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TECHNICAL REPORT
NATICK/TR-79/014

LEVEL II

ENTREE PRODUCTION GUIDES FOR MODIFIED DIETS AT WALTER REED ARMY MEDICAL CENTER

PART V: RENAL DIET ITEMS

by

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DECEMBER 1979

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

Food Engineering Laboratory

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At the request of the Walter Reed Army Medical Center, production guides for modified or restricted diets have been developed at NARADCOM. This report includes production guides for eight entrees and one dessert item, desinged for patients on a Renal Diet. The products are portioned into individual servings and then frozen. A panel of food technologists has evaluated samples for color, odor, flavor, texture, and appearance, initially, and after storage at 0°F (-18°C) for 3 months, 6 months, and 12 months. Based on

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these technological evaluations, there were no significant sensory changes in the products over a one-year storage period at 0°F (-18°C). These nine production guides are written in percentages, 25 servings and single servings. They are restricted in protein, sodium, potassium, and water, with calories as high as feasible. Nutrient analysis of each serving is included.

PREFACE

This project was completed at the U.S. Army Natick Research and Development Command at the request of the Walter Reed Army Medical Center and was funded under Intra-Army Order for Reimbursable Services No. S 49193-7008.

The authors wish to thank the Analytical Branch of the Food Science Laboratory for performing the nutritional analysis and the technologists who tested the samples at each withdrawal from storage. Consultations with Captain Jeanette Stanbury, dietitian from Walter Reed, and Mrs. Carol Stoller, dietitian at the Boston Dispensary were invaluable.

The following Food Engineering Laboratory personnel, listed alphabetically, were contributors to the efforts covered in this report:

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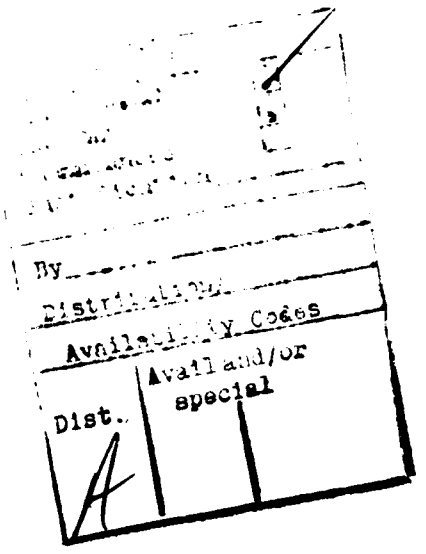

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FOREWORD

Cook-freeze systems are becoming increasingly important in the Armed Forces feeding systems, as well as in hospital feeding, both military and non-military. The construction of a new Walter Reed Army Medical Center (WRAMC) using a cook-freeze system resulted in the development at the U.S. Army Natick Research and Development Command (NARADCOM) of 38 guides designed for this system. These guides, published in Technical Report Natick/TR-77/005[1], were designed for regular hospital feeding, either for patients on nonrestricted diets or for cafeteria use. Other production guides for military cook-freeze systems have been published at NARADCOM. [2, 3, 4, 5, 6]

[1]R. Young, C. Shaw, G. Darsch, J. Tuomy and G. Walker; Meat and Fish Entree Item Production Guides Prepared for Walter Reed Army Medical Center. Natick/TR-77/005 (FEL 77-004) April 1977 (A.D. A004476)

[2]R. Helmer, H. Schlup; Meat Entree Production Guides Developed for Use in Fort Lee Interim Central Food Preparation Facility. Natick/TR-74-27 (FEL) March 1975 (A.D. A009733)

[3]A. Rahman, H. Gorfein, N. Kelley, G. Schafer, W. Swantak and D. Westcott; Production Guides for Vegetables, Entrees, Soups, Desserts, Pastries and Salads Developed for Use in Central Food Preparation Facility. Natick/TR-75-35 (FEL 13) September 1974 (A.D. A001725)

[4]A. Rahman, H. Schlup, G. Schafer, W. Swantak and N. Kelley; Production Guides for Meat and Vegetable Entrees and Desserts Developed for Use in the Frozen Foil Pack Feeding System, F.E. Warren Air Force Base. Natick/TR-70-20 (FEL) February 1976 (A.D. 694354)

[5]J. Tuomy, G. Walker, L. Hinnergardt; Pilot Plant Production of Frozen Entree Items for the Navy. Natick/TR-76-31A (FEL 59) September 1976 (A.D. A031327)

[6]G. Walker, J. Tuomy, C. Kanter; Egg Products for Use in a Cook/Freeze System. Natick/TR-76-28 (FEL 57) August 1976 (A.D. A031327)

At the request of personnel at WRAMC, production guides for modified or restricted diets have been developed at NARADCOM. The dietary restrictions follow the guidelines prescribed by the dietary staff at WRAMC. The requests for production guides for entrees fall into five major categories, each of which are the subjects of Technical Reports:

Part I: Consolidated Modified Meat Entree Production Guides[7] for patients on:

a. Calorie restricted, type II, hyperlipoproteinemia* diabetic, bland diets.

b. Sodium restricted, calorie restricted, type II, hyperlipoproteinemia, diabetic, bland diets.

Part II: Pureed Bland Entree Production Guides[8] for patients unable to chew regular entrees.

Part III: Dental Liquid Entree Production Guides[9] for patients on a liquid diet.

Part IV: Meat Substitute Entrees[10] for patients not desiring to eat meat, fish, or poultry.

Part V: Renal diet items[11] for patients with restricted protein, potassium and sodium intake.

[7]C. Shaw, G. Darsch, G. Legris, Y. Masuoka and J. Tuomy; Entree Production Guides for Modified Diets at Walter Reed Army Medical Center, Part I: Consolidated Modified Meat Entrees. Natick/TR-79/010 1979.

[8]C. Shaw, V. Loveridge, G. Darsch and J. Tuomy; Entree Production Guides for Modified Diets at Walter Reed Army Medical Center, Part II: Pureed Bland Entrees. Natick/TR-79/011 1979.

