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TECHNICAL REPORT

NATICK/TR-78/006

**STORAGE STUDY OF FROZEN ENTREE ITEMS
DEVELOPED FOR
WALTER REED ARMY MEDICAL CENTER**

Project Reference: 83166103000

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April 1978

**UNITED STATES ARMY
NATICK RESEARCH and DEVELOPMENT COMMAND
NATICK, MASSACHUSETTS 01760**



**Food Engineering Laboratory
FEL-73**

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM													
1. REPORT NUMBER NATICK/TR-78/006	2. GOVT ACCESSION NO. AD-A091	3. RECIPIENT'S CATALOG NUMBER 769													
4. TITLE (and Subtitle) STORAGE STUDY OF FROZEN ENTREE ITEMS DEVELOPED FOR WALTER REED ARMY MEDICAL CENTER.		5. TYPE OF REPORT & PERIOD COVERED Technical Repts.													
7. AUTHOR(s) Gerald Darsch, Carol Shaw, and Justin Tuomy		6. PERFORMING ORG. REPORT NUMBER FEL-73													
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Natick Research and Development Command Natick, Massachusetts 01760		8. CONTRACT OR GRANT NUMBER(s) 41													
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Natick Research & Development Command ATTN: DRXNM-WTA (Animal Products Group) Natick, Massachusetts 01760		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 83166103000 6.4													
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) NATICK/FEL-73		12. REPORT DATE November 1977													
		13. NUMBER OF PAGES													
		15. SECURITY CLASS. (of this report) UNCLASSIFIED													
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE													
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.															
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)															
18. SUPPLEMENTARY NOTES															
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) <table border="0"> <tr> <td>FOOD SYSTEMS</td> <td>FOOD ACCEPTANCE</td> <td>TEST METHODS</td> </tr> <tr> <td>FROZEN FOODS</td> <td>WALTER REED ARMY MEDICAL CENTER</td> <td>FOOD SERVICE</td> </tr> <tr> <td>STORAGE</td> <td>STABILITY</td> <td></td> </tr> <tr> <td>ENTREES</td> <td>SENSES (PHYSIOLOGY)</td> <td></td> </tr> </table>				FOOD SYSTEMS	FOOD ACCEPTANCE	TEST METHODS	FROZEN FOODS	WALTER REED ARMY MEDICAL CENTER	FOOD SERVICE	STORAGE	STABILITY		ENTREES	SENSES (PHYSIOLOGY)	
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report contains results of storage studies in frozen entree products developed for the new Walter Reed Army Medical Center food service system. The products were prepared in accordance with production guides already developed for Walter Reed. Generally, products were stored for one year and evaluated at 0, 1, 2, 6, 9 and 12 months. Average results of technical panel evaluations are shown for each product and are summarized for initial and final evaluation.															

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PREFACE

The new Walter Reed Army Medical Center (WRAMC) food service system utilizing cook-freeze is expected to be in operation in FY78. The Food Engineering Laboratory (FEL) of the U. S. Army Natick Research and Development Command (NARADCOM) has been charged with rendering all possible technical assistance in bringing the system on-stream. Considerable efforts are being made to redesign Walter Reed Army Medical Center (WRAMC) menu items so that they can be made on commercial equipment and frozen for storage.

This study is concerned with storage stability of specific entree items developed for WRAMC. The work was performed under the O&MA program and Army Requirement 4-1, Support to Modern Army Food Service System.

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STORAGE STUDY OF FROZEN ENTREE ITEMS
DEVELOPED FOR WALTER REED ARMY MEDICAL CENTER

INTRODUCTION

Cook-freeze systems tailored for specific situations are being used or contemplated for use in several Armed Forces feeding situations, and it is anticipated that the use of these types of systems will become increasingly important in the future. Length of time products are scheduled to be kept in frozen storage varies from system to system with many systems set up for less than three months storage. In other cases the products could be stored for a year or more.

Unpublished studies conducted at NARADCOM indicate that some frozen products start to deteriorate appreciably between three and six months after being placed in storage. Reasons for this are not clearly understood at the present time, and there is not yet a sure method of predicting product response to storage without actually conducting storage tests.

At the request of Walter Reed Army Medical Center (WRAMC) 38 entree items were developed for use in the new food service facility.* While these products were developed for a system which expects to store them no more than 60 days, the products could be used in other systems which require longer storage. Thirty five of the products were made and stored for one year for testing.

*Young, Raymond, Carol Shaw, Gerald Darsch, Justin Tuomy and George Walker, 1977. Meat and Fish Entree Item Production Guides Prepared for Walter Reed Army Medical Center Technical Report Natick/TR-77/005 US Army Natick Research & Development Command.

PROCEDURE

The entrees were reformulated in the Food Engineering Laboratory (FEL) utilizing troop issue products whenever possible. Adequate quantities to each were prepared to insure that sensory evaluations could be performed at specific intervals for one year. After preparation, the products were placed in half size steam table pans (aluminum disposable), cooled, frozen and stored at (-23°C) .

