PCR-P-049
1 June 2016
W/ Change 02 14 Jul 17 ES17-047 (DSCP-SS-17-01160)

SECTION C

This document covers a shelf stable performance readiness bar fortified with calcium and vitamin D.

C-1 ITEM DESCRIPTION

PCR-P-049, PERFORMANCE READINESS BAR, FORTIFIED WITH CALCIUM AND VITAMIN D

Flavor.

Flavor I - Chocolate

C-2 PRODUCT REQUIREMENTS

A. Product standard. A sample shall be subjected to product demonstration model (PDM) inspection as applicable, in accordance with the tests and inspections of Section E of this Product Contract Requirements (PCR) document. The approved sample shall serve as the product standard. Should the contractor at any time plan to or actually produce the product using different raw material or process methodologies from the approved product standard, which result in a product noncomparable to the product standard, the contractor shall submit a replacement PDM for approval. In any event, all product produced must meet all requirements of this document including product standard comparability.

B. Shelf life. The packaged product shall meet the minimum shelf life requirement of 6 months at 80ºF.

C. Appearance. The finished product shall be free from foreign materials.

(1) Flavor I. The bar shall be intact and shall have a medium to dark brown exterior color with a smooth to slightly rough glossy exterior surface. The interior matrix shall be a uniform medium to dark brown color with a dense and slightly porous structure. The interior matrix shall have small intact pieces of light and dark tan crisped cereal grains uniformly distributed throughout. The bar may have a semi-translucent white powdery appearance dispersed throughout the interior matrix and exterior surface.

D. Odor and flavor. The packaged food shall be free from foreign odors and flavors.

(1) Flavor I. The bar shall have a moderately sweet baking chocolate, cocoa and toasted grain odor and flavor. The bar may have a slight to moderate bicarbonate or leavening agent odor and flavor.

E. Texture. The bar shall be chewy and slightly soft with crispy pieces of cereal grains.

F. Dimensions. The bar shall be not less than 4-1/4 inches and not greater than 5-1/4 inches in length by not less than 1-1/2 inches and not greater than 2 inches in width.

G. Net weight. The net weight of an individual bar shall be not less than 2.3 ounces (65 grams).

H. Palatability and overall appearance. The finished product shall be equal to or better than the approved product standard in palatability and overall appearance.

I. Analytical requirements.

(1) Protein. The protein content shall be not less than 8 grams and not greater than 12 grams per bar.

(2) *Trans* fat. The *trans* fat content shall be not greater than 0 grams per bar.

(3) Water activity. The water activity (a_w) shall be not greater than 0.55 when measured at 77ºF (25ºC).

(4) Calories. The calorie content shall be not less than 200 calories and not greater than 250 calories per bar.

(5) Carbohydrates. The carbohydrate content shall be not less than 35 grams and not greater than 43 grams per bar.

(6) Calcium. The calcium content shall be not less than ~~900~~850 milligrams and not greater than ~~1000~~1100 milligrams per bar.

(7) Vitamin D3. The vitamin D3 content shall be not less than ~~1600~~1400 International Units (IU) and not greater than 2000 IU per bar.

J. Microbiological requirements.

(1) Aerobic plate count. The aerobic plate count shall be not greater than 25,000 Colony Forming Units (CFU) per gram in eight of nine samples and not greater than 50,000 CFU per gram in any individual sample.

(2) Yeast and mold. The yeast and mold count (combined) shall not exceed 100 CFU per gram.

(3) *Escherichia coli (E. coli)* count. *E. coli* shall have less than 10 CFU per gram or less than 3 Most Probable Number (MPN) per gram, where findings indicate zero colonies CFU per plate or zero tubes producing gas for MPN.

(4) *Salmonella*. The product shall be *Salmonella* negative for each of nine pouches tested per production lot.

K. Product formulation and ingredients. The following formula shall be used. Ingredient suppliers and available specific ingredients may change (companies bought out, part numbers change, ingredients no longer supplied, etc.). Any changes in formulations and ingredients shall be pre-approved by Natick Soldier Research, Development and Engineering Center (NSRDEC), Combat Feeding Directorate (CFD).

(1) Flavor I, Chocolate.