[9]C. Shaw, V. Loveridge, G. Darsch and J. Tuomy; Entree Production Guides for Modified Diets at Walter Reed Army Medical Center, Part III: Dental Liquid Entrees. Natick/TR-79/012 1979.

[10]G. Darsch, R. Young, C. Shaw and J. Tuomy; Entree Production Guides for Modified Diets at Walter Reed Army Medical Center, Part IV: Meat Substitute Entrees. Natick/TR-79/013 1979.

[11]J. McNutt, M. Branagan, J. McPhee, L. Albertini and M. Klicka; Entree Production Guides for Modified Diets at Walter Reed Army Medical Center, Part V: Renal Diet Items

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*Type II hyperlipoproteinemia diets are low in unsaturated fats and cholesterol. Because these diets are also restricted in calories, all fats have been restricted.

The first section, Part I, of Modified Diets consolidates several different types of diet restrictions, thus allowing the hospital to drastically reduce the number of special diets needed. By careful formulation, these products have retained high flavor quality. The second section, Part II, includes diets designed to upgrade the quality and vary the types of pureed diluted foods or commercial baby foods that are usually served to patients requiring a bland diet of pureed consistency. The third type of diet in Part III, the Dental Liquid, represents a totally new concept in liquid feeding. The production guides in this section make up liquid foods having the taste of a regular entree. Thus, instead of drinking sweet milkshake-type products, a patient can order such liquids as chicken curry, ham with raisin sauce, or veal paprika. The fourth section, Part IV, contains production guides for entrees not containing meat, fish, or poultry. These are designed for the increasing numbers of vegetarian patients. Part V, Renal Diets, consists of eight very carefully weighed entrees and one dessert. These items are designed to give some variety in the diet for the patient with renal dysfunction where calories, protein, sodium, and potassium need to be carefully monitored.

For use in the WRAMC facility, all of the production guides, except those for the Renal Diets, have been written in 100-portion servings using both English and metric units and English volumes of liquids. Percentages of each ingredient are given to allow easy conversion to various sized batches. In order that these guides may be helpful to smaller military hospitals, ten serving portions are given, using common (US customary) kitchen measurements. Production guides for the renal diets are based on percentages, twenty-five portions in both metric and customary units and one-portion servings in metric units. Directions for serving the products without the freezing process are given for the benefit of small hospitals which may not have freezing capabilities.

INTRODUCTION

There are four main objectives to consider in the diet for renal patients. They are to prevent or treat uremia, kidney failure; treat edema caused by the retention of water and sodium; maintain the patient's nutrition; and have a diet as palatable as possible. To meet these first two objectives, it is necessary to restrict protein, sodium, potassium, and water in the diet.

Protein restriction may be the most important of the restrictions for the patient, due to accumulations of nitrogenous waste products in the blood. Since protein is limited, it is necessary to use protein sources of high biological value - those which contain a higher proportion of essential amino acids.

Sodium is restricted to prevent sodium retention and edema. Potassium is restricted to prevent danger of cardiac arrythmias or possible cardiac standstill. Potassium restriction is a difficult aspect of the diet, since all foods except for concentrated carbohydrates contain some potassium.

The intake of fluids is regulated to balance the output of fluids including the insensible water loss through lungs, skin and feces. Rigid fluid restriction is needed for those patients in whom gross edema produces symptoms and particularly where pulmonary edema is present.

Chronic renal failure is a wasting disease so maintaining the patient's nutrition including an adequate caloric intake is of prime importance. When the intake of protein and electrolytes is restricted, calories from carbohydrates and fats become necessary to prevent the breakdown of tissue protein.

It is easy to see that palatability becomes a very essential diet consideration in these cases, since even the most motivated patient has difficulty adhering to this diet. In this study, the most important consideration has been to produce highly acceptable food items within the parameters of the diet.

PROCEDURE

The mission of the Experimental Kitchens was to develop production guides for eight entrees and one dessert item for patients on renal diets. Each production guide was to have percentages of each ingredient, quantities of ingredients for 25 portions, and also quantities for an individual portion.

The nine production guides included in this report are based upon single serving recipes for renal diets submitted by Walter Reed Hospital. In developing the guides, the amount of meat, fish and vegetables included in the serving have not been altered. The low protein, low sodium, low potassium, low liquid requirements were followed followed in all cases.

Seasonings such as lemon extract, distilled vinegar, sugar, dill, rosemary, bay leaf, basil, cloves, and cinnamon have been used to enhance the flavor, since salt is not allowed.

Gravies have been reformulated where freezing-thawing would cause a breakdown of the gravy on reheating.

Though the renal diet should have a high fat content to meet the caloric requirements of the patient, it was not possible to maintain a high quantity of fat in all recipes. On freezing, thawing, and then reheating, the fat floated on top of the sauce, and was considered unpalatable. Heavy cream, as a sauce, tended to break down on reheating. The use of encapsulated fat, as tried in the Sloppy Joe, was successful, but due to the nonfat milk contained in the encapsulated fat, the potassium content of the item was too high. In some cases, fat has been reduced from the amount present in the original recipes.

TECHNOLOGICAL EVALUATIONS

Fifty portions of each item were prepared and stored at 0°F (-18°C) in individual aluminum containers, which were covered and labeled.

The initial sample, which was frozen overnight, was tested by a panel of 10 to 12 food technologists. For serving, all samples were tempered at room temperature for one hour, then heated in a 325°F (163°C) convection oven for 10 to 12 minutes until internal temperature of the food reached 160°F (71°C). This procedure was repeated for each item after storage at 0°F (-18°C) for 3 months, 6 months, and 1 year. A nine-point scale was used for evaluation of color, odor, flavor, texture and appearance. (See appendix). Each tester was given one-half of a portion for evaluation.

After the six months evaluation of the products, it was apparent that the beef stew and wheat starch apple pie needed to be reformulated. The panel felt that the beef stew needed a thickened gravy, and the wheat starch pie was unacceptable because on storage the bottom crust of the wheat starch pie became very pasty. This was reformulated into a pie with only a top crust which necessarily reduced the calories.

