits were rated as lowest because of the lowest sweetness and aroma and poorest flesh texture. We already reported that large Hakuho fruit had more rough and weaker texture at the full ripe stage compared to the medium fruits produced in moderately fertilized trees[14,15].

Conclusion

From these results we can suggest that the peach fruits produced in Ichinomiya located in southern Okayama generally have a weak or flat taste compared to those produced under root zone restriction and severely controlled fertilizer application system in our university orchard[4,5,6], although the fruit size is greatly larger. For example, the TSS content should be higher than 13° Brix at least and juice acidity should

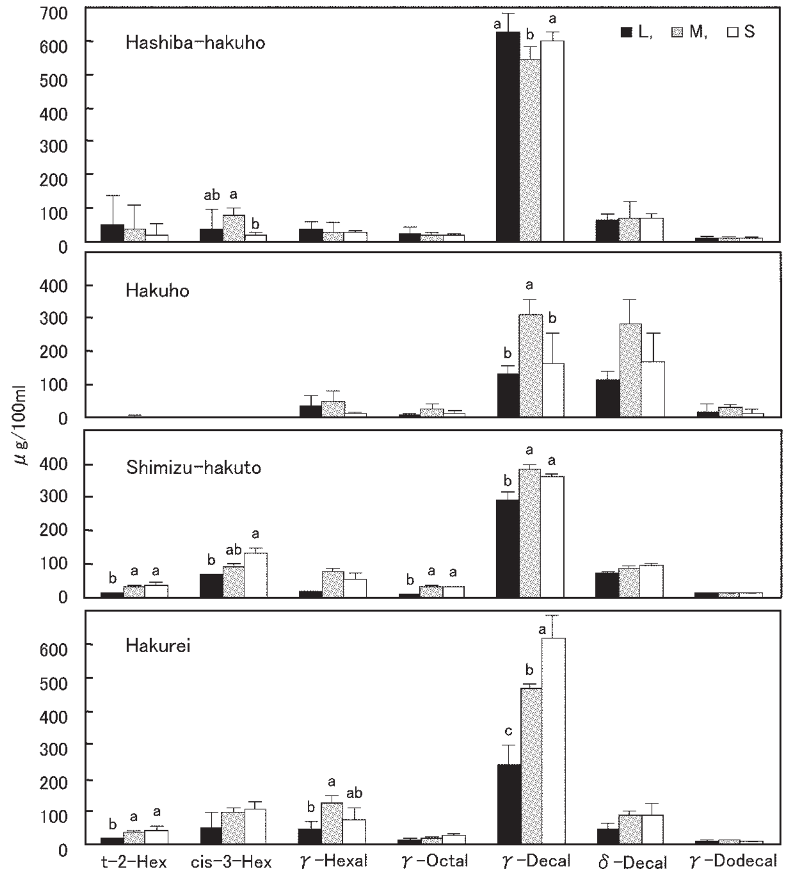

Fig. 2 Lactone contents in the juice of various cultivars and sizes of peach fruits at the full ripe stage. t-2-Hex, t-2-hexanal; *cis*-3-Hex, *cis*-3-hexanol; γ-Hexal, γ-hexalactone; γ-Octal, γ-octalactone; γ-Decal, γ-decalactone; δ-Decal, δ-decalactone; γ-Dodecal, γ-dodecalactone. Bars indicate SD. Means are separated by DMRT ($p<0.05$), $n=3$.

Table 4 Sensory quality of various cultivars and sizes of peach fruits at their full ripe stage[a)]

Cultivar	Fruit size category	Flavor			Aroma	Texture		Total taste
		Sweetness	Sourness	Bitterness		Firmness	Fineness	
Hashiba-hakuho	L	—	—	—	—	22b	—	—
	M	—	—	—	—	17c	—	—
	S	—	—	—	—	30a	—	—
Hakuho	L	10b[b)]	20	20	15	23	—	10b
	M	20a	14	16	19	21	—	20a
	S	18a	14	16	17	22	—	18a
Shimizu-hakuto	L	28	19	20	23	25	19	24
	M	24	25	25	27	25	25	28
	S	20	28	27	22	22	22	20
Hakurei	L	28	22	28	26	22b	25	25
	M	23	26	19	26	19b	25	26
	S	21	24	25	20	31a	22	21

a)Score; 4 (strong) −1 (weak).
b)Kahan's rank test ($p<0.05$).

be between 0.3 and 0.5% to satisfy consumers. These values in the 'large' fruits sampled at the packing-house were 12-13° Brix and below 0.3%, respectively. Furthermore, those fruits contained excessively higher levels of asparagine, which deteriorate the fruit taste, than fruits produced in our orchard. Such flavor characteristics of the fruits produced in commercial orchards may result from excessive fertilizer applications for producing large size peaches. It is a general and common trend in Japanese markets that large sized fruits can usually acquire higher prices than smaller fruits. However, it is now clear that large fruits in medium and late maturing cultivars, traditionally acquiring the highest market prices among all peach cultivars in Okayama, possess lower contents of sugars, acids, and peachy aroma than medium or small fruits, as shown in this investigation. For further development of peach fruit production in this area, it may be needed to produce fruits with deep and strong tastes and aromas, although large size is not so important.