Ingredients	Percent by weight
Corn syrup (DE 42)	19.200
Date plum or Plum/date/grape fruit paste 1/	14.000
Soy protein cereal crisps 80% protein 2/	12.300
Confectioners' sugar	10.000
Maltodextrin (DE 10)	8.220
Crisp rice cereal, tiny round 2/	8.000
High roast African liquor (chocolate wafers) 3/	7.250
Dextrose monohydrate powder	5.000
Palm oil shortening	4.300
Vitamin premix 4/	3.900
Cocoa powder, Red Dutch (10-12 percent fat)	3.000
Whey protein concentrate 80%	2.000
Glycerin USP or food grade	1.900
Lecithin	0.500
Vanilla powder	0.420
Ascorbyl palmitate	0.015
Mixed tocopherols	0.003

NOTE: The corn syrup and the maltodextrin percentages may be adjusted to ease process and control end item texture. No other percentage adjustments shall be made.

1/ "Fructose, glycerin, date, plum, prep, (40 percent Fructose)" or "Plum/Date/Grape Fruit Paste Fat Replacer" from Mariani Ingredient Prod, 500 Crocker Rd., Vacaville, CA 95688.

2/ "Soy protein crisps 639" and "Crisp Rice Tiny Round 200" from Pacific Grain Products Inc., P.O. Box 2 Woodland, CA 95776.

3/ "H-365" from Wilbur Chocolate, Lititz, PA 17543.

4/ Vitamin premix shall include calcium (as calcium carbonate) and vitamin D3 (as cholecalciferol) and shall be made to ensure compliance with requirements as stated in C-2, I(6) and (7). Vendor shall use FT150302 from DSM Nutritional Products 2105 Technology Drive Schenectady, NY 12308 (or equivalent premix).

L. Preparation and processing. The following preparation and processes were used at the NSRDEC for processing the performance readiness bars fortified with calcium and vitamin D3. Industrial preparation and processing equipment may be used to produce product of the same quality as produced at NSRDEC.

(1) Liquid mix. The liquid mix may be prepared as follows using a steam-jacketed kettle equipped with swept surface agitator.

a. Add corn syrup and glycerin and heat to 180-200°F (82-93°C).

b. Add shortening, lecithin, mixed tocopherols, ascorbyl palmitate; mix until shortening is melted completely. Allow the product temperature to drop to 160°F (71°C).

c. Add date plum fruit paste and mix thoroughly 5-10 minutes or until uniformly mixed and maintain temperature at 150-160°F (66-71°C).

d. Add chocolate liquor and mix thoroughly for 5 minutes until uniform and maintain temperature at 140°F (60°C).

e. Maintain product under low agitation at a temperature not to exceed 140°F (60°C). Temperature may be lowered using cold water in kettle jacket if necessary to obtain suitable viscosity of final dough for extrusion.

f. The liquid mix is drawn according to batch size. The liquid mix may be held in the kettle under low agitation up to 4 hours.

(2) Dough mix. The dough mix may be prepared as follows using an 80 quart Hobart Mixer with standard paddle.

a. Add liquid mix and mix 30 seconds on setting #3 (medium-high speed 183 revolutions per minute (RPM)).

b. Add dry ingredients (dextrose, maltodextrin, cocoa, dry vanilla) and mix 2 to 4 minutes on setting #1 (low speed 55 RPM) or until mix appears homogeneous.

c. Pre-blend Fructose and vitamin D3/calcium premix until uniform and then add to batch. Mix on setting #1 or #2 (low to medium speed 55-120 RPM) until uniformly distributed throughout the dough.

d. Add cereal crisps and mix for 1 - 2 minutes on setting #1 (low speed 55 RPM) until crisps are uniformly dispersed throughout matrix.

NOTE: Caution needs to be taken throughout mixing process to minimize breaking of the crisps.

(3) Bar forming. The bar may be formed as follows using a Hosokawa BEPEX GmhH Model F 97 265 – 266. Other types of bar forming such as: sheeting and/or slab forming equipment are also acceptable. Any type of high shear bar forming shall be avoided to maintain rice crisp integrity.

a. Product shall be extruded through a nozzle or sheeted/formed and cut to produce a bar with nominal dimensions as stated in C-2, F.

b. Finished product is cooled to less than 90°F (32°C) prior to handling and packaging.

SECTION D

D-1 PACKAGING

A. Packaging. One bar shall be commercially packaged in a foil or metalized laminate pouch that will provide an effective light, moisture and oxygen barrier.