Results of the storage test are shown in Table 1. The second reformulated beef stew and wheat starch apple pie have not been in storage for the full 12 months, but ratings are satisfactory after six months of storage. The seven remaining entrees have withstood 12 months at 0°F (-18°C) with no significant decline in ratings due to storage. All ratings are in an acceptable range.

NUTRIENT ANALYSIS

Ten initial samples of each item were sent to the Analytical Chemistry Branch of the Food Sciences Laboratory for determination of nutrient composition (proximate and minerals). Samples were combined and two sets of 100-gram portions were analyzed. Table 2 shows the mean values of two analyses. A portion analysis as shown on the production guide is based upon these analyses. For example, if a portion size is 90 grams, the nutrient analysis is 90% of the 100gram values.

Energy values are computed as specific energy values based on the procedure of the Atwater system as used in Agriculture Handbook No. 8.[12] See Table 3 for computation of energy values).

[12] USDA Composition of Foods, Agriculture Handbook No. 8, Superintendent of Documents, U.S. Government Printing Office, Washington, DC, Reprinted Oct 1975.

BEEF STEW

Renal Diet Each Portion: 61 g

Ingredients	Percent	25 portions Pounds	Grams	1 portion Weight	Measure
1. Beef, diced	26.65	1.21	550	22 g	
Butter, Na/R	2.67	0.12	55	2	
Onions, chopped	13.32	0.61	275	11	
2. Water	26.65	1.21	550	22	
Caramel coloring	0.03	0.001	0.55		< 1/8 tsp. (pinch)
Bay leaf, whole	0.004	0.0002	0.10	—	—
Thyme, ground	0.02	0.001	0.5		< 1/8 tsp. (pinch)
Pepper, black	0.02	0.001	0.5		< 1/8 tsp. (pinch)
3. Starch, Col-Flo 67	1.33	0.06	27.5	1	
Water, cold	2.67	0.12	55	2	
4. Carrots, cooked	13.32	0.61	275	11	
Peas, canned, Na/R, drained	13.32	0.61	275	11	
TOTALS	100.00	4.55	2064.15		

ANALYSIS OF ONE SERVING

Calories	63	Ash	0.37 g
Protein	5.36 g	Calcium	17.1 mg
Fat	2.98 g	Phosphorous	42 mg
Sodium	14 mg	Iron	0.7 mg
Potassium	129 mg	Magnesium	7.9 mg
Water	48.59 g	Chloride as NaCl	0.06 g
Carbohydrate	3.7 g		

BEEF STEW
Renal Diet

PROCEDURE:

1a. Cut beef into dices approximately 10 grams each.

b. Saute diced beef and onions in Na/R butter until beef is browned and onions are tender.

2a. Add water, caramel coloring, bay leaf, thyme, and pepper from Section 2 of ingredients listing.

b. Simmer covered for 1½ hours or until beef is tender.

c. Remove beef, chill, and hold for Step 4b. Reserve liquid for Step 3b.

Gravy preparation:

3a. Using ingredients in Section 3, make a slurry with starch and water.

b. Add to liquid from Step 2c, and heat to 180°F (82°C) stirring constantly.

c. Add back water to maintain formula weight (with overrun) which is 825g for 25 servings or 33g for 1 serving.

4a. Slice carrots into approximately 5-gram pieces. Simmer in unsalted water for 10 minutes and drain.

b. Assemble each serving as follows in individual containers:

11 grams cooked beef
10 grams drained carrots
10 grams drained peas
30 grams gravy

c. Cover, label, and freeze.

NOTES:

1. Formula includes a 10% overrun. Theoretical yield for 25 portions is 27.5 portions.

2. Formula is based on 55% yield of beef. Cooked weight equals approximately 275 grams for 25 servings.

3. To serve without freezing, heat covered in convection oven at 325°F (163°C) for approximately 10 minutes to an internal temperature of 160°F (71°C).

4. To prepare Veal Stew, substitute diced veal for diced beef in Step 1a.

BEEF OR VEAL STEW

INGREDIENTS

Meat

1. Beef, boneless, frozen, grill steak - NSN 8905-0I-004- 2994, MIL-B-0043813, type III.

Vegetables

2. Carrots, fresh - NSN 8915-00-127-8019, Fed. HHH-V-1744/10.
3. Onions, dry - NSN 8915-00-616-0200, Fed. HHH-V-1744/40.

Condiments

4. Bay leaf, whole - NSN 8950-00-170-9561, Fed. EE-S-631, type I
5. Pepper, black, ground - 8950-00-127-8067, Fed. EE-S-631, type II
6. Thyme, ground - 8950-00-616-5483, Fed. EE-S-631, type II

Special Procurement

7. Butter, sweet (no salt added)
8. Caramel coloring, powdered
9. Peas, canned, Na/R
10. Starch, Col-Flo 67

CHICKEN A LA KING

Renal Diet Each Portion: 62 g

Ingredients	Percent	25 Portions Pounds	25 Portions Grams	1 Portion Weight	1 Portion Measure
1. Chicken breasts, boneless, skinless, raw	28.26	1.10	500	20 g	
Butter, Na/R	2.83	0.11	50	2 g	
Dill weed	0.06	0.002	1		< 1/8 tsp. (pinch)
Rosemary, ground	0.06	0.002	1		< 1/8 tsp. (pinch)
2. Sauce					
Wheat starch	1.81	0.07	32	1.25 g	
Water	24.02	0.94	425	17 g	
Cream, heavy	14.13	0.55	250	10 g	
Lemon extract, imitation	0.57	0.02	10		< 1/8 tsp. (pinch)
3. Carrots, fresh, peeled	14.13	0.55	250	10 g	
Peas, Na/R, drained	14.13	0.55	250	10 g	
TOTALS	100.00	3.894	1769		

ANALYSIS OF ONE SERVING

Calories	80	Ash	0.4 g
Protein	6.1 g	Calcium	17 mg
Fat	8.2 g	Phosphorous	63 mg
Sodium	23 mg	Iron	0.1 mg
Potassium	105 mg	Magnesium	9.0 mg
Water	48.0 g	Chloride as NaCl	0.07 g
Carbohydrate	2.4 g		

CHICKEN A LA KING

Renal Diets

PROCEDURE:

Meat Preparation:

1a. Cut chicken into bite size pieces, approximately 10 grams each.

b. Add seasonings listed in Section 1 to chicken, and saute in butter for 10 minutes or until internal temperature reaches 165°F (74°C).

c. Chill chicken and hold for Step 3b. Reserve fat for Step 2a.

