SELECTION OF PROTOTYPE PACKAGING SUITABLE FOR HEALTHY CHINESE FOOD DELIVERY

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ABSTRACT

This research aims to select the appropriate packaging for healthy Chinese food delivery, i.e. environmentally friendly, maintain food temperature well, maintain food quality until it reaches the consumer, and protect the food inside in good condition without damage during transportation. In this research, 3 types of packaging were selected: paper packaging, thin economical plastic packaging, and thick and beautiful plastic packaging to pack 15 healthy Chinese food menus. The types of healthy food are divided into 4 categories: 1) Salad, fried, stir-fried, and baked, 2) Large pieces (whole), 3) Soup, curry, and stew, and 4) Dipping sauce. From the experiment of packing food in all 3 types of packaging, measuring the temperature for 3 hours, it was found that the paper packaging had a core temperature of 57-60 degrees Celsius, while the economical thin plastic packaging and the thick and beautiful plastic packaging had a core temperature of 60-66 degrees Celsius. The core temperature of the food indicates the safety of cooked food, which is a safe range for the growth of microorganisms in food during transportation. From the analysis of plastic food containers according to the Ministry of Public Health Announcement No. 295 (2005) and the number of microorganisms according to the Microbiological Quality Criteria for Food and Food Contact Containers, No. 3 (2017), it was found that all 3 types of packaging are safe to use for packing Chinese table food for delivery.

Keywords: Packaging, Healthy Chinese-dishes, Delivery

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INTRODUCTION

The Chinese Food business has been with Thais for a long time. The Chinese Food business started with Chinese people who immigrated to Thailand and has become very popular both in Thailand and abroad because it has a delicious taste, is rich in nutrients, and is suitable for organizing gatherings with relatives and friends or in various traditional ceremonies. Bangkok and its vicinity, especially Nakhon Pathom Province, has many Chinese food businesses. In addition, it is a source of raw materials, which has made it famous for a long time. The current Chinese food business is facing problems from increasing raw material costs, fierce competition, and the COVID-19 situation, which has significantly reduced sales or income of the business. Therefore, Chinese food operators should be more mindful of the cleanliness and safety of Chinese food to comply with the regulations of the Ministry of Public Health and to prevent problems from damaging the reputation of the establishment and being sued in court. Chinese food delivery has become a new option for entrepreneurs and consumers to increase convenience, safety, and reduce the risk of going out to eat Chinese food at restaurants or auspicious ceremonies as it used to be.

Quality control of delivery and customer service to be clean and safe, use packaging that can retain heat well because Chinese food is usually consumed while hot, and the packaging should be able to keep the food tightly closed, not leaking, and not contaminating the food inside, and use foil paper, bags or transport bags that retain heat, reduce the chance of contamination, and make transportation efficient, and use reusable or biodegradable materials or packaging to protect the environment. This is something that entrepreneurs should consider and give the priority to when distributing Chinese food for delivery. In this research, the researcher selected packaging for healthy Chinese food for delivery according to the criteria for packaging properties that are suitable for healthy Chinese food for delivery, including environmentally friendly packaging, reasonable cost, good food temperature retention, and the ability to maintain the quality of the food until it reaches the consumer, attracting customers' interest, looking good and worth the price, convenient for transportation, and being able to protect the food inside to be in good condition, not damaged.

Research objectives

1) To select packaging for healthy Chinese table food delivery according to the criteria for packaging properties suitable for healthy Chinese table food delivery

2) To examine the properties of packaging and the properties of food contained in the packaging for healthy Chinese table food delivery

RESEARCH METHODOLOGY

Analyze the behavior of consumers of healthy Chinese table food delivery on the characteristics of packaging for Chinese table food delivery by studying in-depth information from documents and additional research, in-depth interviews, focus group process from stakeholders, and using the obtained information to select the type of packaging.