The entrees were evaluated in FEL by technological panels composed of food technologists familiar with each product. Evaluation were performed at specified intervals; i.e., initial, 1, 2, 6, 9 and 12 months. The number of panelists participating in each evaluation will be designated by N in Tables 2 thru 36. The products were reheated in a convection oven (preheated to 163°C) to an internal temperature of 71°C . Quality rating scales with values ranging from 1 (extremely poor) thru 9 (excellent) were used. In determining statistical significance, an analysis of variance utilizing Duncan's Multiple Range Test was employed.

RESULTS & DISCUSSION

While there is no cut off number on the panel rating scale below which a product is considered unacceptable, it is usually accepted that a product receiving a rating below 6.0 is borderline and below 5.0 probably unacceptable. Of equal importance to the absolute number is the change during storage.

In Table I, the average initial and final panel ratings for each product are shown with statistical differences being asterisked. In Tables 2 through 36 the average of panel ratings for each product at each withdrawal are given. In going down each column figures followed by the same letter are not statistically different. Numerals followed by different letters are significantly different from each other at at least the 5 percent level.

TABLE 1

AVERAGE INITIAL AND FINAL PANEL RATINGS

Entree	Time	Color	Odor	Flavor	Texture	Appearance
Barbecued Sliced Beef	INT	6.9	7.1	6.9	6.7	7.0
	12 Mo.	7.1	6.7	6.1*	6.3	7.0
Beef a la Mode	INT	7.2	7.1	7.1	6.9	7.2
	12 Mo.	7.0	6.8**	6.6**	6.7	6.8
Beef Stroganoff	INT	7.0	7.3	7.2	7.1	7.0
	12 Mo.	6.8	6.8	6.4	6.3	6.6
Country Style Steak	INT	6.7	6.9	6.5	6.6	6.7
	12 Mo.	6.7	6.7**	6.3**	6.4	6.6**
Creamed Chipped Beef	INT	7.3	7.1	7.2	7.2	7.3
	12 Mo.	7.0	6.6*	6.4*	6.6	6.8
Egg Foo Yung	INT	7.1	7.1	6.5	7.2	7.2
	2 Mo.	6.9	6.9	6.6	6.6	7.1
Hungarian Goulash	INT	7.2	7.2	7.1	7.0	7.1
	12 Mo.	6.2*	6.3*	5.9*	5.9*	6.3*
Neopolitan Spaghetti	INT	6.2	6.7	6.9	7.1	6.4
	12 Mo.	6.5	6.5**	6.1*	6.3*	6.3**
Pepper Steak	INT	6.7	7.1	6.6	6.6	6.7
	12 Mo.	6.5	6.5	6.2	6.7	6.6
Spanish Steak	INT	7.1	7.3	6.6	6.7	7.0
	12 Mo.	6.7	6.4*	6.2	6.0	6.5**
Tallierines	INT	7.2	7.4	7.4	7.2	7.2
	12 Mo.	6.9	6.9*	6.9**	7.1**	6.9**

Table I Continued

Entree	Time	Color	Odor	Flavor	Texture	Appearance
Yankee Pot Roast	INT	7.1	7.1	6.6	6.6	7.2
	12 Mo.	6.6*	6.0*	5.9*	5.9*	6.5*
Perch Yucatan	INT	7.2	6.8	6.4	7.1	7.2
	12 Mo.	7.2**	6.6**	6.2**	7.0**	7.1**
Salmon Patties	INT	6.6	6.7	6.6	6.6	6.5
	12 Mo.	6.1**	6.2**	5.8	5.9*	5.7*
Seafood Au Gratin	INT	7.2	7.3	6.9	7.1	7.3
	12 Mo.	6.6	6.8**	6.0*	5.8*	6.5*
Shrimp Creole	INT	7.4	7.1	7.0	6.6	7.3
	12 Mo.	6.8*	6.8	6.7	6.2	6.8**
Shrimp Newburg	INT	7.5	7.2	7.3	7.1	7.4
	12 Mo.	7.2	6.6	6.3*	6.0*	6.8**
Tuna Patties	INT	7.5	7.2	7.3	7.1	7.4
	12 Mo.	6.6*	6.3*	6.2*	6.2*	6.4*
Ham Loaf	INT	7.3	7.0	7.4	6.9	7.0
	12 Mo.	6.4*	6.5	6.5*	6.3	6.1*
Breaded Pork Chops	INT	6.5	6.7	6.7	6.3	6.6
	12 Mo.	6.5	5.9	5.2*	5.6	6.1
Arroz Con Pollo	INT	7.5	7.4	7.4	7.3	7.6
	12 Mo.	6.9*	6.7*	6.5*	6.5*	7.0*
Chicken & Cornbread Casserole	INT	7.0	6.9	7.0	6.6	6.7
	12 Mo.	6.8	6.5	6.8	6.5	6.7
Chicken Parmesan	INT	6.7	6.8	6.7	6.3	6.6
	12 Mo.	6.9	6.7	6.5**	6.5**	7.0
Oriental Chicken	INT	6.8	6.9	6.6	7.1	6.7
	12 Mo.	7.0**	7.0**	6.9	7.1**	7.0**

