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Research on the Consumers' Willingness to Buy Traceable Pork with Different Quality Information: A Case Study of Consumers in Weifang, Shandong Province

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Abstract The traceability system can effectively reduce the food safety risks, however, it is confronted with various problems during its implementation. In this context, the paper carries out a case study of consumers in Weifang, Shandong Province, and studies their willingness to pay the traceable pork with different quality information. The results indicate that, the consumers show high expectations towards the introduction of traceability system, and they tend to buy the traceable pork only with breeding and slaughter information; their behaviors of purchase are greatly influenced by the following factors: the consumers' education, age, income, attention on food safety and whether there are pregnant family members, *etc.*

Key words Food safety, Different quality information, Traceable pork

It is believed that the traceability system is one of the most effective tools to radically prevent the food safety risks^[1-2]. However, the production of traceable food with safety information, in comparison with that of ordinary food, will necessary need additional costs^[3-4]. The food safety information recorded by the traceability system is closely related to the width, depth and precision of the system. With comprehensive food safety information, the consumers will identify and prevent the food safety risks more easily^[5], but more costs will be added and the food price will be higher. The consumers' needs for traceable food with different safety information vary from person to person. Therefore, the traceable food with different safety information does not necessarily have great market needs, and the extension of traceable food depends on the consumer demand at different levels. In 2010, the total output of meat products in China reached 79 250 000 t, ranking the first in the whole world, among which there are 50 700 000 t pork, accounting for 64% and 49% of total pork production in China and in whole world, respectively. The consumption of pork took up for over 50% that of the whole meat, however, the meat product is also one type of the food with frequent safety incidents. In this paper, with a case study of traceable pork, the author studied the needs of different consumer groups for the traceable food with different safety information, and sought to prevent the food safety risks by taking the path of traceability system.

1 Selection of samples and design of studies

As one of the major provinces in China, Shandong Province ranks

the second and the third in its population and GDP, its social structure is currently in an important period of transition. Weifang is located in central Jiaodong Peninsula, and both its economic and social development is only at the average level in Shandong Province. In recent years, the people's incomes in Weifang are gradually increasing, and their wish to improve the food quality is becoming increasingly intense. The case of Weifang consumers can be extended to that of Shandong Province and that of whole China.

1.1 Selection of pork varieties To study the consumers' preference for certain pork variety will effectively eliminate the influence of non-fundamental factors on the conclusions. The hind leg is generally consumed in domestic market^[6], and it is indicated by the author's pre-survey that the pork hind leg price is generally consistent in Weifang, Shandong Province. Therefore, in consideration of standardization, the hind leg was selected as the consumers' preferable pork variety.

1.2 The setting of different traceable information of pork

It is pointed out in 2002 term by the EU committee that a complete traceability system should cover the information of place of origin, production, processing, circulation, sales, consumption and quality assurance. But there is still a great debate on the interpretation of the level of safety information and the nature of each level in the academic field. Given the consumers' limited knowledge of traceable food, the study in this paper defines the safety information as one or several types of information, including the information of pig breeding farms, the slaughter information, the processing information, as well as the information of cold storage, delivery and sales, and the safety of pork products is basically reflected by the four types of information.

1.3 Design of questionnaires A field investigation was conducted in several large supermarkets in Weifang, Shandong Prov-

Received: January 20, 2012 Accepted: January 12, 2013

Supported by the Youth Project for Humanities and Social Sciences of Ministry of Education in 2012 (12YJC630326 and 12XJJC790003).

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ince to observe the price of ordinary pork hind leg in April, 2011, and the price was found to fluctuate between 19.6 – 20.4 Yuan/kg. The author also interviewed Weifang Animal Husbandry Bureau, pig breeding, slaughter, processing and sellers, and established a complete and economical traceability system. It is estimated that the price of traceable pork with complete safety information will be four Yuan/kg higher than that of ordinary pork price^[7], and professional personnels are invited to estimate the price of the pork hind leg with the four types of traceable information. It is considered that the additional price by adding one more traceable information is basically the same as the estimated results, the hind leg was studied at the price of 20 Yuan/kg, and the price of the pork hind leg with four different types of traceable information can be seen in Fig. 1. The investigation was finished in April, 2011.