Sauce Preparation:

2a. Add wheat starch to reserved fat. Stir until well blended, and cook for approximately two minutes.

b. Add water and cream and heat to 180°F (82°C) stirring constantly.

c. Blend in lemon extract.

d. Add back water to maintain formula weight for sauce (717 grams for 25 servings or 28 grams for one serving).

3a. Slice carrots into approximately 5-gram pieces. Simmer in unsalted water 10 minutes and drain.

b. Assemble each serving as follows in individual containers:

14 grams cooked chicken
10 grams cooked carrots
10 grams canned peas
28 grams sauce

c. Cover, label, and freeze.

NOTES:

1. Formula is based on 70% yield of chicken. Cooked weight of chicken equals approximately 350 grams for 25 servings.

2. To serve without freezing, assemble serving and heat to an internal temperature of 160°F (71°C).

CHICKEN A LA KING

Renal Diet

INGREDIENTS

Vegetables

1. Carrots, fresh, U.S. No. 1 grade - NSN 8915-00-127-8019, Fed. HHH-V-1744/10.

Condiments

2. Dill weed, whole - NSN 8950-00-149-1368, high commercial grade.

Special Procurement

3. Butter, sweet (no salt added)

4. Chicken breasts, fresh

5. Cream, heavy

6. Lemon extract, imitation

7. Peas, canned Na/R

8. Rosemary, ground

9. Wheat starch

CREAM CHEESE SANDWICH, GRILLED

Renal Diet

Each Portion: 1 Sandwich
3.5 oz.
100 g

Ingredients	Percent	25 Portions Pounds	25 Portions Grams	1 Portion Weight	1 Portion Measure
Wheat starch bread, Commercial	50.00	2.76	1250		2 slices (25 g/slice)
Cream cheese	30.00	1.65	750	30 g	2 tbsp
Butter, Na/R	20.00	1.10	500	20 g	4 tsp
TOTALS	100.00	5.51	2500		

ANALYSIS OF ONE SERVING

Calories	37.6	Ash	0.47 g
Protein	3.09 g	Calcium	239 mg
Fat	29.64 g	Phosphorous	55 mg
Sodium	127 mg	Iron	0.2 mg
Potassium	47 mg	Magnesium	2.0 mg
Water	39.23 g	Chloride as NaCl	0.27 g
Carbohydrates	27.6 g		

GRILLED CREAM CHEESE SANDWICH

Renal Diet

PROCEDURE:

1a. Cut bread into 25 g slices.

b. Using two slices bread per sandwich, spread one slice with 30 g cream cheese.

c. Spread second slice with 10 g Na/R butter, and combine sandwich.

d. Spread outside of each slice with 5 g Na/R butter.

e. Grill on 375°F (191°C) griddle, 3 minutes per sode, or until well browned.

f. Cut sandwich in half and wrap in aluminum foil.

2a. Place sandwich in individual container.

b. Cover, label, and freeze.

NOTE: Alternate method of grilling. Place sandwiches on sheet pan and bake in 400°F convection oven ten minutes or until browned.

GRILLED CREAM CHEESE SANDWICH

Renal Diet

INGREDIENTS

Dairy Foods and Eggs

1. Cheese, cream - NSN 8910-00-383-7910

Special Procurement

2. Wheatstarch bread

3. Butter, sweet (no salt added)

MACARONI AND CHEESE

Renal Diet — Each Portion (130 g)

Ingredients	25 Portions Percent	Pounds	Grams	1 Portion Weight	Measure
1. Macaroni, cooked	36.24	2.75	1250	50 g	
2. Butter, Na/R	3.62	0.27	125	5 g	
Wheat starch	2.17	0.17	75	3 g	
Cream, heavy	47.10	3.58	1625	65 g	
Cheese, Na/R, ground	10.87	0.83	375	15 g	
TOTALS	100.00	7.60	3450		

ANALYSIS OF ONE SERVING

Calories	369	Water	73.8 g
Protein	6.5 g	Ash	1.1 g
Fat	30.5 g	Calcium	145 mg
Sodium	111 mg	Phosphorous	158 mg
Potassium	205 mg	Iron	1.7 mg
Water	73.8 g	Magnesium	16.6 mg
Carbohydrate	18.1 g	Chloride as NaCl	0.26 g

MACARONI AND CHEESE

Renal Diet

PROCEDURE:

1a. Cook macaroni in unsalted boiling water until tender (15-20 minutes).

b. Rinse thoroughly in cold water.

2a. Melt butter. Stir in wheat starch to make a roux.

b. Add cream and heat to 180°F (82°C) stirring constantly

c. Add cheese and blend well.

d. Combine macaroni and cheese sauce.

e. Cool to about 50°F (10°C).

f. Place 130 g in individual container.

g. Cover, label, and freeze.

NOTES:

1. Approximately 15 oz. uncooked macaroni will yield 2.75 lb cooked macaroni.

2. To serve without freezing, heat in a convection oven at 325°F (163°C) for approximately 15 minutes to an internal temperature of 160°F (71°C).