Table I Continued

	Time	Color	Odor	Flavor	Texture	Appearance
Oven Fried Chicken	INT	7.0	7.0	6.9	6.7	6.9
	12 Mo.	6.4*	6.0*	5.5*	6.3	6.1*
Savory Chicken	INT	6.8	6.9	6.5	6.3	6.8
	12 Mo.	6.4**	6.2*	5.8*	6.2	6.3*
Turkey Tetrazzini	INT	7.5	7.2	7.1	7.2	7.4
	12 Mo.	6.7*	6.4*	6.3*	6.2*	6.4*
Breaded Rabbit	INT	6.6	6.9	6.6	6.7	6.5
	12 Mo.	6.6	6.2*	6.1	6.2	6.5
Breaded Veal Cutlet	INT	7.0	6.9	7.0	6.8	6.5
	12 Mo.	6.1*	5.0*	4.2*	6.0*	5.9*
Veal Balls Braised	INT	6.9	6.9	6.4	6.0	6.6
	12 Mo.	6.5**	6.5	5.8	6.0	6.3
Veal Cordon Bleu	INT	6.7	7.1	6.8	6.6	6.8
	6 Mo.	6.7	6.8	6.6	6.4	6.7
Veal Cutlets Baked	INT	6.5	6.9	6.5	6.2	6.5
	2 Mo.	6.4	6.5	6.3	5.8	6.3
Veal Loaf	INT	6.8	6.9	6.8	6.6	6.8
	12 Mo.	6.2**	6.1*	6.1	6.2	6.1*
Veal Parmesan	INT	7.4	7.2	6.8	6.4	7.0
	12 Mo.	6.5*	6.2*	5.8*	6.3	6.5
Ruben Sandwich	INT	7.2	7.2	7.0	6.8	7.3
	12 Mo.	6.5*	6.3*	5.8*	6.1*	6.5*

* Significant difference at least at the 5% level.

** Refer to tables 2-36 for significant differences at intervals other than initial and 12 months.

Table 2 Panel Ratings for Barbecued Sliced Beef

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.40	6.9A	.59	7.1A	.88	6.9A	.96	6.7A	.53	7.0A
2 IM0	15	.68	6.8A	.35	7.1A	.77	7.2A	.83	6.6A	.53	7.0A
3 2M0	15	.78	7.0A	.41	7.2A	.99	6.9A	.83	6.5A	.52	7.1A
4 6M0	12	.43	7.0A	.00	7.0A	.58	6.8A	1.30	5.7A	.39	7.2A
5 9M0	12	.47	7.1A	.62	6.9A	.85	6.6A	.65	6.6A	.00	7.0A
6 12M0	15	.59	7.1A	.96	6.7A	1.10	6.1B	1.03	6.3A	.65	7.0A

Table 3 Panel Rating for Beef A La Mode

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.41	7.2A	.46	7.1A	.64	7.1AB	.80	6.9A	.68	7.2A
2 1M0	15	.53	7.0A	.53	7.0A	.64	6.9AB	.59	7.1A	.53	7.0A
3 2M0	18	.65	7.2A	.33	7.1A	.75	7.3A	.99	6.8A	.69	7.3A
4 6M0	13	.00	7.0A	.78	6.5B	.86	6.1C	1.07	6.2A	.44	6.8A
5 9M0	16	.52	7.0A	.75	6.8AB	1.20	6.7ABC	.96	6.9A	.57	6.9A
6 12M0	13	.00	7.0A	.44	6.8AB	.66	6.6BC	.75	6.7A	.38	6.8A

Table 4 Panel Rating for Beef Stroganoff

ROW	N	COLOR			ODOR			FLAVOR			TEXTURE			APPEARANCE		
		ST. DEV	AVG		ST. DEV	AVG		ST. DEV	AVG		ST. DEV	AVG		ST. DEV	AVG	
1 OM0	15	.76	7.0A		.62	7.3A		1.01	7.2A		1.06	7.1A		.76	7.0A	
2 1M0	15	.64	7.1A		.88	6.9A		.92	7.1A		1.30	6.4A		.59	7.1A	
3 2M0	15	.46	6.9A		.46	7.1A		.59	6.9A		.83	6.4A		.46	6.9A	
4 6M0	13	.38	6.8A		.44	6.8A		.51	6.6A		1.07	6.2A		.44	6.8A	
5 9M0	16	.45	6.7A		.37	7.0A		1.02	6.6A		1.24	6.1A		.70	6.7A	
6 12M0	13	.55	6.8A		.60	6.8A		.65	6.4A		.85	6.3A		.77	6.6A	

Table 5 Panel Rating for Country Style Steak

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.96	6.7A	.83	6.9A	.99	6.5A	1.40	6.6A	.96	6.7A
2 1M0	15	.96	6.7A	.83	6.9A	.99	6.5A	.90	6.3A	.52	6.9A
3 2M0	15	.76	7.0A	.88	6.9A	1.18	6.7A	1.54	6.3A	.80	6.9A
4 6M0	12	.00	7.0A	.41	7.0A	.60	6.8A	.66	6.5A	.00	7.0A
5 9M0	10	.53	6.5A	.95	5.7B	1.06	5.3B	.97	5.6A	.88	6.1B
6 12M0	12	.45	6.7A	.65	6.7A	.98	6.3A	.67	6.4A	.67	6.6AB