D-2 LABELING

A. Packaged bar. Each packaged bar shall be labeled in accordance with all Food and Drug Administration (FDA) laws and regulations for commercially produced food products. In addition the commercially packaged product shall be labeled with the following:

(1) Name and flavor of product (letters not less than 1/8 inch high)
(2) Ingredients
(3) Date 1/
(4) Net weight
(5) Name and address of packer
(6) "Supplement Facts" label in accordance with the Dietary Supplement Health and Education Act (DSHEA) and all applicable FDA regulations
(7) DO NOT CONSUME MORE THAN 1 BAR WITHIN A 15 HOUR TIME PERIOD AND NO MORE THAN 2 BARS WITHIN A 24 HOUR TIME PERIOD

1/ Each pouch shall have the date of pack noted by using a four digit code beginning with the final digit of the current year followed by the three digit Julian day code. For example, 14 February 2017 would be coded as 7045. The Julian day code shall represent the day the product was packaged into the pouch.

D-3 PACKING

A. Packing. No more than 40 pounds of packaged bars shall be packed in a snug-fitting shipping container and closed in accordance with good commercial practices.

D-5 MARKING

A. Shipping containers. Shipping containers shall be marked in accordance with Defense Logistics Agency (DLA) Troop Support Form 3556, Marking Instructions for Boxes, Sacks, and Unit Loads of Perishable and Semiperishable Subsistence.

SECTION E INSPECTION AND ACCEPTANCE

The following quality assurance criteria, utilizing ANSI/ASQ Z1.4, Sampling Procedures and Tables for Inspection by Attributes, are required. Unless otherwise specified, single sampling plans indicated in ANSI/ASQ Z1.4 will be utilized.

A. Definitions.

(1) Critical defect. A critical defect is a defect that judgment and experience indicate would result in hazardous or unsafe conditions for individuals using, maintaining, or depending on the item; or a defect that judgment and experience indicate is likely to prevent the consumption of the product.

(2) Major defect. A major defect is a defect, other than critical, that is likely to result in failure, or to reduce materially the usability of the unit of product for its intended purpose.

(3) Minor defect. A minor defect is a defect that is not likely to reduce materially the usability of the unit of product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit.

B. Classification of inspections. The inspection requirements specified herein are classified as follows:

(1) Product standard inspection. The PDM shall be inspected in accordance with the provisions of this document and evaluated for overall appearance and palatability.

(2) Conformance inspection. Conformance inspection shall include the product examination and the methods of inspection cited in this section. The contractor shall submit (36) sample bars during the first large scale lot of production as first article samples to be evaluated for conformance and comparability to the initial PDM. The selected bars shall be submitted to the following address for evaluation:

DEPARTMENT OF THE ARMY
RDNS-SEC-EMR
NATICK SOLDIER SYSTEMS CENTER
10 GENERAL GREENE AVENUE
NATICK, MA 01760

E-5 QUALITY ASSURANCE PROVISIONS (PRODUCT)

A. Product examination. The finished product shall be examined for compliance with the performance requirements specified in Section C of this Product Contract Requirements document utilizing the double sampling plans indicated in ANSI/ASQ Z1.4. The sample unit shall be one bar. The inspection level shall be S-3 and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 1.5 for major defects and 4.0 for minor defects. Defects and defect classifications are listed in table I.

TABLE I. Product defects 1/ 2/

Category		Defect
Major	Minor	
		General
101		Product not performance readiness bar.
		Flavor I – Chocolate
		Appearance
	201	Bar not intact. 3/
	202	Bar not a medium to dark brown exterior color.
	203	Bar does not have a smooth to slightly rough glossy exterior surface.
	204	Interior matrix not a uniform medium to dark brown color.
	205	Interior matrix not a dense or not a slightly porous structure.
	206	Interior matrix does not have small intact pieces of light or dark tan crisped cereal grains. 4/

TABLE I. Product defects 1/ 2/ - Continued

Category		Defect
Major	Minor	
	207	Crisped cereal grains not uniformly distributed throughout the interior matrix.
		Odor and flavor
102		Bar not a moderately sweet baking chocolate or cocoa or toasted grain odor or flavor.
		Texture
	208	Bar not chewy or not slightly soft or not with crispy pieces of cereal grains.

	Dimensions
209	Bar is less than 4-1/4 inches or is greater than 5-1/4 inches in length by less than 1-1/2 inches or greater than 2 inches in width.
	Net weight
210	Net weight of an individual bar less than 2.3 ounces (65 grams).