MACARONI AND CHEESE

INGREDIENTS — Renal Diet

Cereal

1. Macaroni, elbow - NSN 8920-00-067-6146, Fed. N-M-51, group I, type A, class 2, style a, form II.

Special Procurement

2. Butter, sweet (no salt added)

3. Cheese Na/R

4. Cream, heavy

5. Wheat starch

SLOPPY JOE

Renal Diet Each Portion: 75 g

	Ingredients	Percent	25 Portions Pounds	25 Portions Grams	1 Portion Weights	1 Portion Measure
1.	Beef, ground	33.03	1.65	750	30 g	
	Onions, finely chopped	5.51	0.28	125	5 g	
	Butter, Na/R	1.10	0.06	25	1 g	
2.	Tomatoes, canned Na/R	55.05	2.75	1250	50 g	
	Vinegar, distilled	2.20	0.11	50	2 g	
	Sugar	2.20	0.11	50	2 g	
	Wheat starch	0.66	0.03	15	0.6 g	
	Basil, ground	0.04	0.002	1		<1/8 tsp. (pinch)
	Garlic, granular	0.13	0.006	3		<1/8 tsp. (pinch)
	Cloves, ground	0.08	0.004	2		<1/8 tsp. (pinch)
	TOTALS	100.00	5.002	2271		

ANALYSIS OF ONE SERVING

Calories	106	Ash	0.6 g
Protein	6.5 g	Calcium	3 mg
Fat	6.9 g	Phosphorous	63 mg
Sodium	22 mg	Iron	0.3 mg
Potassium	223 mg	Magnesium	10.9 mg
Water	57.2 g	Chloride as NaCl	0.09 g
Carbohydrate	8.3 g		

SLOPPY JOE

Renal Diet

PROCEDURE:

1. Saute beef and onions in Na/R butter until beef is browned and onions are tender. Hold for step 2d.

2a. Combine ingredients listed in step 2 of ingredient listing in blender and blend until smooth.

b. Heat to 180°F (82°C), stirring constantly.

c. Add water back to maintain 1370 grams for 25 servings or 54 grams for one serving.

d. Add beef and onions to sauce and mix well.

e. Place 75 grams in individual containers.

f. Cover, label, and freeze.

NOTE: To serve without freezing, heat covered, in convection oven 325°F (163°C) for approximately 10 minutes to an internal temperature of 160°F (71°C).

SLOPPY JOE

Renal Diet

INGREDIENTS

Meat

1. Beef, ground - NSN 8905-00-285-2075, USDA Specification for Ground Beef.

Vegetables

2. Garlic, dehydrated, granular - NSN 8915-00-149-1571 Fed. JJJ-O-1866, Type II.

3. Onions, dry - NSN 8915-00-616-0200, Fed. HHH-V-1744/40.

Sugar

4. Sugar, granulated - NSN 8925-00-127-3073, Fed. JJJ-S-791, Type I, Class (a).

Condiments

5. Basil, sweet, ground - NSN 8950-00-404-6066, Fed. EE-S-631, Type II.

6. Cloves, ground - NSN 8950-00-170-9571, Fed. EE-S-631, Type II.

7. Vinegar, distilled - NSN 8950-00-221-0297, Fed. Z-V-401.

Special Procurement

8. Butter, sweet (no salt added)

9. Tomatoes, canned Na/R

10. Wheat starch

SPANISH RICE

Renal Diet

Each Portion:
4 3/4 oz
(134 g)

Ingredients	Percent	25 Portions Pounds	25 Portions Grams	1 Portion Weights	1 Portion Measure
1. Butter, Na/R	6.65	0.55	250	10 g	
Onions, chopped	6.65	0.55	250	10 g	
Beef, ground	19.95	1.65	750	30 g	
2. Tomatoes, canned Na/R	33.37	2.76	1250	50 g	
Rice, cooked	33.37	2.76	1250	50 g	
Rosemary, ground	0.01	0.002	1		1/8 tsp (pinch)
TOTALS	100.00	8.27	3751		

ANALYSIS OF ONE SERVING

Calories	216	Ash	0.67 g
Protein	7.3 g	Calcium	34.7 g
Fat	14.2 g	Phosphorous	79 mg
Sodium	42 mg	Iron	0.5 mg
Potassium	216 mg	Magnesium	12.5 mg
Water	96.96 g	Chloride as NaCl	0.08 g
Carbohydrate	14.8 g		

SPANISH RICE

Renal Diet

PROCEDURE:

1. Saute onions and ground beef in Na/R butter until beef loses its pink color and onions are tender.

2a. Puree canned tomatoes and juice in blender.

b. Add cooked rice, tomatoes and rosemary to ground beef mixture and mix well.

c. Heat to 180°F (82°C).

d. Cool to 50°F (10°C).

e. Place 4 3/4 oz (134 g) in individual containers.

f. Cover, label, and freeze.

NOTES:

1. Formula (25 servings) makes 3 3/4 qt (7.5 lb).

2. 17 oz uncooked rice will yield 12.76 lb cooked rice. Add rice to 5 cups water. Stir, bring to a boil. Cover and simmer 20 minutes.

SPANISH RICE

Renal Diet

Meat, Poultry and Fish

1. Beef, ground, frozen - NSN-8905-00-285-2075, USDA Specification for Ground Beef, Schedule AA

Fruits and Vegetables

2. Onions, dry - NSN-8915-00-616-0200, Fed. HHH-V-1744/40.

Bakery and Cereal Products

3. Rice, parboiled, long grain - NSN-8920-00-530-2185, Fed. N-R-00351.

Special Procurement

4. Butter, sweet (no salt added)

5. Tomatoes, cnd Na/R

6. Rosemary, ground

SWEDISH MEATBALLS

Renal Diet

Each Portion:

2 Meatballs - 23 g
Sauce - 30 g
Total 53 g

Ingredients	Percent	25 Portions Pounds	25 Portions Grams	1 Portion Weights	1 Portion Measure
1. Beef, ground	45.84	1.65	750	30 g	
Onions, finely chopped	7.64	0.28	125	5 g	
Nutmeg	0.12	0.004	2		<1/8 tsp (pinch)
2. Gravy					
Butter, Na/R	3.06	0.11	50	2 g	
Wheat starch	1.96	0.07	32	1.25 g	
Water	25.98	0.94	425	17 g	
Cream, heavy	15.28	0.55	250	10 g	
Dill weed	0.06	0.002	1		<1/8 tsp (pinch)
Nutmeg	0.06	0.002	1		<1/8 tsp (pinch)
TOTALS	100.00	3.608	1636		