Table 6 Panel Rating for Creamed Chipped Beef

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.46	7.3A	.35	7.1AB	.68	7.2A	.68	7.2A	.49	7.3A
2 1M0	14	.59	7.1A	.70	6.9ABC	1.26	6.2C	.68	6.8A	.68	7.0A
3 2M0	18	.47	7.1A	.42	6.9ABC	.86	6.8ABC	.59	7.0A	.54	7.1A
4 6M0	16	.54	7.2A	.45	7.2A	.68	6.9AB	.63	7.0A	.48	7.3A
5 9M0	12	.39	7.2A	.45	6.7BC	.67	6.6ABC	.43	7.0A	.51	7.1A
6 12M0	13	.00	7.0A	.65	6.6C	.77	6.4BC	.65	6.6A	.44	6.8A

Table 7 Panel Rating for Egg Foo Yung

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.88	7.1A	.36	7.1A	1.36	6.5A	.68	7.2A	.86	7.2A
2 1M0	15	.00	7.0A	.00	7.0A	.82	6.7A	.53	7.0A	.52	7.1A
3 2M0	16	.44	6.9A	.57	6.9A	1.03	6.6A	1.03	6.6A	.44	7.1A

Table 8 Panel Rating for Hungarian Goulash

ROW	N	COLOR			ODOR			FLAVOR			TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.41	7.2A	.41	7.2A	.80	7.1A	.65	7.0A	.64	7.1A	.64	7.1A	.64
2 1M0	15	.64	7.1A	.46	7.1A	.56	6.8A	.64	6.9A	.80	7.1A	.80	7.1A	.80
3 2M0	17	.43	7.1A	.00	7.0A	.60	6.9A	.66	6.8A	.43	7.1A	.43	7.1A	.43
4 6M0	13	.38	6.8A	.38	6.8A	.51	6.6A	.88	6.5A	.48	6.7AB	.48	6.7AB	.48
5 9M0	16	.00	7.0A	.44	6.9A	.77	7.1A	.68	6.9A	.44	7.1A	.44	7.1A	.44
6 12M0	10	.79	6.2B	.82	6.3B	.74	5.9B	.88	5.9B	.67	6.3B	.67	6.3B	.67

Table 9 Panel Rating for Neapolitan Spaghetti

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 0M0	15	1.01	6.2A	.72	6.7C	.88	6.9AB	.53	7.1A	.91	6.4B
2 1M0	15	.56	6.8A	.41	7.2AB	.93	7.0AB	.53	7.0A	.59	6.7AB
3 2M0	16	.66	6.8A	.44	6.9ABC	.83	6.8AB	1.13	6.7AB	.72	6.9AB
4 6M0	16	.89	7.0A	.79	7.3A	.85	7.1A	.66	7.2A	.83	7.2A
5 9M0	12	.67	6.4A	.45	6.7BC	.65	6.3BC	.67	6.4B	.51	6.6B
6 12M0	13	.78	6.5A	.66	6.5C	.86	6.1C	.63	6.3B	.75	6.3B

Table 10 Panel Rating for Pepper Steak

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.72	6.7A	.83	7.1A	.99	6.6A	.99	6.6A	.72	6.7A
2 1M0	15	.41	6.8A	.56	6.8A	.80	6.7A	.43	6.8A	.63	6.6A
3 2M0	15	.52	7.1A	.35	6.9A	.80	6.9A	1.10	6.9A	.70	6.7A
4 6M0	13	.60	6.8A	.38	6.8A	.66	6.5A	.60	6.8A	.55	6.8A
5 9M0	13	.41	7.0A	.49	6.9A	.60	6.8A	.88	6.5A	.49	6.9A
6 12M0	13	.88	6.5A	.66	6.5A	.80	6.2A	.85	6.7A	.51	6.6A

Table 11 Panel Rating for Spanish Steak

ROW	N	COLOR			ODOR			FLAVOR			TEXTURE			APPEARANCE		
		ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV
1 OM0	15	.70	7.1A	.80	7.3A	1.18	6.6A	1.18	6.7A	.65	7.0AB					
2 1M0	15	.52	7.1A	.65	7.0A	.92	6.5A	1.05	6.7A	.53	7.0AB					
3 2M0	14	.59	7.3A	.68	7.2A	.85	7.0A	1.03	5.9A	.62	7.3A					
4 6M0	12	.39	6.8A	.00	7.0A	.51	6.6A	.52	6.5A	.58	6.8AB					
5 9M0	13	.55	6.8A	.60	6.8AB	.95	6.1A	.77	6.6A	.55	6.8AB					
6 12M0	13	.63	6.7A	.65	6.4B	1.09	6.2A	.82	6.0A	.66	6.5B					

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Table 12 Panel Rating for Tallerines