Select the appropriate type of prototype packaging for Chinese food delivery based on the results of in-depth interviews with stakeholders. Experiment with packaging 15 healthy Chinese table food menus, divided into 4 types of healthy food: 1) Salad, fried, stir-fried, and baked food 2) Large pieces (whole food) 3) Soup, curry, and stew food and 4) Dipping sauce food

1) Examine the properties of the packaging according to the Ministry of Public Health Announcement No. 295 (2005) on the determination of the quality or standards of safe plastic containers. The plastic used to package food must be of the following quality or standard: clean, free of other substances that may contaminate the food in quantities that may be harmful to health, free of pathogenic microorganisms, and free of color contaminating the food.

2) Experiment with packaging 15 healthy Chinese table food menus. Data was collected on the temperature of the center of the food using a thermometer within 3 hours, which was the time it took to transport the Chinese table food from the production site in Nakhon Pathom Province to consumers in Bangkok. (area near Nakhon Pathom province) and surrounding areas, with a requirement that the core temperature of packaged food not be lower than 60 degrees Celsius, which the core temperature of the food indicates the safety of cooked food, considered a safe range for the growth of microorganisms in food during transport, and inspecting the properties of healthy Chinese table food packaged according to the microbiological quality criteria of food and food contact containers, version 3 (2017).

RESULTS & DISCUSSION

1) The results transportation and the behavior of consumers of Chinese food delivery on the characteristics of packaging for Chinese table food delivery by studying in-depth information from documents and additional research, in-depth interviews, and focus group processes from stakeholders found that the criteria for specifying the characteristics of packaging suitable for Chinese table food delivery from interviews with experts from both the private and public sectors should have the following characteristics: environmental protection, reasonable cost, good food temperature maintenance, and ability to maintain the quality of the food until it reaches the consumer, attracting customers' interest, looking good and worth the price, convenient for transportation, and being able to protect the food inside in good condition without damage. Therefore, the researcher has selected 3 types of packaging: paper, thin, economical polypropylene plastic, and thick, beautiful polypropylene plastic to be used in packaging Chinese table food delivery to comply with the criteria for specifying the characteristics of packaging suitable for Chinese table food delivery in terms of environmental protection, playing an important role in maintaining food quality, and promoting outstanding marketing. Most importantly, it must be suitable for delivery transportation, such as being able to be reheated, being able to protect the product inside, having a packaging format that is convenient for consumption, being a size that is easy to carry, and being easy to open, consume, and store the rest. Examples of packaging characteristics and types of healthy Chinese table food packaged are detailed in Table 1.

Table 1 Examples of packaging characteristics and types of healthy Chinese food packaged

Food Type	**Packaging Type**		
	Paper	**Plastic Thin polypropylene, economical**	**Plastic type Thick, beautiful polypropylene**
Salad, fried, stir-fried and baked dishes			
Healthy Fried Shrimp Salad Recipe			
Large pieces of food (whole food)			
Healthy fried sea bass with fish sauce			

Food Type	Packaging Type		
	Paper	Plastic Thin polypropylene, economical	Plastic type Thick, beautiful polypropylene
Soups, curries and stews			
Healthy Chinese bamboo shoot soup with tender pork ribs			

When considering paper packaging, it was found that its advantages are safe, biodegradable, low cost, and environmentally friendly. On the other hand, its disadvantages are that it is a packaging that cannot prevent moisture, is less strong than other types of packaging, and cannot be heated in a microwave. However, research has selected Fest Bio paper packaging, which is made from natural pulp, can be heated in both a microwave and an oven, and can decompose within 60 days. When considering thin, economical plastics, such as thin polypropylene (PP), it was found that its advantages are that it is safe packaging, is strong and tough, holds its shape well, is moderately resistant to bending, and can withstand heat up to 110 degrees Celsius. Therefore, it can be used to heat food in a microwave, is clear, prevents moisture from passing through, and can be reused. However, its disadvantages are that it does not prevent air from passing through and is not resistant to cold. On the other hand, polyethylene terephthalate (PET) has outstanding clarity and gas barrier properties. When considering thick and beautiful plastics, such as thick polypropylene, it was found that its advantages are that it is safe packaging. It is strong and tough, holds its shape well, is highly resistant to bending, and can withstand heat up to 110 degrees Celsius. Therefore, it can be used to heat food in a microwave. It prevents moisture from passing through well. It can be reused more than thin polypropylene. Most importantly, it has an attractive appearance and is designed to be suitable for delivery transportation. However, it is quite expensive (Duangrutai Tharongchot, 2007).