1/ Presence of any foreign materials such as, but not limited to dirt, insect parts, hair, glass, wood, or metal, or any foreign odors or flavors such as, but not limited to burnt, scorched, rancid, sour, stale, musty or moldy shall be cause for rejection.

2/ The protein, *trans* fat, calories and carbohydrate content shall be verified by the DSHEA "Supplement Facts" label. Product not conforming to the protein, *trans* fat, calories and carbohydrate content requirements as specified in Section C-2, I of this document shall be cause for rejection.

3/ A bar that is not intact is broken into two or more pieces.

4/ At least 50 percent of the crisped cereal grain pieces shall be intact upon visual examination of a cross section of bar.

B. Methods of inspection.

(1) Shelf life. The contractor shall provide a Certificate of Conformance (CoC) that the product has a 6 month shelf life when stored at 80°F.

(2) Net weight. The net weight of the bars shall be determined by weighing each sample unit on a suitable scale tared with a representative empty pouch. Results shall be reported to the nearest 0.1 ounce or to the nearest 1 gram.

(3) Nutrient content. The contractor shall provide a CoC for the lot including the production formula and premix source formula. Product not conforming to the ingredients, including vitamin premix and percentages as specified in Section C of this Product Contract Requirements document shall be cause for rejection.

(4) Analytical. The sample to be analyzed shall be a composite of eight filled and sealed pouches which have been selected at random from the lot. The composite sample shall

be prepared and analyzed in accordance with the following methods of the Official Methods of Analysis (OMA) of AOAC International.

Test	Method Number
Calcium	984.27, 985.01, or 2011.14 2/
Vitamin D3	979.24, 2002.05, or 2011.11 2/

Verification will be conducted through actual testing by a third party certified analytical laboratory or NSRDEC. Test results shall be reported to the nearest milligram, or IU, as applicable. Any result not conforming to the vitamin and mineral requirement shall be cause for rejection.

2/ Tests will be conducted for calcium and vitamin D3 on the PDMs. If the formula is changed then another set of tests shall be conducted by a third party certified analytical laboratory or NSRDEC, for calcium and vitamin D3, and NSRDEC will be provided a copy of the formulation.

(5) Water activity (a_w) testing. Eight filled and sealed pouches shall be randomly selected from one production lot and tested for a_w in accordance with the latest edition of the OMA of AOAC International, method 978.18, using an electric hygrometer system self-temperature controlled (at 25°C) or an equivalent instrument. Water activity shall be determined not less than 48 hours after packaging to allow moisture equilibration in the product. The sample unit shall be a specimen from the center of the product. Test results shall be reported to the nearest 0.01. Verification will be conducted through actual testing by a third party certified analytical laboratory or NSRDEC. Any nonconforming a_w result shall be cause for rejection.

(6) Microbiological testing. Nine filled and sealed pouches shall be randomly selected from the lot regardless of lot size (recommend selecting three bars each from the beginning, middle and end of production). The pouched product shall be individually tested for microbiological levels in accordance with the latest edition of the OMA of AOAC International or the FDA Bacteriological Analytical Manual (BAM). For aerobic plate count the average result for all pouched product tested must comply as provided in C-2, J(1). For yeast and mold, results for each pouched product must comply as provided respectively in C-2, J(2). For *E. coli* and *Salmonella*, results for each pouch must comply as provided respectively in C-2, J(3) and (4). Verification will be conducted through actual testing by a third party certified analytical laboratory or NSRDEC. Any result not conforming to the microbiological requirements shall be cause for rejection.

Test	Method Number
Aerobic plate count	966.23, 990.12, or BAM, Ch. 3
Yeast and mold	997.02 or BAM, Ch. 18

E.coli	991.14, 2005.03
Salmonella	994.04, 967.26, 996.08, 2003.09, 2004.03

SECTION J REFERENCE DOCUMENTS

Unless otherwise specified, the applicable version of these documents is that which is active on the date of the solicitation or contract.