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	12	.58	7.2A	.51	7.4A	.67	7.4A	.62	7.2A	.72	7.2A
2 1M0	13	.00	7.0A	.49	6.9BC	.86	7.1AB	.38	7.2AB	.38	7.2A
3 2M0	11	.00	7.0A	.60	7.0B	.58	7.2AB	.00	7.0AB	.00	7.0A
4 6M0	13	.69	6.8A	.55	6.8BC	.87	6.6BC	.60	6.8BC	.75	6.7AB
5 9M0	12	.67	6.5A	.52	6.5C	.62	6.3C	.51	6.4C	.79	6.4B
6 12M0	15	.59	6.9A	.46	6.9BC	.59	6.9AB	.46	7.1AB	.64	6.9AB

Table 13 Panel Rating for Yankee Pot Roast

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.35	7.1A	.46	7.1A	.83	6.6A	.99	6.6B	.56	7.2A
2 1M0	15	.41	7.2A	.46	7.1A	.52	6.9A	.59	7.3A	.41	7.2A
3 2M0	17	.50	7.0A	.49	6.9A	.61	6.6A	.72	6.5BC	.61	7.0A
4 6M0	12	.39	6.8AB	.39	6.8A	.65	6.3AB	1.00	6.1BC	.39	6.8AB
5 9M0	14	.47	6.9AB	.73	6.7A	.70	6.8A	.76	6.5BC	.47	6.9A
6 12M0	10	.52	6.6B	.82	6.0B	.74	5.9C	.74	5.9C	.53	6.5B

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Table 14 Panel Rating for Perch Yucatan

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	12	.45	7.2A	.72	6.8A	1.00	6.4A	.79	7.1A	.83	7.2A
2 1M0	14	.53	7.1A	.83	6.7A	1.02	6.4A	.73	6.9AB	.53	7.1A
3 2M0	12	.67	7.1A	.67	6.4A	.90	6.6A	.75	6.7AB	.58	6.8A
4 6M0	13	.58	7.0A	.85	6.3A	.80	6.2A	.87	6.4BC	.58	7.0A
5 9M0	12	.90	6.4B	1.06	5.2B	1.00	5.1B	.90	5.9C	1.00	5.9B
6 12M0	15	.56	7.2A	.74	6.6A	.86	6.2A	.53	7.0AB	.52	7.1A

Table 15 Panel Rating for Salmon Patties

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.63	6.6AB	.49	6.7AB	.74	6.6A	.63	6.6AB	.64	6.5A
2 1M0	15	.46	6.9A	.41	6.8A	.63	6.6A	.65	7.0A	.74	6.5A
3 2M0	15	.83	6.5ABC	.74	6.6AB	.99	6.5A	1.13	6.5AB	.99	6.5A
4 6M0	12	.65	6.3BC	.51	6.4ABC	.97	6.3A	.83	5.8C	.67	6.5A
5 9M0	13	.82	6.0C	.95	5.9C	.82	6.0A	.82	6.0BC	.95	5.9AB
6 12M0	13	.64	6.1BC	.73	6.2BC	.80	5.8A	.76	5.9BC	.75	5.7B

Table 16 Panel Rating for Seafood Au Gratin

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.68	7.2A	.59	7.3A	.88	6.9A	.92	7.1A	.82	7.3A
2 1M0	15	.46	6.9AB	.53	7.0AB	1.03	6.9A	1.26	6.2BC	.90	6.7B
3 2M0	13	.60	7.2A	.73	7.2A	1.04	6.9A	.90	6.8AB	.90	7.2AB
4 6M0	14	.47	6.9AB	.76	6.6BC	.85	6.4AB	.92	6.1BC	.76	6.6BC
5 9M0	15	.80	6.3C	1.06	6.1C	1.35	5.6C	1.32	5.8C	.96	5.9C
6 12M0	12	.51	6.6BC	.39	6.8AB	.60	6.0BC	.94	5.8C	.52	6.5BC

Table 17 Panel Rating for Shrimp Creole

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	16	.51	7.4A	.57	7.1A	.89	7.0A	1.02	6.6A	.48	7.3AB
2 1M0	15	.52	7.1ABC	.80	6.9A	1.10	6.7A	1.29	6.3A	.77	7.2ABC
3 2M0	14	.91	7.3AB	.74	7.4A	1.07	6.9A	1.28	6.6A	.65	7.4A
4 6M0	13	.49	6.9BC	.60	6.8A	.66	6.5A	.82	6.0A	.49	6.9BC
5 9M0	13	.44	6.8C	.44	6.8A	.66	6.5A	.95	6.1A	.44	6.8C
6 12M0	12	.58	6.8BC	.72	6.8A	.62	6.7A	.72	6.2A	.58	6.8BC

Table 18 Panel Rating for Shrimp Newburg

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.64	7.5A	.77	7.2A	.82	7.3A	.64	7.1A	.74	7.4A
2 1M0	15	.96	7.3A	1.06	7.1A	1.16	7.1AB	1.21	6.8AB	1.01	7.2AB
3 2M0	14	.78	7.0A	.62	7.1A	.83	6.7ABC	1.07	6.3BC	.73	6.7BC
4 6M0	13	.00	7.0A	.48	6.7A	.48	6.7ABC	.58	6.0C	.77	6.4C
5 9M0	13	.38	6.8A	.48	6.7A	.66	6.5BC	.95	5.9C	.63	6.7BC
6 12M0	12	.39	7.2A	.51	6.6A	.78	6.3C	.74	6.0C	.58	6.8ABC