Table 1 The estimated price of pork hind leg with different traceable information

No.	The traceable information	Price//Yuan/kg
A	None	20
B	Breeding information	21
C	Breeding and slaughter information	22
D	Breeding, slaughter and processing information	23
E	Breeding, slaughter, processing, cold storage and transport information	24

The age, sex, income, education and family members of investigated consumers are directly given by the consumers, who are also required to answer several other problems, including their knowledge and attitude towards food safety, as well as the general evaluation of food market.

2 Statistical features of samples

2.1 The basic features of interviewees A total of 765 shares of questionnaires are received, accounting for about 95.63% of to-

tal questionnaires released. According to the questionnaires, the interviewees are generally aged between 26 – 40 with high school and below education and an annual income below 60 000; 62.0% , 71.8% and 85.9% of the interviewees have no children below 16, elders above 60 or pregnant women; and about 51.8% of the interviewees are female.

2.2 The consumers' recognition of traceable food As is indicated by the investigation, 97.3% of interviewees showed attention on food safety. About 18.0% and 40.0% of the consumers have a clear and general knowledge about the food traceability system, while only 37.0% of consumers had heard about the traceability system in 2008^[8], indicating that the consumers' knowledge about the traceable food has been greatly improved. However, there are still 42.0% of consumers who know nothing about the food traceability system, the consumers' recognition of the system is generally at a low level.

2.3 The consumers' attention towards the "traceability labels" of pork Generally, the traceable information of food is recorded in the "traceability label". However, it is found out that only 36.9% of consumers check the "traceability labels" when buying the pork.

2.4 The consumers' willingness to purchase the traceable pork Only 4.3% expressed their unwillingness to buy the traceable pork. Among the consumers who are willing to buy the traceable pork, about 32.6% , 27.8% , 19.6% and 15.7% of consumers choose to buy B, C, D and E – type traceable pork.

3 Analysis on the influencing factors of traceable pork varieties selection

The consumers' selection of traceable pork varieties in Weifang, Shandong Province can be seen in Table 2.

Table 2 The consumer's choice of traceable pork varieties

First-class index	Second-class index	Total sample size	A		B		C		D		E	
			Sample size	Proportion//%	Sample size	Proportion//%	Sample size	Proportion//%	Sample size	Proportion//%	Sample size	Proportion//%
Sex	Male	369	17	4.6	120	32.5	101	27.4	73	19.8	58	15.7
	Female	396	16	4.0	129	32.6	112	28.3	77	19.4	62	15.7
Age	25 and below	219	24	11.0	74	33.8	46	21.0	36	16.4	39	17.8
	26 – 40	231	7	3.0	74	32.0	75	32.5	44	19.0	31	31.5
	41 – 55	150	1	0.7	22	14.7	42	28.0	44	29.3	41	27.3
	56 and above	165	1	0.6	79	47.9	50	30.3	26	15.7	9	5.5
Education	High school education and below	294	17	5.8	123	41.8	74	25.2	42	14.3	38	12.9
	Technical college education	264	11	4.2	81	30.7	72	27.3	62	23.5	38	14.3
	University education	123	3	2.4	37	30.1	46	37.5	19	15.4	18	14.6
	Postgraduate education and above	84	2	2.4	8	9.5	21	25.0	27	32.1	26	31.0
Whether there are children aged below 16	Yes	291	7	2.4	95	32.6	81	27.8	62	21.3	46	15.8
	No	474	26	5.5	154	32.5	132	27.8	88	18.6	74	15.6
Whether there are elders aged above 60	Yes	216	13	6.0	71	32.9	60	27.8	37	17.1	35	16.2
	No	549	20	3.6	178	32.4	153	27.9	113	20.6	85	15.5

To be continued

Continued(Table 2)

First-class index	Second-class index	Total sample size	A		B		C		D		E	
			Sample size	Proportion//%	Sample size	Proportion//%	Sample size	Proportion//%	Sample size	Proportion//%	Sample size	Proportion//%
Whether there are pregnant women	Yes	108	1	0.9	31	28.7	28	25.9	23	21.3	25	23.2
	No	657	32	4.9	218	33.2	185	28.2	127	19.3	95	14.4
Annual income	30 000 Yuan and below	345	24	7.0	149	43.2	72	20.9	55	15.9	45	13.0
	30 000 – 60 000	303	7	2.3	80	26.4	109	36.0	60	19.8	47	15.5
	60 000 and above	117	2	1.7	20	17.1	32	27.4	35	29.9	28	23.9
Consumers' attention towards food safety	Well	636	15	2.3	206	32.4	179	28.1	125	19.7	111	17.5
	Average	108	12	11.1	38	35.2	30	27.8	21	19.4	7	6.5
	Poor	21	6	28.7	5	23.8	4	19.0	4	19.0	2	9.5
Consumers' recognition of traceable food	Well	138	5	3.6	45	32.6	33	23.9	27	19.6	28	20.3
	Average	306	10	3.3	101	33.0	88	28.8	63	20.6	44	14.4
	Poor	321	18	5.6	103	32.1	92	28.7	60	18.7	48	15.0
Whether care about the "traceable labels"	Yes	282	9	3.2	93	33.0	79	28.0	56	19.9	45	16.0
	No	483	24	5.0	156	32.3	134	27.7	94	19.5	75	15.5