DLA Troop Support Form

Form 3556	Marking Instructions for Boxes, Sacks, and Unit Loads of Perishable and Semiperishable Subsistence

GOVERNMENT PUBLICATIONS

FOOD AND DRUG ADMINISTRATION	Bacteriological Analytical Manual (BAM) http://www.fda.gov/food/foodscienceresearch/laboratorymethods/ucm2006949.htm

NON-GOVERNMENTAL STANDARDS

AMERICAN SOCIETY FOR QUALITY (ASQ) www.asq.org

ANSI/ASQ Z1.4	Sampling Procedures and Tables for Inspection by Attributes

AOAC INTERNATIONAL www.aoac.org
Official Methods of Analysis (OMA) of AOAC International

For DLA Troop Support Website Posting

RDNS-SEC-EM 14 July 2017

TO: DLA Troop Support - Subsistence

SUBJECT: ES17-047 (DSCP-SS-17-01160); Follow up to ES17-045 (DSCP-SS-17-01190); Waiver request; modify the percentage of the original premix formula and a document change to increase the ranges for calcium and Vitamin D in PCR-P-049, Performance Readiness Bar, Fortified with Calcium and Vitamin D; Contract SPE3S1-16-R-0012.

1. Reference: Memo from RDNS-SEC-EM to DSCP-FTRE, dated 6 July 2017, ES17-045 (DSCP-SS-17-01190); Waiver request; Nonconforming lots to formulation; PCR-P-049, Performance Readiness Bar, Fortified with Calcium and Vitamin D; Contract SPE3S1-17-D-Z123.

2. Natick received an Engineering Support Case from DLA - Troop Support, on behalf of the Vendor, requesting a waiver to the percent by weight of vitamin premix specified in Paragraph C-2 Product Requirements, K(1) Product formulation and ingredient as well as a request to change the range requirements for Calcium and Vitamin D3 specified on Page 2, paragraph C-2, H(6)(7) Analytical Requirements of PCR-P-049, Performance Readiness Bar.

3. Page 3, Paragraph C-2, K(1) Product formulation and ingredients of PCR-P-049, states that there shall be 3.9 percent by weight of Vitamin Premix in the required formula. Additionally on page 2, Paragraph C-2, H(6)(7) Analytical Requirements, of PCR-P-049 states that “The calcium content shall be not less than 900 milligrams and not greater than 1000 milligrams per bar.” and that the “The vitamin D3 content shall be not less than 1600 International Units (IU) and not greater than 2000 IU per bar.”

4. The Vendor is requesting a waiver to the percent by weight requirement of the Vitamin Premix on Page 3, Paragraph C-2, K(1) Product formulation and ingredients of PCR-P-049 from 3.9 percent by weight to 3.55 percent by weight. Additionally, the Vendor is requesting a change to the range requirements for Calcium and Vitamin D3 specified on Page 2, Paragraph C-2, H(6)(7) Analytical Requirements of PCR-P-049, Performance Readiness Bar. The Vendor is requesting that Natick broaden the range requirement for Vitamin D3 (750 IU range) and Calcium (250 mg range).

5. Natick conducted a teleconference with DLA-Troop Support, the Vendor, and Supplier of Vitamin Premix to discuss the current Vitamin Premix product data sheet (Product Code: FT150302 from the Supplier) as well as an alternate Vitamin Premix product data sheet (Product Code: XR66991000 from the Supplier). The Supplier indicated that the alternate Vitamin Premix (Product Code: XR66991000) may produce a more consistent product and would therefore yield an end item that meets the analytical requirement for Calcium and Vitamin D3 in PCR-P-049.

6. Natick also conducted a teleconference with the Army Representative to discuss increasing the allowable range for Calcium and Vitamin D3 in PCR-P-049.

7. Based upon the information above, Natick recommends a waiver to reduce the percent by weight requirement of the Vitamin Premix on Page 3, Paragraph C-2, K(1) Product formulation and ingredients of PCR-P-049 from 3.9 percent to 3.55 percent. All other standards related to product, performance, and analytical requirements will be required to be met satisfactorily.

8. Additionally, Natick recommends a change to the range requirements for Calcium and Vitamin D3 specified on Page 2, Paragraph C-2, H(6)(7) Analytical Requirements of PCR-P-049, Performance Readiness Bar to the following:

(6) Calcium. The calcium content shall be not less than 850 milligrams and not greater than 1100 milligrams per bar.

(7) Vitamin D3. The vitamin D3 content shall be not less than 1400 International Units (IU) and not greater than 2000 IU per bar.

9. Natick does not recommend a change to footnote 4/ for C-2, K(1) Product formulation and ingredients to include the alternate Vitamin Premix Product code since the footnote allows for an equivalent premix to be used.

10. The Service Representative was contacted and the reply was:

Army: Concurs with Natick

11. Attached is Change 02, PCR-P-049, Performance Readiness Bar, Fortified with Calcium and Vitamin D, dated 14 July 2017, with strikethroughs and changes highlighted.