2) Results of the examination of chemical and microbiological properties of the packaging according to the Ministry of Public Health Announcement No. 295 (2005) on the determination of quality or standards of plastic containers and the results of the examination of microbiological properties of healthy Chinese food packed in packaging according to the microbiological quality criteria of food and food contact containers, No. 3 (2017) are shown in Tables 2 and 3. From the examination of chemical and microbiological properties of the packaging according to the Ministry of Public Health Announcement No. 295 (2005) on the determination of quality or standards of plastic containers of economical thin polypropylene plastic packaging and beautiful thick polypropylene plastic (Table 2), it was found that the quality of the plastic containers complies with the Ministry of Public Health Announcement (No. 295) B.E. 2548 on the determination of quality or standards of plastic containers, namely, they must be clean, free from other substances such as heavy metals such as lead, contaminating the food in quantities that may be harmful to health, and free from color contaminating the food. The number of residual substances that can evaporate in water Acetic acid with a concentration of 4%, alcohol with a concentration of 20% and heptane are within the standard criteria, indicating that they can be used as containers for healthy Chinese food

When considering the microbial quality analysis of paper packaging, economical thin polypropylene plastic, and beautiful thick polypropylene plastic, it was found that there was no contamination of Bacillus cereus, Clostridium perfringens, Salmonella spp., and Staphylococcus aureus on all 3 types of packaging. Therefore, it can be said that the microbial contamination in all 3 menus, namely, Healthy Fried Shrimp Salad, which represents a type of

food that has been dried with a free water content (aw) of less than 0.86 (referring to the Department of Medical Sciences, Section 2.2.4), and Healthy Fried Sea Bass with Fish Sauce and Healthy Black Chicken Stewed in Chinese Medicine, which represent general ready-to-eat food (referring to the Department of Medical Sciences, Section 2.2.5), had microbial contamination mostly from poor personnel hygiene and possible contamination during the production process, storage of raw materials, and finished products due to some raw materials. Therefore, it is necessary to control personnel hygiene to be of high quality, such as wearing a cloth to cover the mouth to prevent coughing or sneezing on food, wearing gloves to prevent picking, scratching, or scratching while working. which allows germs or toxins to spread into the food, including controlling the cleaning of raw materials to be clean, using heat in cooking at high temperatures, and reducing contamination during the production process, storage of raw materials and finished products because of some raw materials

Table 2 Chemical and microbiological quality of packaging for healthy Chinese table food for delivery according to the Ministry of Public Health Announcement No. 295 (2005) on the quality or standards of packaging made from paper and plastic.

Packing Type	**Chemical Quality**	**Limit of quantitation (LOQ)**	**Results**	**(Swab Test)**	**Results**
Paper	-	-	-	*Bacillus cereus* (per piece)	Not found
				Clostridium perfringens (per piece)	Not found
				Salmonella spp (per piece)	Not found
				Stapphylococcus aureus (per piece)	Not found
Thin polypropylene plastic, economical price	Cadmium content (mg/kg)	2	<2	*Bacillus cereus* (per piece)	Not found
	Color migration in distilled water	-	Negative	*Clostridium perfringens* (per piece)	Not found
	Lead content (mg/kg)	2	<2	*Salmonella* spp (per piece)	Not found
	Heavy metal (mg/dm^3)	1	<1	*Stapphylococcus aureus* (per piece)	Not found
	Potassium permanganate used for reaction	3	<3		
	Residue substances which is evaporate in distilled water (mg/dm^3)	5	<5		
	Residue substances which is evaporate in 4% concentrated acetic acid (mg/dm^3)	5	5		
	Residue substances which is evaporate in 20% ethanol (mg/dm^3)	5	<5		
	Residue substances which is evaporate in n-heptane (mg/dm^3)	5	5		