ANALYSIS OF ONE SERVING

Calories	121	Ash	0.3 g
Protein	6.5 g	Calcium	11 mg
Fat	10.0 g	Phosphorous	57 mg
Sodium	17 mg	Iron	0.1 mg
Potassium	60 mg	Magnesium	6.3 mg
Water	34.9 g	Chloride as NaCl	0.05
Carbohydrate	1.2 g		

SWEDISH MEATBALLS

Renal Diet

PROCEDURE

Meat Preparation:

1a. Combine all ingredients listed in step 1 of ingredients listing.

b. Mix until well blended, approximately one minute at low speed.

c. Form into meatballs, 17 grams each.

d. Place on sheet pan. Bake in convection oven at 325°F (163°C) for 10 minutes or to 160°F (71°C) internal temperature.

e. Place two meatballs in each individual container.

Gravy Preparation:

2a. Melt butter and add wheat starch. Stir until well blended. Cook for approximately two minutes.

b. Add water, cream, dill and nutmeg from step 2 of ingredients listing and heat to 180°F (82°C) stirring constantly.

c. Add back water to maintain formula weight for gravy (757 grams for 25 servings or 30 grams for one serving).

d. Pour 30 grams sauce over meatballs in each individual container.

e. Cover, label, and freeze.

NOTE: To serve without freezing, heat covered in a convection oven at 325°F (163°C) for approximately 10 minutes to an internal temperature of 160°F (71°C).

SWEDISH MEATBALLS

Renal Diet

INGREDIENTS

Meat

1. Beef, ground, frozen - NSN 8905-00-285-2075, USDA Specification for Ground Beef, Schedule AA.

Vegetables

2. Onions, dry - NSN 8915-00-616-0200, Fed. HHH-V-1744/40

Condiments

3. Dill weed, whole - NSN 8950-00-149-1368, high commercial grade

4. Nutmeg, ground - NSN 8950-00-127-8047, Fed. EE-S-631, type II.

Special Procurement

5. Butter, sweet, (no salt added)

6. Cream, heavy

7. Wheat starch

TUNA NOODLE CASSEROLE

Renal Diet

Each Portion:

4.75 oz
(135 g)

Ingredients	Percent	25 Portions Pounds	Grams	1 Portion Weights	Measure
1. Noodles, cooked	34.38	2.75	1250	50 g	
2. Mushrooms, fresh, sliced	17.19	1.38	625	25 g	
Onions, chopped	3.44	0.27	125	5 g	
Butter, Na/R	6.88	0.55	250	10 g	
3. Cream, heavy	27.51	2.20	1000	40 g	
Dill weed	0.14	0.01	5		<1/8 tsp (pinch)
Pepper, black, ground	0.14	0.01	5		<1/8 tsp (pinch)
4. Tuna, canned, Na/R	10.32	0.83	375	15 g	
TOTALS	100.00	8.00	3635		

ANALYSIS OF ONE SERVING

Calories	297	Ash	0.7 g
Protein	8.9 g	Calcium	45 mg
Fat	23.8 mg	Phosphorus	128 mg
Sodium	23 mg	Iron	2.8 mg
Potassium	181 mg	Magnesium	17.0 mg
Water	88.5 g	Chloride as NaCl	0.11 g
Carbohydrate	13.4 g		

TUNA NOODLE CASSEROLE

Renal Diet

PROCEDURE:

1a. Cook noodles in unsalted, boiling water until tender (15-20 minutes).

b. Rinse thoroughly in cold water.

2. Saute mushrooms and onions in butter.

3a. Combine ingredients listed in section 3 with noodles, sauteed mushrooms and onions.

b. Mix well.

4a. Assemble each serving as follows in individual container:

15 g tuna fish
120 g noodle mixture

b. Cover, label, and freeze.

NOTE: Approximately 12 oz uncooked noodles will yield 2.75 lb cooked noodles.

TUNA NOODLE CASSEROLE

Renal Diet

Vegetables

1. Onions, dry - NSN 8915-00-616-0200, Fed. HHH-V-1744/40

Cereals & Bakery Goods

2. Noodles, egg - NSN 8920-00-126-3388, Fed N-N-591, type I

Condiments

3. Pepper, black, ground - NSN 8950-00-616-5486, Fed EE-S-631, Type II

4. Dill weed, whole - NSN 8950-00-149-1368, high commercial grade

Special Procurement

5. Butter, sweet (no salt added)

6. Tuna, canned, Na/R

7. Cream, heavy

8. Mushrooms, fresh

WHEAT STARCH APPLE PIE

(Top Crust)

Renal Diet

Each Portion: 160 g

Ingredients	Percent	25 Portions Pounds	Grams	1 Portion Weights	Measure
Crust:					
1. Butter, Na/R softened	4.42	0.44	200	8 g	
Shortening	7.74	0.77	350	14 g	
Corn Syrup	3.32	0.33	150	6 g	
Wheat starch	17.70	1.76	800	32 g	
Filling:					
2. Apples, peeled, cored, & sliced	55.30	5.51	2500	100 g	
Butter, Na/R	5.53	0.55	250	10 g	
Sugar, granulated	5.53	0.55	250	10 g	
Cinnamon, ground	0.31	0.03	14		1/4 tsp
Nutmeg, ground	0.15	0.015	7		1/8 tsp
TOTALS	100.00	9.955	4521		

ANALYSIS OF ONE SERVING

Calories	432	Ash	0.3 g
Protein	0.2 g	Calcium	27 mg
Fat	26.8 g	Phosphorous	29 mg
Sodium	18 mg	Iron	0.3 mg
Potassium	94 mg	Magnesium	5.6 mg
Water	80.4 g	Chloride as NaCl	0.03 g
Carbohydrate	52.7 g		

WHEAT STARCH APPLE PIE

Renal Diet

PROCEDURE:

1a. To prepare crust, combine all ingredients in section 1 of ingredient listing and mix thoroughly.

b. Weigh top crusts (60 g each) and roll into rectangles 2 1/2" x 3 1/2".

c. Place on sheet pans and bake in convection oven at 400°F (204°C), for 15 minutes or until golden brown. Cool.

