Research on the Preference of Consumers for Black Fungus Based on Conjoint Analysis Approach

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Abstract—Taking the consumers in Jilin City as the investigation objects, and then by means of in-depth interview, this paper confirms the main factors local consumers took into account when purchasing black fungus, and then uses conjoint analysis approach to confirm the main factors consumers took into account when purchasing black fungus, and its importance. Finally, combining with the conclusion of consumers' preference for purchasing black fungus, the paper puts forward relevant suggestions for black fungus planting bases, retailers and industrial associations to establish well-known brands, enhance black fungus publicity strength, establish a product rating system, exploit an sales channel and upgrade black fungus product package, etc.

Keywords—Conjoint analysis approach; Black fungus; Purchasing preference; Influencing factors

I. INTRODUCTION

Black fungus has the effect of benefiting qi and keeping fitness, nourishing kidney and nourishing the stomach, activating blood, anticoagulation, antithrombosis, lowering blood lipid and strong absorption effect, and in case of eating it often, it can facilitate the elimination of garbage inside the body, and the effect of preventing disease. Along with the development of black fungus industry, the improvement of planting technology and diversified varieties, the black fungus market is mixed with false products. In the process for consumers to select black fungus products, they tend to "eat healthy and nutritious food", and will consider various factors in the purchasing process, and which factors are relatively important, and for black fungus enterprises and black fungus terminal retail store, how to effectively communicate with consumers considering the relevant knowledge and information of black fungus products is very necessary.

II. RESEARCH DESIGN

This paper will adopt conjoint analysis approach to study the preference for consumers to select black fungus products. In the research, firstly, it is requested to confirm the product attribute and attribute level that can exert important influences on the behaviors of consumers to purchase black fungus products, and then through orthogonal experiment, confirm representative black fungus attribute and attribute level, and stimulate product portfolio; and then conduct the measurement

of consumers' black fungus product preference as per the product design questionnaire simulated thereby [1-2].

A. Confirmation on the attribution and attribution level of black fungus products

Through reviewing and sorting out the relevant references about the influencing factors of agricultural products purchasing behaviors, this paper has confirmed factors such as price, the place of production, quality, and appearance when purchasing agricultural products [3-6]. But the research object is black fungus products, which belong to the fungoid products in agricultural products, but have certain difference with various types of agricultural products, so in the process of confirming the consideration about attribute, except for comprehensively considering the aforementioned inductive attributes, 33 retailers and 53 consumers of black fungus products were deeply interviewed at the same time. In the interview process of black fungus retailers and consumers, 76 interviewees mentioned that the black fungus type and appearance (thickness and black fungus size) should be considered when purchasing black fungus, and 68 interviewees also mentioned the place of production for black fungus, 54 interviewees will also consider the price when purchasing it, and 23 interviewees also mentioned the package, especially when giving black fungus products as gifts, which have certain requirements for package; in the interviewing process of 53 consumers, 46 people mentioned that they will generally consider the channel to purchase black fungus products, of which 37 consumers recommended specialty retail physical store, and 9 people also mentioned online purchasing. Through summarizing the aforementioned references and in-depth interview, this research confirms the factors considered by consumers when purchasing black fungus products as 6 attributes, including the variety, appearance, and price, place of production, package, and purchasing channel of black fungus. After confirming the aforementioned product attribute, 15 merchants and 17 consumers stated and confirmed the level of the aforementioned 6 attributes. Finally, the attribute and attribute level of black fungus products are confirmed as shown in Table 1.

TABLE I. ATTRIBUTION AND ATTRIBUTION LEVEL OF BLACK FUNGUS

Attribute	Attribute Level	No.
Variety	Spring black fungus	1
	Summer black fungus	2
	Autumn black fungus	3
Appearance	Common	1
	Better	2
	Good	3
Price	Low price	1
	Medium price	2
	Higher price	3
Place of production for black fungus	Product of geographical indication	1
	Product of non-geographical indication	2
Black fungus package	Low-grade package	1
	Medium-grade package	2
	High-grade package	3
Purchasing channel	Sales of the exclusive stores	1
	Sales of non-exclusive stores	2

B. Black fungus product simulation

After the attribute of black fungus products and the corresponding attribute level have been confirmed as per the aforementioned methods, the next one is simulated black fungus product portfolio. The method for the simulated product portfolio adopts full-profile method, and as per the attribute and attribute level quantities selected thereby, 324 types of black fungus product simulation portfolios can be obtained. But in case of requesting the interviewees to cooperate with the

completion of evaluation about 324 types of black fungus products, this will not only increase the time pressure of interviewees, but also make it inconvenient to make statistics about the recycled data, and influence the accuracy and scientificity. Thus, in order to ensure that experimental data are more representative, this research uses SPSS21 software to conduct orthogonal experimental design and form the profile result of simulated products as shown in Table 2.