Packing Type	Chemical Quality	Limit of quantitation (LOQ)	Results	(Swab Test)	Results
Thick, beautiful polypropylene plastic	Cadmium content (mg/kg)	2	<2	*Bacillus cereus* (per piece)	Not found
	Color migration in distilled water	-	Negative	*Clostridium perfringens* (per piece)	Not found
	Lead content (mg/kg)	2	<2	*Salmonella* spp (per piece)	Not found
	Heavy metal (mg/dm^3)	1	<1	*Stapphylococcus aureus* (per piece)	Not found
	Potassium permanganate used for reaction	3	<3		
	Residue substances which is evaporate in distilled water (mg/dm^3)	5	<5		
	Residue substances which is evaporate in 4% concentrated acetic acid (mg/dm^3)	5	<5		
	Residue substances which is evaporate in 20% ethanol (mg/dm^3)	5	<5		
	Residue substances which is evaporate in n-heptane (mg/dm^3)	5	<5		

Table 3 Microbiological quality of healthy Chinese food packaged according to the Microbiological Quality Criteria for Food and Food Contact Containers, 3rd Edition (2017)

Food Menu	Microbiological quality criteria for food and food contact containers, 3rd edition (2017)	Packaging type papers	Thin polypropylene plastic packaging, economical price	Thick, beautiful polypropylene plastic packaging
Healthy fried shrimp salad recipe (Refer to the Department of Medical Sciences, section 2.2.4	CFU/gram Number of yeast and mold CFU/gram (Less Than 100)	4.3×10^4	5.3×10^4	3.8×10^2
	Escherichia coli MPN/gram (Less Than 3)	Less than 3	Less than 3	Less than 3
	Staphylococcus aureus CFU/gram (Less Than 10)	Less than 10	Less than 10	Less than 10
	Clostridium perfringens CFU/grams (Less Than 100)	Less than 10	Less than 10	Less than 10
	Bacillus cereus CFU/gram (Less Than 1,000)	Less than 10	Less than 10	Less than 10
	Salmonella spp./ 25gram (Not found)	Not Found	Not Found	Not Found
Fried sea bass with fish sauce, healthy recipe (Refer to the Department of Medical Sciences, section 2.2.5)	Number of microorganisms CFU/gram (Less Than 1 Í10^6)	5.6×10^5	1.4×10^6	1.5×10^5
	Escherichia coli MPN/gram (Less Than 3)	Less than 3	Less than 3	Less than 3
	Staphylococcus aureus CFU/gram (Less Than 100)	2.6×10^3	2.1×10^3	2.2×10^4
	Clostridium perfringens CFU/gram (Less Than 100)	Less than 10	Less than 10	Less than 10
	Bacillus cereus CFU/gram (Less Than 100)	4.5×10^2	6.2×10^2	6.4×10^2

Food Menu	Microbiological quality criteria for food and food contact containers, 3rd edition (2017)	Packaging type papers	Thin polypropylene plastic packaging, economical price	Thick, beautiful polypropylene plastic packaging
	Salmonella spp./ 25 gram (Not Found)	Not Found	Not Found	Not Found
	Vibrio cholerae/ 25 gram (Not Found)	Not Found	Not Found	Not Found
	Vibrio parahaemolyticus/ 25 gram (Not Found)	Not Found	Not Found	Not Found
	Listeria monocytogenes/ 25 gram (Not Found)	Not Found	Not Found	Not Found
Black chicken stewed with Chinese medicine for health (Refer to the Department of Medical Sciences, section 2.2.5)	Number of microorganisms CFU/gram (less than 1 10^6)	2.6 X 10^6	2.8 X 10^6	6.8 X 10^6
	Escherichia coli MPN/gram (Less Than 3)	Not Found	Not Found	Not Found
	Staphylococcus aureus CFU/gram (Less Than 100)	Less Than 10	2.5 X 10^2	Less Than 10
	Clostridium perfringens CFU/gram (Less Than 100)	Less Than 10	Less Than 10	Less Than 10
	Bacillus cereus CFU/gram (Less Than 100)	Less than 10	Less than 10	Less than 10
	Salmonella spp./ 25 gram (Not Found)	Not Found	Not Found	Not Found
	Vibrio cholerae/ 25gram (Not Found)	Not Found	Not Found	Not Found
	Vibrio parahaemolyticus/ 25 gram (Not Found)	Not Found	Not Found	Not Found