2a. For filling, combine ingredients in section 2 of ingredient listing.

b. Bake covered in convection oven 400°F (204°C) until apples are tender, about 25 minutes.

c. Assemble each individual serving as follows:

(1) Place 112 g apple pie filling, cooked, in serving dish
(2) Top with baked top crust

d. Cover, label, and freeze.

NOTES:

1. Pie crusts are extremely tender and care must be used in handling to keep from crumbling.

2. Individual forms or stencils may be made to aid in rolling of crust. It is recommended that parchment paper be placed on sheet pans. Place weighed dough in stencil and press dough into corners onto the parchment paper. Approximately 15 crusts per sheet pan can be formed.

WHEAT STARCH APPLE PIE

Renal Diet

Ingredients

Fruits

1. Apples, fresh - NSN 8915-00-126-8811, Fed. Y-F-1741/1.

Sugar

2. Sugar, granulated - NSN 8925-00-127-3073, Fed. JJJ-S-791, Class A.

Condiments

3. Cinnamon, ground - NSN 8950-00-170-9573, Fed. EE-S-631, Type IIA.

4. Nutmeg, ground - NSN 8950-00-127-8047, Fed. EE-S-631, Type II.

Oils and Fats

5. Shortening compound, general purpose - NSN 8945-00-616-0091, Fed. EE-S-321, Type II, Class 1(b).

Special Procurement

6. Butter, sweet (no salt added)

7. Syrup, corn

8. Wheat starch

MEAN RATINGS[a] OF FOOD TECHNOLOGISTS
INITIALLY AND AT SPECIFIED STORAGE TIMES[b]

TABLE 1

Beef Stew

	Color	Odor	Flavor	Texture	Appearance
Initial n=10	6.8(0.63)[c]	6.8(0.42)	6.6(0.84)	7.3(0.82)	6.8(0.42)
3 mos@0°F n=10	7.0(0.47)	7.0(0.00)	6.7(0.48)	7.0(0.67)	6.9(0.57)
9 mos@0°F n=10	6.9(0.74)	7.1(0.32)	6.8(0.63)	6.8(0.63)	7.0(0.47)

Chicken A La King

Initial n=10	7.2(0.42)	6.9(0.32)	6.4(0.97)	7.1(0.32)	6.8(0.63)
3 mos@0°F n=10	6.7(0.67)	6.8(0.42)	6.1(0.99)	6.9(0.32)	6.7(0.67)
6 mos@0°F n=12	6.8(0.58)	6.8(0.58)	6.3(1.76)	6.8(0.58)	6.5(0.90)
12 mos@0°F n=10	6.7(0.95)	6.8(1.03)	6.4(1.26)	7.1(0.74)	6.5(1.08)

Cream Cheese Sandwich

Initial n=10	7.5(0.53)	7.5(0.53)	7.2(0.63)	7.2(0.63)	7.4(0.52)
3 mos@0°F n=10	7.4(0.52)	7.4(0.52)	7.0(0.94)	6.9(0.74)	7.3(0.67)
6 mos@0°F n=10	7.3(0.48)	7.2(0.48)	6.8(0.79)	6.8(0.92)	7.1(0.57)
12 mos@0°F n=10	7.3(0.67)	7.3(0.42)	7.2(0.42)	7.0(0.47)	7.4(0.52)

Macaroni and Cheese

Initial n=12	7.2(0.58)	7.0(0.43)	6.5(1.38)	6.8(0.83)	6.9(0.90)
3 mos@0°F n=10	7.3(0.48)	6.9(1.10)	6.1(1.10)	6.9(0.74)	6.7(0.82)
6 mos@0°F n=12	7.2(0.58)	7.0(0.00)	6.3(0.97)	7.1(0.79)	7.2(0.58)
12 mos@0°F n=10	7.1(0.74)	6.8(0.63)	6.1(0.99)	7.0(0.82)	6.8(1.03)

Sloppy Joe

Initial n=10	7.2(0.42)	6.9(0.57)	6.8(0.79)	6.9(0.88)	6.7(0.82)
3 mos@0°F n=10	6.9(0.32)	6.8(0.63	6.5(0.53)	6.8(0.42)	6.6(0.52)
6 mos@0°F n=12	7.0(0.74)	7.0(0.74)	6.5(0.80)	6.9(0.67)	6.7(0.89)
12 mos@0°F n=10	6.8(0.63)	7.0(0.67)	6.7(0.95)	6.8(0.92)	6.0(1.15)

Spanish Rice

Initial n=10	6.6(0.84)	7.0(0.67)	6.3(0.95)	7.0(0.47)	6.7(0.82)
3 mos@0°F n=10	6.7(0.48)	6.8(0.42)	6.5(0.85)	7.0(0.47)	6.6(0.52)
6 mos@0°F n=10	6.4(0.70)	6.9(0.32)	6.5(0.53)	6.9(0.32)	6.7(0.67)
12 mos@0°F n=10	6.1(1.20)	7.0(0.67)	6.6(0.97)	7.2(0.63)	6.6(0.97)

Swedish Meatballs

Initial n=10	7.0(0.00)	7.2(0.42)	6.4(0.70)	6.2(0.79)	6.8(0.42)
3 mos@0°F n=10	6.6(0.52)	6.9(0.57)	6.1(0.57)	6.5(0.53)	6.5(0.53)
6 mos@0°F n=12	7.0(0.60)	6.8(0.58)	6.2(1.34)	6.4(1.00)	6.5(1.00)
12 mos@0°F n=10	6.7(0.67)	7.0(0.67)	6.1(1.20)	5.7(0.67)	6.3(0.95)