References

1) Buttery, M. H., R. M. Seifert, D. G. Guadagni and L. C. Ling : Characterization of additional volatile components of tomato. J. Agric. Food Chem., **19**, 524-529 (1971)

2) Hirano, K., K. Iwamoto and G. Okamoto : Effect of forchlorfenuron (CPPU) application on berry growth and quality of 'Neo Muscat' grape. J. ASEV Jpn., **7**, 102-107 (1996) (Japanese text with English abstract)

3) Horvat, R. J., G. W. Chapman Jr., J. A. Robertson, F. I. Meredith, R. Scorza, A. M. Callahan and P. Morgens : Comparison of the volatile compounds from commercial peach cultivars. J. Agri. Food Chem., **38**, 234-237 (1990)

4) Jia, H., K. Hirano and G. Okamoto : Effect of fertilizer levels on tree growth and fruit quality of 'Hakuho'peaches (*Prunus persica*). J. Japan. Soc. Hort. Sci., **68**, 487-493 (1999)

5) Jia, H., G. Okamoto and K. Hirano : Effect of amino acid composition on the taste of 'Hakuho' peaches (*Prunus persica* Batsch) grown under different fertilizer levels. J. Japan. Soc. Hort. Sci., **69**, 135-140 (2000)

6) Jia, H. and G. Okamoto : Distribution of volatile compounds in peach fruit. J. Japan. Hort. Sci., **70**, 223-225 (2001)

7) Jia, H. : Studies on peach quality affected by orchard practices. Doctoral Thesis of Okayama University (2002)

8) Kakiuchi, N. and A. Ohmiya : Changes in composition and volatile constituents in peach fruit in relation to maturity at harvest and ripening. J. Japan. Soc. Hort. Sci., **60**, 204-216 (1991)

9) Mills, T. M. and M. H. Mpelasoka : Water relations, growth, and the composition of 'Braeburn' apple fruit under deficit irrigation. J. Amer. Soc. Hort. Sci., **121**, 286-291 (1996)

10) Mpelasoka, B. S., M. H. Behboudian, J. Dixon, S. M. Neal and H. W. Caspari : Improvement of fruit quality and storage potential of 'Braeburn' apple through deficit irrigation. J. Hort. Sci. & Biotech., **75**, 615-621 (2000)

11) Mpelasoka, B. S., M. H. Behboudian and T. M. Mills : Effects of deficit irrigation on fruit maturity and quality of 'Braeburn'apple. Sci. Hort., **90**, 279-290 (2001)

12) Okamoto, G., M. Manabe and K. Hirano : Suitable fertilizer level for Gros Colman. J. ASEV Jpn., **8**, 14-24 (1997) (Japanese text with English abstract)

13) Okamoto, G. : Unpalatable peach fruits produced in over-fertilized orchards. Agriculture and Horticulture **76**, 349-354 (2001) (Japanese text)

14) Okamoto, G., H., Jia, A. Kitamura and K. Hirano : Effect of different fertilizer application levels on texture of 'Hakuho' peach (*Prunus persica* Batsch). J. Japan. Soc. Hort. Sci., **70**, 533-538 (2001)

15) Okamoto, G. and H. Jia : Effect of orchard practices on fruit taste and aroma constituents. Food and Food Ingredients Journal **199**, 10-21 (2002) (Japanese text with English abstract)

16) Osaki, K., C. Yukaewa, X. Zhong and H. Iwabuchi : Peaches (*Prunus persica* Batsch) and their volatile components. Food and Food Ingredients Journal **195**, 44-60 (2001) (Japanese text with English abstract)

17) Zucconi, F. : Peach. In Handbook of Fruit Set and Development (Monselise, S. P. ed), pp. 303-321, CRC Press, Florida (1986)

岡山で生産される白色桃の果実サイズ別の果皮色と果汁成分

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岡山市一宮のモモの選果場に出荷された有袋栽培の‘橋場白鳳’（早生），‘白鳳’（早中生），‘清水白桃’（中生）および‘白麗’（晩生）から，３段階のサイズ（Ｌ，Ｍ，Ｓ）の果実を入手し，完熟状態（手で皮が剥ける）に達するまで25℃の室温においた．それらの果実について，果皮色と果汁成分の分析と果肉の食味テストを行い，果実のサイズによる品質の相違を検討した．‘橋場白鳳’では，Ｓ果実は地色が暗く，‘清水白桃’のＬ果実は着色が濃いが色調が暗く，‘白麗’のＬ果実は着色が薄くて黄色が強く，いずれも外観が劣った．果汁中の主要な甘味成分であるスクロース＋フルクトース含量は，‘白鳳’，‘清水白桃’および‘白麗’ではＳまたはＬ果実で高く，酸味成分のリンゴ酸＋クエン酸含量は，それら３品種のＬ果実で最も低かった．‘橋場白鳳’では果実サイズによる糖・酸含量の有意な差がなかった．果実に苦みを与えるアスパラギン含量は，‘橋場白鳳’と‘白鳳’ではＬ果実で高かったが，‘清水白桃’と‘白麗’ではどのサイズでも含量が低かった．モモ香の主成分である γ-decalactone は，‘橋場白鳳’ではＬ果実で高かったが，‘白鳳’と‘清水白桃’ではM果実で，‘白麗’ではＳ果実で高かった．官能テストの結果，‘白鳳’のＬ果実と‘白麗’のＳ果実は食味が劣った．これらの結果から，岡山の「白桃」を代表する‘白鳳’，‘清水白桃’，‘白麗’の大果は，中程度の大きさの果実より甘味と酸味が低く，アロマが弱いなど，食味が薄く，肉質も劣ると考えられる．