From Table 3, Microbiological Quality Criteria for Food and Food Contact Containers, Edition 3 (2017), when considering the healthy fried shrimp salad menu packaged in paper packaging, thin polypropylene plastic, economical price, and thick polypropylene plastic, beautiful, it was found that the amount of yeast and mold exceeded the standard value according to the Microbiological Quality Criteria for Food and Food Contact Containers, Edition 3 (2017), which are microorganisms that are commonly found in nature and often directly contaminate food, cooking equipment, or in the food processing process, including storage conditions. Therefore, it is the cause of food spoilage. If yeast and mold are found in a large amount in food, it may mean that the place where that type of food is produced has poor food sanitation or the processing temperature is not sufficient to destroy yeast and mold in food. It also indicates contamination during the production process, storage of raw materials, and finished products because some raw materials, such as corn starch, may be contaminated by yeast and mold as well as toxins. While Escherichia coli, which is a bacterium that shows contamination in human feces, is an index of food sanitation and mold. Staphylococcus aureus is a bacterium that shows the hygiene of personnel because it is often found in humans, such as in mucus, saliva, secretions, acne, boils, pus, especially those that are inflamed. Therefore, the hygiene of those who directly touch food must be controlled, including Clostridium perfringens and Bacillus cereus, which are bacteria found in soil and often contaminated with raw materials such as vegetables and fruits. These bacteria are in the amount of the standard value according to the Microbiological Quality Criteria for Food and Food Contact Containers, Edition 3 (2017) when considering Salmonella spp., which are bacteria found in raw materials from animals, especially poultry such as chicken, eggs, turkey, shellfish, salad, etc. From the experimental results, no Salmonella spp. was found in the Healthy Fried Shrimp Salad menu packaged in paper packaging, thin polypropylene plastic, economical price, and thick, beautiful

When considering the healthy fried sea bass menu packaged in paper packaging, thin polypropylene plastic, economical price, and thick polypropylene plastic, it was found that the

total number of microorganisms was in the range of 105-106, which indicates that there may be a high amount of initial microbial contamination. Staphylococcus aureus and Bacillus cereus had microbial amounts exceeding the standard values according to the Microbiological Quality Criteria for Food and Food Contact Containers, Edition 3 (2017), which was caused by poor personnel hygiene and contamination may occur during the production process, storage of raw materials, and finished products due to some raw materials. Meanwhile, Escherichia coli and Clostridium perfringens were within the standard values according to the Microbiological Quality Criteria for Food and Food Contact Containers, Edition 3 (2017), while Salmonella spp., Vibrio cholerae, Vibrio parahaemolyticus, and Listeria monocytogenes The results of the experiment did not detect the said germs in the healthy fried sea bass with fish sauce menu packaged in paper packaging, thin, economical polypropylene plastic, and thick, beautiful polypropylene plastic.

When considering the healthy black chicken stewed in Chinese herbs menu packaged in paper packaging, economical thin polypropylene plastic, and beautiful thick polypropylene plastic, it was found that the total number of microorganisms was in the range of 106, which indicates that there may be a high amount of initial microbial contamination as well. Meanwhile, Staphylococcus aureus packaged in economical thin polypropylene plastic packaging had a microbial amount exceeding the standard value according to the microbiological quality criteria for food and food contact containers, version 3 (2017), indicating that personnel hygiene was poor. In addition, Escherichia coli, Clostridium perfringens, and Bacillus cereus were found to be within the standard value according to the microbiological quality criteria for food and food contact containers, version 3 (2017), as well as Salmonella spp., Vibrio cholerae, Vibrio parahaemolyticus, and Listeria monocytogenes were not found in the healthy black chicken stewed in Chinese herbs menu packaged in paper packaging. Thin, economical polypropylene plastic and thick, attractive polypropylene plastic

Table 4 Food temperature within 3 hours during delivery transportation of healthy Chinese table food packaged in different types of packages.