Tuna Noodle Casserole

	Color	Odor	Flavor	Texture	Appearance
Initial n=10	6.8(0.79)	6.6(0.97)	6.6(0.84)	7.7(0.47)	6.6(0.84)
3 mos@0°F n=10	6.5(0.53)	6.5(0.85)	5.7(1.16)	6.9(0.57)	6.5(0.71)
6 mos@0°F n=10	6.9(0.57)	6.9(0.88)	6.3(0.82)	7.0(0.67)	6.9(0.57)
12 mos@0°F n=10	6.3(1.06)	5.9(1.52)	5.6(1.35)	6.9(0.74)	6.3(1.06)

Apple Pie

Initial n=10	6.8(0.42)	6.9(0.57)	6.4(0.70)	6.1(0.88)	6.3(1.06)
3 mos@0°F n=10	7.3(0.48)	7.2(0.42)	6.3(1.34)	5.4(1.17)	7.2(0.63)*
6 mos@0°F n=10	6.8(0.79)	7.1(0.57)	6.7(0.82)	6.2(0.92)	6.8(0.79)
12 mos@0°F n=10	6.7(1.06)	7.0(0.67)	6.8(1.14)	6.0(1.15)	6.8(0.92)

*Significantly higher than initial rating at the 0.05 level. This extremely fragile crust is difficult to serve, thus the change in rating of appearance is probably not due to storage but to the cutting of portion into half-size servings for the test.

[a]Rated on a 1 to 9 scale (1=extremely poor; 9=excellent)

[b]There were no significant differences in ratings due to storage ($p < 0.05$)

[c]( ) indicates standard deviations

TABLE 2

NUTRIENT COMPOSITION (Proximate and Mineral) OF ITEMS FOR RENAL DIET

100 GRAM PORTIONS [a]

Food Item	Water	Energy	Protein	Fat	Carbohydrate	Ash	Calcium	Phosphorus	Iron	Sodium	Potassium	Magnesium	Chloride as NaCl
	Pct.	Cal. [b]	gm.	gm.	gm.	gm.	mg.	mg.	mg.	mg.	mg.	mg.	gms.
1. Beef Stew	79.65	104	8.80	4.89	6.06	0.60	28.1	70	1.2	24	212	13.0	0.10
2. Chicken a La King	77.52	128	9.78	8.23	3.86	0.61	27.0	102	0.2	37	170	14.5	0.12
3. Grilled Cream Cheese Sandwich	39.23	376	3.09	29.64	27.57	0.47	23.9	55	0.2	127	47	2.0	0.25
4. Macaroni and Cheese	56.74	284	5.00	23.48	13.94	0.84	112.2	122	1.3	86	158	12.8	0.20
5. Sloppy Joe	76.24	141	8.64	9.22	6.45	0.78	4.0	84	0.4	29	298	14.5	0.12
6. Spanish Rice	72.36	161	5.45	10.60	11.09	0.50	25.9	59	0.4	31	161	9.3	0.06
7. Swedish Meat Balls	65.94	229	12.28	18.86	2.28	0.64	20.0	107	0.2	32	114	11.9	0.10
8. Tuna Noodle Casserole	65.56	220	6.61	17.41	9.90	0.52	33.4	95	1.7	17	134	12.6	0.08
9. Apple Pie	50.22	270	.13	16.74	32.73	0.18	16.8	18	0.2	11	59	3.5	0.02

[a] Nutrient composition for a single serving portion is shown on the production guide.

[b] Calories are based on specific energy values. See Table 3.

TABLE 3

CALCULATED SPECIFIC ENERGY VALUES*

For 100 Gram Portions

Food Item	Calories	Protein Calorie Factor	Fat Calorie Factor	Carbohydrate Calorie Factor
Beef Stew	104	4.09	8.96	3.99
Chicken a la King	129	4.18	8.80	3.98
Cream Cheese Sandwich	376	4.16	8.75	3.78
Macaroni and Cheese	284	4.18	8.79	4.06
Sloppy Joe	141	3.97	8.99	3.70
Spanish Rice	161	4.04	8.88	4.06
Swedish Meatballs	229	4.25	8.92	3.83
Tuna Noodle Casserole	220	4.02	8.79	4.04
Wheat Starch Apple Pie	270	3.70	8.88	3.70

*Calculated using data from Agriculture Handbook 8, Table 6, page 160, "Data Used for Calculating Energy Values of Foods or Food Groups by the Atwater System." (See Reference 12).

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APPENDIX

Form Used for Sensory Evaluations of Each Storage Withdrawal

TECHNOLOGICAL EXAMINATION

PRODUCT:	DATE
TESTERS NAME:	

COLOR									
ODOR									
FLAVOR									
TEXTURE									
APPEARANCE									
Sample Number	Extremely Poor	Very Poor	Poor	Below Fair Above Poor	Fair	Below Good Above Fair	Good	Very Good	Excellent

COLOR									
ODOR									
FLAVOR									
TEXTURE									
APPEARANCE									
Sample Number	Extremely Poor	Very Poor	Poor	Below Fair Above Poor	Fair	Below Good Above Fair	Good	Very Good	Excellent

COLOR									
ODOR									
FLAVOR									
TEXTURE									
APPEARANCE									
Sample Number	Extremely Poor	Very Poor	Poor	Below Fair Above Poor	Fair	Below Good Above Fair	Good	Very Good	Excellent

COLOR									
ODOR									
FLAVOR									
TEXTURE									
APPEARANCE									
Sample Number	Extremely Poor	Very Poor	Poor	Below Fair Above Poor	Fair	Below Good Above Fair	Good	Very Good	Excellent

COLOR									
ODOR									
FLAVOR									
TEXTURE									
APPEARANCE									
Sample Number	Extremely Poor	Very Poor	Poor	Below Fair Above Poor	Fair	Below Good Above Fair	Good	Very Good	Excellent

AMXRE Form 685
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