HIGH QUALITY LEAN MEAT PRODUCTION AND CONSUMERS' PREFERENCE IN JAPAN(2)
- CONSUMERS' PREFERENCE TO JAPANESE SHORTHORN -

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BACKGROUND

In terms of beef consumption, Japanese consumers tend to prefer marbled meat to lean meat for their eating habit. This may partly because beef consumption is much smaller than chicken and pork in quantity. However, consumers' demand for high quality lean meat is growing recently(Table 1), since consumers are much more concerned about their health and food safety . In Japan, the main conditions of good lean meat can be summarized as follows; low fat, safe, and, in particular, good taste. Many studies have been argued that consumers' taste was affected not only by the differences of meat quality based on feeding method, but also by consumers' preference per se toward meat. Although a large number of studies have been made on these issues, little is known about the case of lean meat of Japanese Shorthorn, which can be regarded as a representative of lean meat in Japan.

OBJECTIVES

The main objectives of the present study are followed.

(1) We tried to demonstrate how the difference of meat quality originated from the feeding method affect consumers' judgment of meat taste. Extensive sensory tests was employed for this purpose. The panels were chosen from both consumers, and experts, such as retailers and restaurant cooks.

(2) Then we explored the relationships between consumers' preference and their response to the sensory tests. For this purpose, we analyzed the survey which were done along with the sensory tests.

(3) Based on the above analysis, we try to figure out the characteristics of future target consumers.

METHODS

(1) Extensive Sensory Tests to Consumers

We conducted extensive sensory tests to consumers living around Morioka area where our research institute is located. The number of consumers was about eighty people and their age was varied from 18 to 59 years old. Beef from three kinds of steers were tested for comparison, that is, Japanese Shorthorn beef, well-marbled meat of Japaneses Black, and Australian beef. In terms of B.M.S., which stands for marbling rate in Japanese market, Japanese Black meat was classified into No.5, and others were in No.2 class. Two types of Japanese Shorthorn meat were tested. One type was from feeding by high concentrate (Exp.2-A) and the other type was from feeding by relatively high roughage (Exp.3-A), while both were produced in our research institute. Sirloin was cut into 1.5 cm thick and grilled as medium-rare steak. There were six evaluation items in the test shown as follows; tenderness, odor, juiciness, taste ("umami"), aftertaste, and overall judgement. Each panels put scores in five scales (very poor: -2 ～ excellent: +2).

(2) Evaluation by Retailers and Restaurant Cooks

Retailers and restaurant cooks were asked to evaluate Japanese Shorthorn meat. Sirloin part (500 g) was tested for the sensory tests, but the way in which meat was cooked was decided by their own judgement. They were asked to evaluate meat in seven scales (-3～+3). In these evaluation, panels were asked to judge them without standard sample.

(3) Survey to Consumers

Consumers participated in sensory tests were also asked to fill out a questionnaire on their intention toward meat consumption. The survey was done along with sensory tests.

RESULTS AND DISCUSSIONS

(1) Result of Sensory Tests to Consumers (Figure 1)

Japanese Black got the highest score in every evaluation item. Japanese Shorthorn fed with relatively high roughage got approximately the same score as Japanese Black, while Shorthorn beef fed with concentrated feed got smaller score than Australian beef. These two types of Shorthorn beef showed significant differences in terms of all evaluation items except odor ($p<0.01$).

(2) Result of Sensory Tests to Retailers and Restaurant Cooks (Figure 2)

The results showed the parallel outcome as that to consumers. Shorthorn raised by high roughage got higher average, and the t- test for the difference of average was demonstrated to be significant ($p<0.01$).

(3) Result of Survey and its Implications to Sensory Tests

In the present survey, consumers were asked the following questions; "Among Japanese Black, Japanese Shorthorn, and Australian Beef, which do you like best?", and "Specify the reason why you like the meat best?". The answers to these questions showed significant correlation ($p<0.01$; qui-square test).

The reason why consumers most evaluate each meat was characterized as follows: In the case of Japanese Black meat, consumers appraised its tenderness. For Australian Beef and Japanese Shorthorn, consumers evaluated their good flavor and good taste of meat.

As for the reason why consumers least evaluated each meat was as follows: Consumers who do not prefer Japanese Black meat found it so fatty. In the case of Japanese Shorthorn and Australian Beef, lack of juiciness and flavor were the main reason why they do not evaluate the meat (Table 2, Table 3).

These results suggest that consumers who prefer marbled meat to lean meat, or who think tenderness is one of the most important qualities of tasty beef, tend to choose Japanese Black meat for their preference. Otherwise, consumers tend to prefer Japanese Shorthorn or Australian Beef (Table 4).

CONCLUSION

(1) Sensory tests showed that the difference of feeding method affected the taste of Japanese Shorthorn.