Food Type	**Packaging Type**														
	Paper					**Polypropylene plastic Thin, economical price**					**Polypropylene plastic Thick, beautiful**				
	Temperature (^{O}C)					**Temperature (^{O}C)**					**Temperature (^{O}C)**				
	Duration (hours)					**Duration (hours)**					**Duration (hours)**				
	0	**1**	**2**	**3**	**Temperature drop rate (%)**	**0**	**1**	**2**	**3**	**Temperature drop rate (%)**	**0**	**1**	**2**	**3**	**Temperature drop rate (%)**
Salad, fried, stir-fried and baked food															
1. Healthy fried shrimp salad recipe	70	61	60	57	11.43	70	63	62	61	8.57	70	62	61	60	9.64
2. Fried pork sausage, healthy recipe	70	61	60	58	11.07	70	63	62	60	8.93	70	62	61	60	9.64
3. Healthy crab recipe	70	61	60	59	10.71	70	63	62	61	8.57	70	62	61	60	9.64
4. Healthy hack-gut recipe	70	61	60	58	11.07	70	63	62	61	8.57	70	62	61	60	9.64
5. Shrimp with tamarind sauce, healthy recipe	70	61	60	57	11.43	70	63	62	61	8.57	70	62	61	60	9.64

Food Type	Packaging Type														
	Paper					Polypropylene plastic Thin, economical price					Polypropylene plastic Thick, beautiful				
	Temperature (^{O}C)					Temperature (^{O}C)					Temperature (^{O}C)				
	Duration (hours)					Duration (hours)					Duration (hours)				
	0	1	2	3	Temperature drop rate (%)	0	1	2	3	Temperature drop rate (%)	0	1	2	3	Temperature drop rate (%)
6. Stir-fried scallops with oyster sauce for health	72	63	62	60	10.76	72	65	64	62	8.68	72	64	63	62	9.38
7. Baked pork ribs with bean curd	73	61	59	57	14.38	73	68	66	64	7.19	73	64	62	60	11.30
8. Healthy stir-fried Peking duck with basil sauce	72	63	62	60	10.76	72	65	64	62	8.68	72	64	63	62	9.38
9. Healthy fried suckling pig with garlic	70	61	60	57	11.43	70	63	62	61	8.57	70	62	61	60	9.64
10. Healthy pork knuckle topped with vegetables	70	61	60	57	11.43	70	63	62	61	8.57	70	62	61	60	9.64
Large pieces of food (whole)															
11. Fried sea bass with fish sauce, healthy recipe	72	63	62	61	10.42	72	65	64	63	8.33	72	64	63	62	9.38
Soup, curry and stewed dishes															
12. Black chicken stewed with Chinese medicine for health	72	63	62	60	10.76	72	65	64	63	8.33	72	64	63	62	9.38
13. Healthy stewed black chicken with pickled lemon	75	66	65	64	10.00	75	68	67	66	8.00	75	67	66	65	9.00
14. Thai chicken stewed with Chinese medicine, healthy recipe	75	66	65	64	10.00	75	68	67	66	8.00	75	67	66	65	9.00

Food Type	Packaging Type														
	Paper					Polypropylene plastic Thin, economical price					Polypropylene plastic Thick, beautiful				
	Temperature (^{O}C)					Temperature (^{O}C)					Temperature (^{O}C)				
	Duration (hours)					Duration (hours)					Duration (hours)				
	0	1	2	3	Temperature drop rate (%)	0	1	2	3	Temperature drop rate (%)	0	1	2	3	Temperature drop rate (%)
15. Chinese bamboo shoot soup with baby pork ribs	72	63	62	60	10.76	72	65	64	63	8.33	72	64	63	62	9.38