Table 19 Panel Rating for Tuna Patties

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.64	7.5A	.77	7.2A	.82	7.3A	.64	7.1A	.74	7.4A
2 1M0	15	.53	7.0BC	.70	6.9A	.70	6.7ABC	.86	6.2B	.77	6.8BC
3 2M0	15	.35	7.1AB	.65	7.0A	.93	7.0AB	.80	6.9A	.70	7.1AB
4 6M0	13	.49	6.9BC	.44	6.8AB	.78	6.5BC	.60	6.8AB	.38	6.8BC
5 9M0	13	.49	6.9BC	.75	6.7AB	1.07	6.2C	.77	6.6AB	.49	6.9ABC
6 12M0	13	.51	6.6C	.85	6.3B	.99	6.2C	.90	6.2B	.77	6.4C

Table 20 Panel Rating for Ham Loaf

ROW	N	COLOR			ODOR			FLAVOR			TEXTURE			APPEARANCE		
		ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV
1 0M0	15	.70	7.3A	.85	7.0A	.91	7.4A	1.03	6.9A	.85	7.0A	.85	7.0A	.85	7.0A	.85
2 1M0	15	.83	6.6B	.74	6.6A	.59	7.1AB	.46	6.7A	.92	6.5AB	.92	6.5AB	.92	6.5AB	.92
3 2M0	15	.92	6.9AB	.76	7.0A	.96	7.1AB	.94	7.2A	.88	7.1A	.88	7.1A	.88	7.1A	.88
4 6M0	13	.63	6.7AB	.69	6.8A	.69	6.8AB	.66	6.5A	.60	6.8A	.60	6.8A	.60	6.8A	.60
5 9M0	15	.64	6.5B	.62	6.7A	.62	6.7B	.68	6.8A	.52	6.5AB	.52	6.5AB	.52	6.5AB	.52
6 12M0	13	.65	6.4B	.78	6.5A	.66	6.5B	.85	6.3A	.64	6.1B	.64	6.1B	.64	6.1B	.64

Table 21 Panel Rating for Breaded Pork Chops

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.64	6.5A	.72	6.7A	.80	6.7A	.80	6.3A	.83	6.6A
2 1M0	16	.89	6.4A	.91	6.2A	.93	6.1AB	.79	6.3A	.95	6.3A
3 2M0	12	.67	6.5A	.67	6.4A	.67	5.9B	.79	6.4A	.62	6.7A
4 6M0	13	.51	6.6A	.52	6.5A	.80	6.2AB	.80	5.8A	.52	6.5A
5 9M0	12	.67	6.5A	.49	6.3A	.60	6.0B	.74	6.0A	.72	6.2A
6 12M0	13	.52	6.5A	.76	5.9A	1.07	5.2C	.65	5.6A	.49	6.1A

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Table 22 Panel Rating for Arroz Con Pollo

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	18	.79	7.5A	.70	7.4A	1.14	7.4A	.84	7.3A	.85	7.6A
2 1M0	15	.64	7.1AB	.52	7.1AB	.74	7.1AB	.85	7.0AB	.59	7.3AB
3 2M0	14	.65	7.5A	.58	7.2AB	.86	7.1AB	.73	6.9AB	.63	7.6A
4 6M0	13	.49	6.9B	.38	6.8BC	.69	6.8AB	.69	6.2C	.38	6.8B
5 9M0	12	.51	7.1AB	.45	6.7BC	.51	6.6B	.45	6.7AB	.51	7.1B
6 12M0	13	.76	6.9B	.75	6.7C	.97	6.5B	.78	6.5BC	.58	7.0B

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Table 23 Panel Rating for Chicken and Cornbread Casserole

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 0M0	15	.53	7.0A	.35	6.9A	.00	7.0A	.83	6.6A	.88	6.7A
2 1M0	16	.37	7.0A	.68	6.7A	.66	6.8A	.81	6.6A	.58	6.7A
3 2M0	12	.00	7.0A	.39	6.8A	.62	6.7A	.51	7.1A	.39	7.2A
4 6M0	13	.65	6.6A	.75	6.7A	.52	6.5A	.66	6.5A	.66	6.5A
5 9M0	13	.48	6.7A	.52	6.5A	.52	6.5A	.66	6.5A	.77	6.4A
6 12M0	13	.44	6.8A	.52	6.5A	.60	6.8A	.66	6.5A	.48	6.7A

Table 24 Panel Rating for Chicken Parmesan

ROM	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 QMO	18	.89	6.7A	.62	6.8A	.89	6.7A	.96	6.3A	1.04	6.6A
2 1MO	15	.99	6.4A	.72	6.7A	1.13	6.5AB	1.05	6.7A	1.19	6.1A
3 2MO	11	.81	6.4A	1.25	6.2A	1.22	6.1ABC	.79	6.3A	.82	6.5A
4 6MO	12	.72	6.2A	.87	6.3A	.89	5.7BC	.67	6.6A	.72	6.2A
5 9MO	10	.79	6.2A	.99	5.9A	1.07	5.4C	.67	5.3B	.88	6.1A
6 12MO	13	.76	6.9A	.75	6.7A	.97	6.5AB	.78	6.5A	.58	7.0A