(2) The result of survey suggested that even the same meat got different evaluations based on consumers' intention toward meat tastes. And there are considerable number of consumers who do not like fattyness of marbled meat, but evaluate flavor and taste of lean meat.

(3) Consumers with such orientation toward meat taste could be the future marketing target of Japanese Shorthorn meat.

PERTINENT LITERATURE
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Table 1 Consumers' Preference
(Lean Meat or Marbled Meat)

N=2,000 %

Year	Lean Meat	Marbled Meat	D.K.
1988	31.2	50.2	18.7
1990	33.1	47.5	19.5
1992	40.4	42.0	17.7
1994	40.6	40.0	19.6

Source; Japan Meat Information Service Center,
Annual Survey about Consumers' Needs for Meat

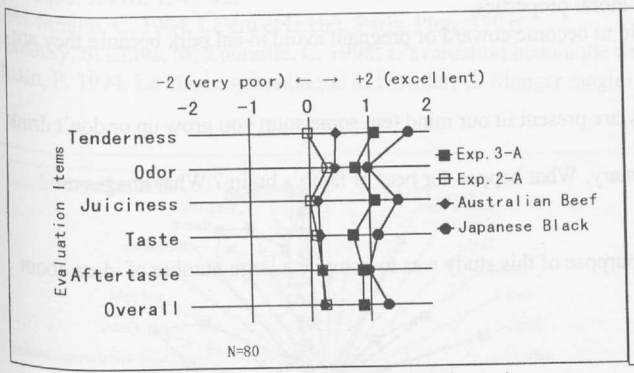

Figure 1 Sensory Tests to Consumers(t-test)
*Significant difference between Exp.3-A and Exp.2-A in all items except odor($p<0.01$)

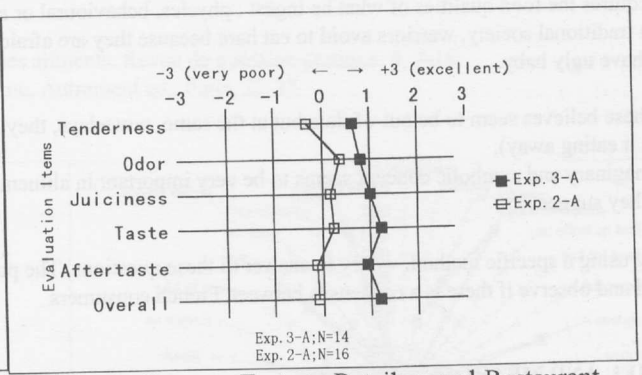

Figure 2 Sensory Tests to Retailers and Restaurant Cooks(t-test)
*Significant difference between Exp.3-A and Exp.2-A in all items except odor($p<0.01$)

Table 2 Relationship between the Most Favorite Meat and its Reasons persons, %

		Reason								
		Total	Tender	Good Taste	Plain	Juicy	Good Flavor	Low Fat	Tough	Other
Overall		77	25	9	7	18	15	2	0	1
		100.0	32.5	11.7	9.1	23.4	19.5	2.6	0	1.3
Most Favorite Meat	Japanese Shorthorn	25	4	5	4	4	7	0	0	1
		100.0	16.0	20.0	16.0	6.0	28.0	0	0	4.0
	Australian Beef	10	0	1	3	1	3	2	0	0
		100.0	0	10.0	30.0	0.0	0.0	20.0	0	0
	Japanese Black	42	21	3	0	13	5	0	0	0
		100.0	50.0	7.1	0	31.0	11.9	0	0	0

$\chi^2 = 42.09$ ($p<0.01$)

Table 3 Relationship between the Least Favorite Meat and its Reasons persons, %

		Reason								
		Total	Hard	Bad Taste	Too Simple	Dry	Flavor -less	Fatty	Too Tender	Other
Overall		78	17	7	6	25	11	10	1	1
		100.0	21.8	9.0	7.7	32.1	14.1	12.8	1.3	1.3
Least Favorite Meat	Japanese Shorthorn	13	3	2	2	4	0	0	1	1
		100.0	23.1	15.4	15.4	30.8	0	0	7.7	7.7
	Australian Beef	49	13	5	2	19	10	0	0	1
		100.0	26.5	10.2	4.1	38.8	20.4	0	0	2.1
	Japanese Black	16	1	0	2	2	1	10	0	0
		100.0	6.3	0	12.5	12.5	6.3	62.5	0	0

$\chi^2 = 61.98$ ($p<0.01$)

Table 4 Relationship between Panel's Intention toward Tender Meat and Most Favorite Meat persons, %

		Most Favorite Meat		
		Total	Lean Meat1)	Japanese Black
Overall		82	39	43
		100.0	47.6	52.4
Intention toward Tender Meat	Strong	62	25	37
		100.0	40.3	59.7
	Weak	20	14	6
		100.0	70.0	30.0

$\chi^2 = 5.34$ ($p<0.05$)
1)Japanese Shorthorn + Australian Beef