From Table 4, when considering the temperature preservation of food in different types of packaging, namely paper packaging, thin, economical polypropylene plastic, and thick, beautiful polypropylene plastic, with the goal of the packaging being able to maintain the temperature of the food at a temperature not lower than 60 degrees Celsius within 3 hours during delivery transportation of 15 healthy Chinese food menus, by measuring the temperature drop every 1 hour using a thermometer, it was found that within 3 hours during delivery transportation, the paper packaging had the center temperature of the food in the range of 57-60 degrees Celsius, while within 3 hours during delivery transportation, the center temperature of the food in the range of 60-66 degrees Celsius, which indicates the safety of cooked food, which is a safe range for the growth of microorganisms in food during transportation. When considering the rate of temperature drop of food within 3 hours during delivery transportation, with different rates of food temperature drop, it was found that the paper packaging tended to have the highest rate of food temperature drop. Next is the thin, inexpensive polypropylene plastic packaging and the thick, beautiful polypropylene plastic packaging, which have similar temperature drop rates. This shows that the thin, inexpensive polypropylene plastic packaging and the thick, beautiful polypropylene plastic packaging can maintain the temperature of the food better than the paper packaging within 3 hours during delivery. This is because the thin, inexpensive polypropylene plastic packaging and the thick, beautiful polypropylene plastic packaging are polypropylene (PP) plastics that have good moisture barrier properties. Importantly, the lid of the packaging is a lockable type so that it can be closed tightly, which has a good effect on maintaining the temperature of the food. Meanwhile, the paper packaging cannot prevent moisture as well as the plastic type.

Recommendations for selecting suitable packaging for healthy Chinese table food delivery that are in line with the criteria for packaging suitable for healthy Chinese table food delivery are environmental conservation, play an important role in maintaining food quality, and promote outstanding marketing. From the experiment, it was found that thin, economical plastic packaging, priced at 7.60 baht per piece, can best maintain the temperature of the food in the packaging because it has the lowest temperature drop rate compared to thick, beautiful paper and plastic packaging. It can be delivered within 3 hours and still maintain the center temperature of the food at no less than 60 degrees Celsius, which is a safe temperature for cooked food. Meanwhile, thick, beautiful polypropylene plastic packaging, priced at 16.00 baht per piece, can best maintain the temperature of the food in the packaging, second only to thin, economical polypropylene plastic packaging, which can also be delivered within 3 hours and still maintain the center temperature of the food at no less than 60 degrees Celsius, which is a safe temperature for cooked food. It also has advantages. It can be reused more than thin polypropylene plastic, is economical, and paper packaging costs 6.00 baht per piece. It can maintain the lowest temperature of food in the packaging because it has the highest temperature drop rate when compared to thin, economical plastic packaging and thick, beautiful plastic. It

is suitable for delivery within 2 hours to have the core temperature of the food not less than 60 degrees Celsius, which is a safe temperature for cooked food.

CONCLUSION

Suitable packaging for healthy Chinese table food delivery is environmentally friendly, maintains food temperature well, maintains food quality until it reaches the consumer, and can protect the food inside to be in good condition without damage during transportation. There are 3 types of packaging: paper packaging, thin, economical plastic packaging, and thick, beautiful plastic packaging to pack 15 healthy Chinese table food menus. The types of healthy food are divided into 4 types: 1) Salad, fried, stir-fried, and baked 2) Large pieces (whole food) 3) Soup, curry, and stewed and 4) Dipping sauce. It is safe to use for packing Chinese table food for delivery transportation in terms of both chemical and microbial quality. In addition, all 3 types of packaging have a core temperature of 57-66 degrees Celsius, which indicates the safety of cooked food during delivery transportation within 3 hours, indicating the safety of cooked food as a safe period for microbial growth in food during transportation.

Suggestions

Further study is needed to evaluate the upgrading various material for marketing uses of the three types of packaging: paper packaging, thin and economical plastic packaging, and thick and attractive plastic packaging.

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