TABLE II. PROFILE DESIGN OF BLACK FUNGUS SIMULATED PRODUCTS

Card No.	Type	Appearance	Price	Black fungus Package	Place of Production for Black fungus	Black fungus Purchasing Channel
1	Summer black fungus	Good	Low price	Low-grade package	Product of geographical indication	Purchase at exclusive stores
2	Spring black fungus	Better	High price	High-grade package	Product of geographical indication	Purchase at exclusive stores
3	Spring black fungus	Better	Medium price	Low-grade package	Product of geographical indication	Purchase at non-exclusive stores
4	Spring black fungus	Common	Low price	Medium-grade package	Product of geographical indication	Purchase at non-exclusive stores
5	Summer black fungus	Common	Medium price	High-grade package	Product of non-geographical indication	Purchase at non-exclusive stores
6	Spring black fungus	Good	Medium price	Low-grade package	Product of non-geographical indication	Purchase at exclusive stores
7	Autumn black fungus	Better	Low price	Low-grade package	Product of non-geographical indication	Purchase at non-exclusive stores
8	Summer black fungus	Better	Low price	Medium-grade package	Product of non-geographical indication	Purchase at exclusive stores
9	Autumn black fungus	Common	Medium price	Medium-grade package	Product of geographical indication	Purchase at exclusive stores
10	Autumn black fungus	Good	Low price	High-grade package	Product of geographical indication	Purchase at non-exclusive stores
11	Spring black fungus	Common	Low price	High-grade package	Product of non-geographical indication	Purchase at exclusive stores
12	Spring black fungus	Common	Low price	Low-grade package	Product of non-geographical indication	Purchase at non-exclusive stores
13	Autumn black fungus	Common	High price	Low-grade package	Product of non-geographical indication	Purchase at exclusive stores
14	Summer black fungus	Common	High price	Low-grade package	Product of geographical indication	Purchase at non-exclusive stores
15	Spring black fungus	Good	High price	Medium-grade package	Product of non-geographical indication	Purchase at non-exclusive stores
16	Spring black fungus	Common	Low price	Low-grade package	Product of geographical indication	Purchase at exclusive stores

III. DATA COLLECTION AND RESULT ANALYSIS

Through the orthogonal experimental design module in SPSS21 software, 16 types of black fungus simulated product portfolios are obtained. In order to better understand the main factors influencing the consumption behavior of black fungus, in the investigation, the group above 25 years old in Jilin City is mainly inquired, and then in combination with the main research objective and the basic conditions about the interviewees, the questionnaire of the research has designed two main parts, and the first part is the basic information about the interviewees, including the gender, age, education background and occupation; the second part is the main part of the questionnaire, and it mainly combines the 16 types of black fungus simulated products obtained through the earlier orthogonal experimental design, and then uses Likert Level 5 scale to measure the purchasing intention of 16 types of black fungus products, and the higher the interviewees' grade for black fungus simulated products is, the stronger the purchasing intension and the bigger the purchasing possibility will be, and after confirming the basic structure of the questionnaire, this research understands about the comprehension degree of interviewees for the questionnaire through the pretest of 25 questionnaires, and then as per the feedback of the pretest, adjusts the questionnaire expression mode, perfects the basic information options, and finally confirms the final questionnaire of the research.

A. Data source and description

From March 25 to March 27, 2018, the author sent 200 paper questionnaires at Jilin Railway Station and the surrounding communities, and totally received 198 copies, and after deleting 7 invalid questionnaires, totally 191 valid questionnaires were recovered, and the questionnaire recycling rate reached to 95.5%. Among interviewees receiving the investigation, females occupied 52.9%, males occupied 47.1%, and the proportion for female interviewees was higher than that for male interviewees. As can be seen from the academic level of interviewees or investigators, interviewees with high school degree occupied 12.6%; interviewees with junior college or undergraduate degree occupied 46.1%, and interviewees with graduate degree and above occupied 18.3%, and interviewees with other degrees occupied 23%, and the coverage range was relatively wide, and can ensure the comprehensive validity of data source. As for the profession, individual jobholders

occupied 16.2% of the interviewees, scientific education work occupied 16.8%, national public servants occupied 16.2%, interviewees of enterprises and public institutions occupied 19.9%, housewife occupied 7.3%, and interviewees engaged in other work occupied 23.6%; as can be seen from the gender, age and profession, there are more professional females among the interviewees, and they can be attentive in the consumption process and pursuit for quality, and will emphasize more on the commodity details than males, and they will consider more factors more comprehensively; meanwhile, they are also the main purchasers and decision-makers for daily necessities and food.