3.1 Influence of consumers' gender on their choice As is indicated in Table 2, the consumers' choice of traceable pork is basically the same, and it can be projected that the consumers' choice of traceable pork is not influenced by their gender.

3.2 Influence of consumers' age on their choice As is indicated in Table 2, the consumers' purchase of traceable pork is influenced by their age. The consumers aged 25 or below prefer to buy B type of pork(33.8%), then followed by C(21.0%), E(17.8%), D(16.4%) and A(11.0%); The preference of consumers aged between 26–40 decreases in the order of C(32.5%), B(32.0%), D(19.0%), E(13.5%) and A(3.0%); The preference of consumers aged between 41–55 decreases in the order of D(29.3%), C(28.0%), E(27.3%), B(14.7%) and A(0.7%); and the preference of consumers aged 56 or above decreases in the order of B(47.9%), C(30.3%), D(15.7%), E(5.5%) and A(0.6%).

3.3 Influence of consumers' education on their choice As is indicated in Table 2, the consumers' purchase of traceable pork is influenced by their education. The consumers with high school or below education are more likely to buy the B type Pork(41.8%), then followed by C(25.2%), D(14.3%), E(12.9%) and A(5.8%); the preference of the consumers with technical college education is shown in the order of C(37.5%), B(30.1%), D(15.4%), E(14.6%) and A(2.4%); while that of the consumers with postgraduate education or above decreases in the order of D(32.1%), E(31.0%), C(25.0%), B(9.5%) and A(2.4%).

3.4 Influence on the consumers' choice by whether there are children aged below 16 As is indicated in Table 2, whether there is children aged below 16 produces little or even no influence on the consumers' choice of traceable pork.

3.5 Influenced on the consumers' choice by whether there is pregnant woman As is indicated in Table 2, the families with pregnant women are more likely to buy B type pork(28.7%), followed by C(25.9%), E(23.2%), D(21.3%) and A(0.9%); the preference of those families without pregnant women from the high to low is as: B(33.2%), C(28.2%), D(19.3%), E(14.

4%) and A(4.9%).

3.6 Influence of the consumers' annual income on their choices As is indicated in Table 2, the consumers' purchase behaviours are affected by their annual incomes to some extent. Those with an annual income of 30 000 Yuan or below are more likely to by B type pork(43.2%), followed by C(20.9%), D(15.9%), E(13.0%) and A(7.0%); the preference of those with an annual income between 30 000 and 60 000 Yuan decreases in the order of C(36.0%), B(26.4%), D(19.8%), E(15.5%) and A(2.3%); while that of those with more than 60 000 Yuan income per year shows as follows: D(29.9%), C(27.4%), E(23.9%), B(17.1%) and A(1.7%).

3.7 Influence of consumers' attention towards food safety on their choices As is indicated in Table 2, the consumers' attention towards food safety will influence their choice of pork varieties, those who do not care about food safety are more likely to buy A type pork(28.7%), that is, untraceable pork; while those who are careful about the food safety tend to buy the traceable pork.

3.8 Influence of the consumers' recognition of traceable food on their choice As is indicated in Table 2, the consumers' choice of traceable pork is less likely to be influenced by their recognition of traceable food.

3.9 Influence of the consumers' knowledge of "traceable labels" on their choice As is indicated in Table 2, the consumers' choice of traceable pork has no relation with whether they know about "traceable labels".

4 Conclusion and discussions

4.1 Conclusion In the case study of consumers in Weifang, Shandong Province, 765 consumers' choice of traceable food is briefly introduced, and the following conclusions are drawn: firstly, during the period with serious food safety problems, as high as 95.7% of consumers choose to buy the traceable pork, indicating that they showed high expectations for the introduction of food traceability system to improve the present food safety situation; secondly, in the selection of traceable pork with four different