Table 25 Panel Rating for Oriental Chicken

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 DM0	15	.00	6.8AB	.52	6.9AB	.91	6.6A	.36	7.1A	.70	6.7ABC
2 1M0	13	.41	7.0A	.68	6.8AB	.60	6.8A	.60	6.8ABC	.49	6.9AB
3 2M0	12	.51	7.1A	.51	7.1A	.39	7.2A	.51	6.9AB	.51	7.1A
4 6M0	13	.52	6.5B	.51	6.4C	.66	6.5A	.83	6.2C	.52	6.5BC
5 9M0	13	.48	6.7AB	.66	6.5BC	.52	6.5A	.66	6.5BC	.77	6.4C
6 12M0	15	.53	7.0A	.65	7.0A	.74	6.9A	.88	7.1AB	.38	7.0A

Table 26 Panel Rating for Oven Fried Chicken

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.65	7.0A	.53	7.0A	.83	6.9A	.98	6.7A	.70	6.9A
2 1M0	15	.64	7.1A	.52	6.9A	.74	6.9A	.86	6.8A	.94	7.2A
3 2M0	15	.80	6.7AB	.72	6.7AB	1.13	6.1BC	1.28	6.3A	.82	6.7AB
4 6M0	12	.39	6.8AB	.52	6.5ABC	.52	6.5AB	.39	6.8A	.65	6.7AB
5 9M0	13	.75	6.3B	.73	6.2BC	.60	5.8CD	.71	6.0A	.76	5.9C
6 12M0	13	.96	6.4B	.71	6.0C	.66	5.5D	.95	6.3A	.95	6.1BC

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Table 27 Panel Rating for Savory Chicken

RON	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 0M0	15	.41	6.8AB	.64	6.9A	.64	6.5A	.90	6.3A	.41	6.8AB
2 1M0	15	.59	6.9A	.52	6.9A	.64	6.9A	.64	6.9A	.59	6.9A
3 2M0	16	.48	6.7AB	.57	6.9A	.79	6.7A	.83	6.2A	.48	6.7ABC
4 6M0	13	.51	6.4B	.38	6.8A	.65	6.4AB	.78	6.5A	.51	6.4BC
5 9M0	13	.38	6.8A	.49	6.9A	.88	6.5A	.65	6.6A	.55	6.8A
6 12M0	13	.65	6.4B	.69	6.2B	.99	5.8B	.80	6.2A	.75	6.3C

Table 28 Panel Rating for Turkey Tetrazzini

ROM	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	17	.62	7.5A	.44	7.2A	.60	7.1A	.66	7.2A	.80	7.4A
2 1M0	15	.59	7.3AB	.46	7.1AB	.88	6.7AB	.96	6.9A	.77	7.2A
3 2M0	17	.85	7.3AB	.66	7.2A	.97	6.8AB	1.25	6.8AB	.88	7.2A
4 6M0	12	.58	6.8BC	.60	7.0AB	.75	6.7AB	.65	6.7AB	.67	6.9AB
5 9M0	15	.00	7.0BC	.62	6.7BC	1.01	5.8C	.96	6.1B	.63	6.4B
6 12M0	12	.49	6.7C	.67	6.4C	.45	6.3BC	.58	6.2B	.51	6.4B

Table 29 Panel Rating for Breaded Rabbit

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	14	.74	6.6A	.36	6.9A	.63	6.6A	.73	6.7A	.74	6.6A
2 1M0	15	.36	6.9A	.64	6.5ABC	.82	6.7A	.86	6.8A	.90	6.7A
3 2M0	12	.49	6.7A	.49	6.7AB	.45	6.7A	.49	6.7A	.49	6.7A
4 6M0	13	.55	6.8A	.52	6.5ABC	.60	6.2A	.55	6.8A	.48	6.7A
5 9M0	12	.51	6.9A	.49	6.3BC	.67	6.4A	.49	6.3A	.67	6.6A
6 12M0	13	.51	6.6A	.80	6.2C	.76	6.1A	.44	6.2A	.52	6.5A

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Table 30 Panel Rating for Breaded Veal Cutlet

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.53	7.0A	.52	6.9A	.85	7.0A	.68	6.8A	.83	6.5AB
2 1M0	17	.50	7.0A	.50	7.0A	.71	7.0A	.70	6.9A	.53	6.8A
3 2M0	17	.59	6.7AB	.37	7.0A	.75	6.8A	1.17	6.1B	.80	6.5ABC
4 6M0	13	.66	6.5AB	.48	6.7A	1.04	5.9B	.90	5.8B	.73	6.2BC
5 9M0	12	.49	6.3BC	1.24	5.4B	1.28	5.0C	.65	5.7B	.51	5.9C
6 12M0	13	.76	6.1C	1.15	5.0B	1.28	4.2D	.71	6.0B	.76	5.9C

