Concentrated Milk Proteins Standard

Product Definition

Concentrated Milk Protein products are obtained by concentrating bovine skim milk through filtration processes so that the finished dry product contains at least 40% protein by weight. Concentrated Milk Protein products may be produced by filtration, dialysis, or any other safe and suitable processes by which all or part of the lactose and minerals may be removed. Products cannot be produced by combining separately produced ingredients, i.e. casein (or caseinates) and whey proteins.

Milk Protein Concentrate (MPC) and Milk Protein Isolate (MPI) are produced by filtration methods (ultrafiltration and diafiltration) which capture essentially all the casein and whey proteins contained in the raw material stream, resulting in products with a casein-to-whey protein ratio equivalent to that of the original milk, generally a value of 80:20.

Concentrated Milk Protein products may also be produced using microfiltration, which will alter the casein-to-whey protein ratio compared to that found in milk. Such products manufactured using microfiltration have casein-to-whey protein ratios that range between 82:18 and 95:5 for commercially available products. These products are called Microfiltered Milk Protein Concentrates (MMPC) and Microfiltered Milk Protein Isolates (MMPI) or Micellar Casein Concentrates (MCC) and Micellar Casein Isolates (MCI).

Concentrated Milk Proteins comply with all provisions of the U.S. Federal Food, Drug, and Cosmetic Act.

Composition: Milk Protein Concentrates (MPCs) and Milk Protein Isolate (MPI)

Several different MPC and MPI products are commercially available, each of which is identified by a number which represents the protein content of the product. These include:

Parameter	Units of Measure	MPC 40	MPC 42	MPC 56	MPC 70	MPC 80	MPC 85	MPI
		Limits (protein limits are minima; all other limits are maxima)						
Protein[1]	%	39.5	41.5	55.5	69.5	79.5	85.0	89.5
Lactose	%	52.0	51.0	36.0	20.0	9.0	8.0	5.0
Fat	%	1.25	1.25	1.50	2.50	2.50	2.50	2.50
Total moisture	%	5.0	5.0	5.0	6.0	6.0	6.0	6.0
Ash	%	10.0	10.0	10.0	10.0	8.0	8.0	8.0

1 - For MPC 85 and MPI the protein limits are on a dry basis instead of the as-is basis. All other units in the table are on the as-is basis.

Composition: Microfiltered Milk Protein Concentrates (MMPCs) and Isolates (MMPIs); and Micellar Casein Concentrates (MCCs) and Isolates (MCIs)

Several different MMPC, MMPI, MCC and MCI products are commercially available, each of which is identified by a number which represents the protein content of the product. These include:

Parameter	Units of Measure	42	70	80	85	MMPI or MCI
		Limits (protein limits are minima; all other limits are maxima)				
Protein[2]	%	41.5	69.5	79.5	85.0	89.5
Lactose	%	51.0	16.0	10.0	3.0	1.0
Fat	%	1.25	2.50	3.00	3.00	3.00
Total moisture	%	5.0	6.0	6.0	6.0	7.0
Ash	%	6.0	8.0	8.0	8.0	8.0

2 - For the 85 and isolate products, the protein limits are on a dry basis instead of the as-is basis. All other units in the table are on the as-is basis.

Other Characteristics

No additional physico-chemical requirements are defined for Concentrated Milk Proteins. Microbiological requirements are as follows:

Microbiological Analysis		
Parameter	**Units of Measure**	**Limits**
Standard plate count	CFU/g	30,000 maximum
Yeast & mold	CFU/g	100 maximum
Coliforms[3]	CFU/g	10 maximum
Enterobacteriaceae[3]	CFU/g	10 maximum
Salmonella genus	CFU/sample[4]	not detected
Listeria genus	CFU/g	not detected

3 - The food industry is trending toward *Enterobacteriaceae* ("EB") as the most commonly used category of indicator organisms for gauging general process sanitation. For compliance with this Standard, either coliforms and/or EB shall be utilized, at the discretion of the manufacturer.

4 - Typical minimum sample size for *Salmonella* testing is 25 g, but the exact sample size and methodology is left to the discretion of the manufacturer.

Methods of Analysis

Parameter	Reference Method
Protein	SMEDP 15.132 (N x 6.38)
Lactose	SMEDP 15.092
Fat	AOAC 989.05
Moisture	AOAC 927.05
Ash	AOAC 900.02
Coliforms	AOAC 989.10
All other microbiological tests	FDA BAM

Product Labeling

Recommended identifications:

Milk Protein Concentrate

where the % protein is declared

Milk Protein Isolate

where the protein content conforms to the limit defined herein

Microfiltered Milk Protein Concentrate

where the % protein is declared

Microfiltered Milk Protein Isolate

where the protein content conforms to the limit defined herein

Micellar Casein Concentrate

where the % protein is declared

Micellar Casein Isolate

where the protein content conforms to the limit defined herein

Typical Applications

Concentrated Milk Proteins can be used as food ingredients in a variety of food categories. Depending on the food category of use, they can serve as emulsifiers, flavor enhancers, flavoring agents, formulation aids, humectants, stabilizers, thickeners, and texturizers; and as sources of high-quality protein.

Typical Storage & Shipping

Product should be stored, shipped, and utilized according to the manufacturer's established recommendations. As guidance, product should be stored and shipped in a cool, dry environment with temperature below 80°F and relative humidity below 65%. Stocks should be rotated and utilized in accordance with the manufacturer's established date of expiration or retest.

Typical Packaging

Multiwall kraft bags with polyolefin inner liner, or other suitable closed containers (e.g., totes) are typical.

Revision History

Version	Effective Date	Notes
1.0*	7/28/2015	First officially approved version of this ingredient standard in its consolidated form, combining Milk Protein Concentrates, Milk Protein Isolate, Microfiltered Milk Protein Concentrates, and Micellar Casein Concentrates.
2.0	07/05/2023	Migrated this Standard to the new modernized format as authorized by the ADPI Standards Committee. No previously established test parameters or limits were materially altered by this update. The standard language regarding product compliance with the U.S. Food, Drug, and Cosmetic Act had been omitted from the prior versions as an oversight and was corrected in this version. Product nomenclature was updated to Microfiltered Milk Protein Concentrate (MMPC) and Micellar Casein Concentrate (MCC) for those respective product categories, for consistency with the naming convention established in the food ingredient marketplace. Casein was omitted from the summary of Methods of Analysis because casein testing is not included among the parameters which define any of the products in this Standard, nor was a testing method provided in the prior version. This revision did require a footnote to clarify the restated units of measure for *Salmonella*.

2.1	10/05/2023	Incorporated the term “isolate” for MMPCs and MCCs where the minimum protein content is 89.5% on a dry basis, consistent with the already established nomenclature for other isolates in the ADPI family of standards. This consistent application of the term “isolate” was vetted with the ADPI Technical Committee before the editorial change was instituted.

* - Assigned *ex post facto*