

Consumer
Acceptance
of Preserves
Made with
Rabbiteye

Preserves



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Introduction

Approximately 45% of the cultivated North American blueberry production is marketed as fresh fruit. The remaining 55% of the blueberries are processed. About two-thirds of the processed berries are frozen for export, consumer retail, and carryover inventory. The remainder of the processed fruit is used in bakery goods, fruit fillings, muffin mixes, or canned for use in preserves, syrup, yogurt, ice cream, baby food, concentrate, and juice drinks (Eck, 1988; Anonymous, 1991).

Highbush blueberries (*Vaccinium corymbosum*) are grown in the Northwest, Midwest, Northeast, Atlantic, and Central regions of the United States. Rabbiteye blueberries (*V. ashei*) are grown mainly in the Southeast. The total highbush and rabbiteye blueberry production (cultivated) in the United States was 145 million pounds (65.9 million kg) in 1992. Of this total, 15 million pounds (6.82 million kg) were rabbiteye and 130 million pounds (59.1 million kg) were highbush (Holbein, 1992). Of the total crop, 63.4% was frozen.

Recently, markets for the rabbiteye blueberry have expanded into the northern states, where the fruit is readily accepted. MBG Marketing is the leader in the U.S. blueberry industry. MBG's recent sales have ranged from \$30 to \$35 million annually. MBG today represents more than 750 blueberry producers in Michigan, Indiana, Florida, Georgia, Arkansas, Mississippi, Louisiana, and Chile (Anonymous, 1992).

Although rabbiteye blueberries have high yields (8,000 lb/acre), they have been reported to be of lower quality than highbush berries (6,000 lb/acre) (Makus and Morris, 1987). This perception has caused the price of rabbiteye berries to be lower (Braswell, 1991). Several scientific papers describing the different physiochemical quality parameters of highbush and rabbiteye blueberries have been published (Ballinger and Kushman, 1970; Galletta et al., 1971; Mainland et al., 1975; Dekazos and Smith, 1976; Ballinger et al., 1978; Spiers, 1981; Miller et al., 1984; Sapers et al., 1984; Miller, 1987; Miller and McDonald, 1988; and Patten et al., 1988).

Blueberry preserves from rabbiteyes have been produced commercially in Louisville, MS and at Southern Touch in Ellisville, MS in the past years and have occasionally been offered in gift boxes by the Mississippi State University Food Science Club. The

product has been widely accepted, but there are no consumer test data available to document its acceptability.

The purpose of this experiment was to assess the acceptability, by a limited number of consumers at Mississippi State University, of blueberry preserves made from frozen blueberries. Demographics studied were region of origin (South, North, and West) and age group (45 and older, and under 45 years of age).

Methodology

Preserves were prepared by thawing and mixing rabbiteye blueberries, sugar (sucrose), and pectin on a 57:42:1 ratio by weight. Berries were placed in a steam-jacketed kettle and heated to 122 °F (50 °C) while being stirred; high-methoxyl pectin (Dacus Inc., Tupelo, MS) mixed with free-run juice and dextrose were added. Finally, sucrose was added. The mix was stirred while being heated to 221 °F (105 °C). Eight-ounce (220-mL) jars were filled with the heated mixture, sealed and held for 3 minutes before cooling with tap water. The final product had 65 °Brix (soluble solids) and a pH of 3.2. The product was stored at 77 °F (25 °C) until given to consumers.

Sixty consumers, all 18 years old or older, returned completed questionnaires (Appendix) after taking the product home and using it as they would a similar commercial product. Thirty-five persons were originally southerners (16 were age 45 or older), 19 were northerners (four were 45 or older), and six were westerners (five were 45 or older) (Table 1).

All of the consumers age 45 or older and 95% of those younger than 45 had eaten fruit preserves before (Table 2). Seventy-six percent of consumers 45 years or older and 58% of those younger than 45 had consumed blueberry preserves previously.

A total of 10 attributes of the preserves were rated by the consumers (Appendix). A 5-point rating scale

Table 1. Region of origin and age category of participating consumers.

Age Group	Region of origin			Total
	South	North	West	
45 or older	16	4	5	25
Younger than	45	19	35	1
TOTAL	35	19	6	60

Table 2. Answers to selected questions on eating habits of participating consumers.

Question	Age Group	Region of origin			Total
		South	North	West	
Have eaten blueberry preserves before?	>45	11	4	4	19
	<45	6	13	1	20
Have eaten fruit preserves before?	>45	16	4	5	25
	<45	17	15	1	33
Would you buy blueberry preserves?	>45	11	2	1	14
	<45	16	15	1	32

was used, with 5 being the highest rating (best), 3 being fair, and below 3 considered below average. Data were subjected to analysis of variance. Factors analyzed were region of origin and age group. Data were analyzed as completely randomized design using PROC GLM, and whenever significant differences ($P < 0.05$) were found, means were separated using Fisher's protected LSD (SAS, 1985).