B. Consumer effectiveness evaluation

Table 3 is the attribute importance value of the entire group output in the process of the conjoint analysis operation program and utility value of the attribute level; besides, there are also the correlation coefficients between the measurement data and the actual data. In the relevant confidends output and shown in the table, the relevant coefficients for Pearson and Kendall are respectively 0.978 and 0.953, which are close to 1, and indicate that the profile observation value for the simulated black fungus product has high relevance with the estimated value, and the fitting degree of the model is good. The data obtained through conjoint analysis approach is relatively reasonable, when being compared with the actual purchasing data and it can more accurately reflect the purchasing preference of interviewees in the process of purchasing black fungus products.

As can be seen from the table, the variety of black fungus is the most important factors considered by consumers, and the importance of attribute occupies 24.125%; secondly, it is whether the place of production is the product of geographical indication, and the importance value is 21.368%; besides, it is the appearance and price of black fungus, and the importance occupies 18.356% and 17.854% respectively; the two attributes ranked behind are purchasing channel and black fungus package, and the importance value occupies 11.268% and 7.029% respectively. As per the ranking of the aforementioned attribute importance value, it can be seen that, the factors influencing the behavior of consumers for purchasing black fungus products are respectively black fungus type or variety, place of production, appearance, price, purchasing channel and package.

TABLE III. TABLE OF GROUP CONJOINT ANALYSIS OUTPUT STRUCTURE SORTS

Attribute	Attribute Level	Importance	Utility Value
Variety	Spring black fungus	24.125	0.094
	Summer black fungus		-0.458
	Autumn black fungus		0.364
Appearance	Common	18.356	-0.694
	Better		0.238
	Good		0.456
Price	Low price	17.854	-0.711
	Medium price		0.568
	High price		0.143
Place of origin for black fungus	Product of geographical indication	21.368	0.889
	Product of non-geographical indication		-0.889
Black fungus package	Low-grade package	7.029	-0.896
	Medium-grade package		0.368
	High-grade package		0.528
Purchasing channel	The sales of exclusive stores	11.268	1.246
	The sales of non-exclusive stores		-1.246
Constant		4.059	
Pearson's R		.978	
Pearson's R's Significance		0.000	
Kendall's tau		.953	
Kendall's tau's Significance		.000	

As shown in Table 3, with respect to the attribute of type, the preference of consumers is respectively autumn black fungus, spring black fungus, and summer black fungus. Spring, summer and autumn black fungus are divided as per the growth season of black fungus, and autumn black fungus grows in autumn, with good sunlight, big diurnal temperature variation, thick and smooth pulp, good hue and flexibility, and in the former in-depth interview, many consumers prefer autumn black fungus; the position of spring black fungus ranks only second to autumn black fungus, and spring black fungus is thin, with better taste, during the in-depth interview, a few people prefer spring black fungus, because there is a saying that, spring is the season for the induction and transmission of diseases, and eating some seasonal food (especially the fruit and fungoid products) can exert certain effect on the prevention of diseases. The hue of summer black fungus itself is bad, with bad taste, no flexibility and it is way too crisp, and many consumers think that the satisfaction degree for eating summer black fungus is bad, and generally, there won't select it.

With respect to the attribute of the place of production, black fungus products of geographical indication are more favored than black fungus products of non-geographical indication. The products of geographical indication refer to the famous place of production for black fungus, and when people purchase black fungus, as long as the place of production is famous, and the planting history is long and well-known, people would like to buy it at a high price, and think that it is cost-effective and will have a satisfied shopping experience. But for products of non-geographical indication, the popularity is low, and people will doubt the product quality, even if it is

high-qualified, and the price is low, they will also select after consideration and comparison.

With respect to the attribute of appearance, good appearance has the biggest utility value, better appearance ranks the second, and the common utility value is negative, and this result is consistent with the information I obtained during the former in-depth interview, because in the purchasing process, we cannot judge the quality of black fungus at most times, and cannot taste it at site, either, so many consumers can merely judge the quality of black fungus through its appearance, and some people will judge from the color of black fungus, while some others judge from the size, the cleaning degree and whether there is peculiar smell, so the appearance can influence whether consumers will purchase it. Except for its growth reasons, the appearance of black fungus is also decided by the transportation and saving factors of the farmers and the retailers.

With respect to the attribute of price, when consumers purchase black fungus, the utility level for the attribute level of medium price is the highest; the high price ranks the second, and the low price utility value is negative. In the in-depth interview, some interviewees thought that "the higher the price, the better the quality", but some other people held that there are still cheap and fine black fungus; besides, there are also opinions about high-price black fungus means better quality

With respect to the attribute of package, the utility value for the attribute level of black fungus with high-grade package takes up the highest proportion, and that for the medium-grade package ranks the second, while the utility value for low-grade package is negative. This indicates that, consumers care about

the package, and black fungus with exquisite and closed packaging will become the brand black fungus representatives produced at famous place of production, with high reliability degree of consumers, while black fungus with low-grade package will make consumers feel like there is purchasing risk, and will worry about the place of production and the quality.