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Table 31 Panel Rating for Veal Balls Braised

ROW	N	COLOR			ODOR			FLAVOR			TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	AVG
1 OM0	16	.50	6.9AB	.89	.89	6.9A	.96	6.4A	1.63	6.0A	.81	6.6A		
2 1M0	15	.46	6.9A	.70	.70	6.9A	.83	6.5A	.49	6.3A	.46	6.7A		
3 2M0	16	.68	6.9A	.50	.50	6.9A	.91	6.2A	.73	6.6A	.66	6.8A		
4 6M0	14	.61	6.3C	.74	.74	6.4A	.93	6.4A	.89	5.8A	.63	6.4A		
5 9M0	12	.39	6.8AB	.45	.45	6.7A	.79	6.4A	.67	6.5A	.45	6.7A		
6 12M0	13	.66	6.5BC	.66	.66	6.5A	.80	5.8A	.82	6.0A	.63	6.3A		

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Table 32 Panel Rating for Veal Cordon Bleu

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	14	.83	6.7A	.36	7.1A	1.05	6.8A	1.34	6.6A	.80	6.8A
2 1M0	15	.59	7.1A	.64	6.9A	.70	7.1A	1.06	6.5A	.59	7.1A
3 2M0	15	.72	6.7A	.82	6.7A	1.06	6.9A	.92	6.5A	.74	6.5A
4 6M0	12	.97	6.7A	.83	6.8A	.80	6.5A	.90	6.4A	.98	6.7A

Table 33 Panel Rating for Veal Cutlets Baked

ROW	N	COLOR		ODOR		FLAVOR		TEXTURE		APPEARANCE	
		ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG	ST. DEV	AVG
1 OM0	15	.52	6.5A	.46	6.9A	1.19	6.5A	.86	6.2A	.52	6.5A
2 1M0	15	.68	6.8A	.52	6.9A	1.15	6.8A	1.06	6.1A	.86	6.8A
3 2M0	15	.91	6.4A	.83	6.5A	.98	6.3A	1.01	5.8A	.88	6.3A

Table 34 Panel Rating for Veal Loaf

ROM	N	COLOR			ODOR			FLAVOR			TEXTURE			APPEARANCE		
		ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV
1 OM0	14	.89	6.8AB	.53	6.9A	.89	6.8A	.76	6.6A	.70	6.8A					
2 1M0	15	.68	7.2A	.65	7.0A	.92	7.1A	.80	7.1A	.85	7.0A					
3 2M0	16	.81	6.9A	.72	6.9A	1.15	6.5A	1.15	6.4A	.96	6.6AB					
4 6M0	13	.48	6.7AB	.48	6.7A	.65	6.6A	.66	6.5A	.48	6.7A					
5 9M0	15	.46	6.9A	.52	6.9A	.74	6.6A	.68	6.8A	.70	6.9A					
6 12M0	13	.93	6.2B	.64	6.1B	.86	6.1A	.80	6.2A	.86	6.1B					

Table 35 Panel Rating for Veal Parmesan

ROW	N	COLOR			ODOR			FLAVOR			TEXTURE			APPEARANCE		
		ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV
1	OMO	16	.50	7.4A	.58	7.2A	.83	6.8AB	1.20	6.4A	.73	7.0A	.73	7.0A	.73	7.0A
2	1MO	15	.59	7.3AB	.35	7.1AB	.65	7.0A	.86	7.2A	.86	7.2A	.86	7.2A	.86	7.2A
3	2MO	17	.00	7.0BC	.70	6.9ABC	.85	6.7ABC	1.00	6.4A	.33	6.9A	.33	6.9A	.33	6.9A
4	6MO	13	.38	6.8CD	.51	6.6CD	.73	6.2BCD	.83	6.2A	.63	6.7A	.63	6.7A	.63	6.7A
5	9MO	12	.00	7.0BC	.49	6.7BCD	1.08	6.1CD	.67	6.5A	.39	6.8A	.39	6.8A	.39	6.8A
6	12MO	13	.66	6.5D	.83	6.2D	.93	5.8D	.85	6.3A	.66	6.5A	.66	6.5A	.66	6.5A

Table 36 Panel Rating for Ruben Sandwich

ROW	N	COLOR			ODOR			FLAVOR			TEXTURE			APPEARANCE		
		ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV	ST. DEV	AVG	ST. DEV
1 OM0	16	.77	7.2A	.54	7.2A	.82	7.0A	.75	6.8AB	.60	7.3A					
2 1M0	12	.51	7.1AB	.39	7.2A	.65	7.3A	.49	6.7AB	.67	6.9ABC					
3 2M0	12	.43	7.0ABC	.00	7.0A	.43	7.0A	.51	6.9A	.43	7.0AB					
4 6M0	13	.00	7.0ABC	.49	6.9A	.55	6.8A	.55	6.8AB	.41	7.0AB					
5 9M0	12	.45	6.7BC	.45	6.7A	.53	6.2B	.49	6.3ABC	.49	6.7BC					
6 12M0	13	.66	6.5C	.75	6.3B	.80	5.8B	.86	6.1C	.66	6.5C					