Results and Discussion

When analyzed by region of origin, southerners and westerners found the quantity of fruit to be very acceptable while northerners found it to be a little less acceptable (Table 3). Northerners could have been comparing these preserves to the ones made with lowbush (wild) blueberries, which yield more berries per jar because they are of smaller size. However, there were no other differences in all other attributes. The overall rating of the product was near or above 4 for all consumers.

Consumers 45 or older rated preserves above 4 in

sweetness while those younger than 45 rated them lower (Table 4). This might be because younger generations prefer less sweet products and because tastebuds of older people are less sensitive. Thus, younger consumers found the product to be oversweetened (too much sugar in recipe). Overall, there was no difference in ratings of preserves by age group. Forty-one of 55 (74.5%) consumers rated rabbiteye blueberry preserves better than or equal to fruit preserves available in the market (Table 5).

This study shows that preserves made from rabbiteye blueberries were rated as good or better than commercial preserves made with highbush blueberries when evaluated by a limited number of consumers. The majority of these consumers indicated they would buy preserves made with rabbiteye blueberries.

Acknowledgments

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Table 3. Ratings of rabbiteye blueberry preserves by region of origin of consumer.

Attribute	Region of origin		
	North	South	West
	Rating ¹		
Appearance ^{NS}	4.36	4.51	4.67
Color ^{NS}	4.79	4.83	5.00
Fruit Quantity	3.63 b ²	4.60 a	4.33a
Spreadability ^{NS}	3.26	3.66	3.83
Skin Toughness ^{NS}	4.21	4.15	4.33
Gel Strength ^{NS}	3.21	3.34	3.00
Sweetness ^{NS}	3.63	3.60	4.17
Flavor ^{NS}	4.21	4.17	3.83
Grittiness ^{NS}	4.11	3.86	3.83
Overall ^{NS}	4.26	4.40	3.83
No. Consumers/Mean	20	36	6

¹On a 5-point scale (see Appendix for details).

²Means within row not followed by same letter ($P < 0.05$) differ.

^{NS}Not significant

Table 4. Ratings of rabbiteye blueberry preserves by consumer age group.

Attribute	Age group	
	Younger than 45	45 or older
	Rating ¹	
Appearance ^{NS}	4.50	4.46
Color ^{NS}	4.86	4.79
Fruit Quantity ^{NS}	4.25	4.29
Spreadability ^{NS}	3.64	3.42
Skin Toughness ^{NS}	4.08	4.35
Gel Strength ^{NS}	3.28	3.25
Sweetness	3.39 a ²	4.08b
Flavor ^{NS}	4.25	4.00
Grittiness ^{NS}	4.14	3.62
Overall ^{NS}	4.44	4.08
No. Consumers/Mean	35	25

¹On a 5-point scale (see Appendix for details).

²Means within row not followed by same letter differ ($P < 0.05$).

^{NS}Not significant.

Table 5. Comparison between rabbiteye blueberry preserves and similar fruit preserves available in the market as reported by participating consumers.

Region of origin	Age group	Like BB less ¹	No difference	Like BB more
South	>45	5 ²	5	4
	<45	3	8	7
North	>45	3	0	1
	<45	2	3	9
West	>45	1	2	1
	<45	0	1	0
TOTAL		14	19	22

¹BB = blueberry preserves

²No. of consumers in that category.

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APPENDIX

Blueberry Preserves Evaluation Form

NAME: _____ DATE: _____

AGE: ___ Below 10 ___ Below 18 ___ Below 45 ___ Above 45

Would you consider yourself a Northerner ____, Southerner ____,
Westerner ____, Other (please specify) _____?

Which product do you consume most often: Fruit jelly ____, Fruit
jam ____, Fruit preserves ____, or Fruit spread ____?

1. On a scale of 1 to 5, rate this product for the following attributes (a score above 3 means acceptable for that attribute):

APPEARANCE _____ (1-not very appealing, 5-most appealing).

COLOR _____ (1-brownish {oxidized}, 5-deep purple).

FRUIT QUANTITY _____ (1-little fruit, 5-lots of fruit).

SPREADABILITY _____ (1-very firm, 5-very loose).

FRUIT SKIN TOUGHNESS _____ (1-very tough, 5-very soft).

GEL STRENGTH _____ (1-very soft, watery, 5-very tough).

SWEETNESS _____ (1-not very sweet, 3-just right, 5-too sweet).

FLAVOR _____ (1-dislike much, 5-like much).

GRITTIENESS _____ (1-very gritty, sandy, 5-very smooth).

OVERALL _____ (1-dislike very much, 5-like very much).

2. Write below any particular comments you may like or dislike about the product (including package, size, label, name):

LIKES:

DISLIKES:

3. Have you eaten blueberry preserves before? Yes _____ No _____

4. Have you eaten any fruit preserves before? Yes _____ No _____
(If yes, answer below; otherwise go to question 5.)

How do you compare this product to the one you consumed before?

_____ Not as good as _____ Just the same _____ Better

5. What does this product need to improve your acceptance of it?
6. Would you buy this product if it was commercially available at a competitive price? Yes _____ No _____
7. Do you have any other comments?

Thank you very much for your cooperation!

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