With respect to the attribute of purchasing channel, the utility value for the attribute level of black fungus sold at exclusive stores is positive value, while the utility value for the level of black fungus sold at non-exclusive stores is negative value, which can indicate that, consumers prefer to purchase black fungus at exclusive stores. The products of exclusive stores generally can realize source traceability, and make consumers feel that the quality and after-sales are ensured; meanwhile, the service and management of exclusive stores are relatively normalized.

IV. RESEARCH CONCLUSION AND SUGGESTIONS

A. Conclusion

When purchasing black fungus, the factors influencing the purchasing behaviors of consumers respectively include the type or variety, place of production, appearance, price, purchasing channel and package of black fungus. As a product with using value and medical value, its quality will be deeply influenced by the season, place of production, water source, and planting technology, and autumn black fungus possessing higher reputation has become the best selection for many consumers, and the black fungus planted at the places of geographical indication can be more easily recognized by consumers. As for the price, as long as the quality is good, and the taste is excellent, consumers would like to purchase it at a higher price. As for the package of black fungus, they are mostly in bulk at present; firstly, this can let consumers more intuitively see the appearance of black fungus; secondly, this can be convenient for eating, so the brand package publicity of black fungus still needs to be improved. As can be seen from the consumption concepts, products sold at exclusive stores are more credible, and merchants, especially those with big storefront, high popularity, and good service attitude are more favored by consumers.

B. Suggestions

1) Ensure black fungus quality, and build famous brand

The type of black fungus is an important attribute concerned by consumers, and autumn black fungus has the highest utility value, with thick pulp, and good taste, and since the sunlight is good and the diurnal temperature variation is big during the planting period, specific to the preference of consumers, the black fungus production bases or sales enterprises can create autumn black fungus brand through combining the variety of autumn black fungus with the regional advantages. Transmit the medical value, the best eating time and various eating methods of autumn black fungus through valid publicity approaches, and promote the popularity of autumn black fungus and autumn black fungus brand.

2) Play regional advantages and enhance publicity strength

The place of production for black fungus is the second important attribute concerned by consumers, so it can be seen that the resource advantages, and regional advantages of the place of production are very important for the influence on consumers' perceptive value for the black fungus, so black fungus industrial associations, and cultivation bases such as Changbai Mountain Area, Jilin Dunhua, Jiaohe and other areas can show the black fungus cultivation sites through online WeChat public account platform, live broadcast and other modes, deepen the consumers' understanding about the place of production, planting environment and technology of black fungus, and further promote the perceptive value of characteristic black fungus products within these areas.

3) Build traceability system, and formulate rating standard

Currently, the price of black fungus sold in the market is different, and this is because of the difference in planting manufacturers and planting costs, and merchants will deliberately increase the price, which can generate the phenomenon that consumers purchase bad-quality black fungus at high price, and good-quality black fungus at suitable price, and although such phenomenon is rare, the mode of incorrectly relaying an erroneous information can also generate a bad influence on the main production area of black fungus and the development of black fungus industry, so this requests the black fungus planting base and industrial associations to establish scientific traceability system for black fungus products, formulate black fungus quality rating standard, conduct the reasonable supervision of pricing, and perfect corresponding industrial standard.

4) Expand sales channel, and upgrade product package

Currently, the sales channel of black fungus industry mainly includes two sales mode, including the offline exclusive stores and non-exclusive stores, and through research and analysis, it can be obtained that the products of exclusive stores are more favored by consumers, with better public praise. Along with the fast development of e-business industry, the expansion of sales channel under the era of internet economy means that the offline exclusive stores operation as well as the online marketing basis should also be simultaneously conducted, and then it is requested to gradually accumulate client source and sales experience, and usher in new challenges in the future. Through in-depth interview, it can be obtained that many stores have their own stores on line, but the benefits are barely satisfactory, and the reason is that the technology operation capacity is insufficient, it cannot be trusted by consumers, the online sales language is not normalized enough, and the cutthroat competition of some merchants, etc., and this has forced some merchants to give up the online marketing. Based on this situation, the government or the relevant black fungus industrial association, etc. should organize merchants to study e-business skills, promote online service level, enhance the industrial supervision strength, strictly control the online admittance quality of black fungus industry, and realize the online and offline combined new marketing mode.

Besides, the package of traditional black fungus products not only has simple and crude materials, but also the uncertain quality, and uncertain safety of the packing process, and with respect to the situation, retailers and manufacturers should improve the black fungus package, and the selection of package materials should be green and environmentally friendly. The product package should also highlight the characteristics about the place of production of the black fungus, highlight the indication about the product of geographical indication, and make consumers recognize the brand and then select to purchase it.

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