

# Dairy Ingredients Application Guide

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AMERICAN  
**Dairy Products**  
INSTITUTE®

# Dairy Ingredient Selection by Food Application

## BAKERY PRODUCTS

	WHEY PROTEINS								MILK PROTEINS					CASEINS		CARBOHYDRATES			FATS		
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Casein-ates	Perme-ates <sup>3</sup>	Lactose	GOS <sup>4</sup>	AMF/Boil	CP
<b>Browning</b>	♦♦♦	♦♦♦	♦♦	♦♦	♦	♦	♦	♦	♦♦	♦♦	♦♦	♦	♦	♦	/	/	♦♦♦	♦♦♦	♦	/	♦♦
<b>Whipping</b>	♦	♦	♦♦	♦♦	♦♦♦	♦	♦♦♦	♦♦	♦	♦♦	♦	♦♦	♦♦	♦♦	♦♦	/	/	/	/	/	♦
<b>Water Binding</b>	♦	♦	♦	♦♦	♦♦	♦♦	♦♦	♦	♦♦	♦♦	♦♦	♦♦	♦♦	♦♦	♦♦	♦♦	♦	♦	♦	/	♦♦
<b>Egg Replacement</b>	♦	♦	♦♦	♦♦	♦♦	♦♦	♦♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	/	/	♦	♦♦
<b>Fat Replacement</b>	♦	♦	♦♦	♦♦	♦♦	♦♦	♦♦	♦	♦♦	♦♦	♦	♦	♦	♦	♦	♦	♦	/	/	/	♦
<b>Flavor Enhancement</b>	♦♦♦	♦♦	♦♦	♦	♦	♦	♦	♦	♦♦	♦♦	♦♦	♦	♦	♦	♦	♦	♦♦	♦	♦	♦♦	♦♦
<b>Sodium Reduction</b>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	♦♦	/	/	/	/
<b>Protein Enhancement</b>	♦	♦	♦♦	♦♦	♦♦	♦♦	♦♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	/	/	/	♦
<b>Anti-Staling</b>	/	/	/	/	/	/	/	♦	/	/	/	/	/	/	/	/	♦	♦	♦	♦♦	♦
<b>Gloss</b>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	♦	♦	/	♦♦	/
<b>Shortening</b>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	♦♦	♦♦

### Legend

- ♦♦♦ HIGH
- ♦♦ MEDIUM
- ♦ LOW

AMF/Boil ..... Anhydrous Milk Fat/Butteroil  
 CP ..... Cream Powder  
 DBM ..... Dry Buttermilk  
 DWM/WMP .... Dry Whole Milk/Whole Milk Powder  
 GOS ..... Galacto-oligosaccharides  
 MPC ..... Milk Protein Concentrate  
 MPI ..... Milk Protein Isolate  
 MWP ..... Milk Whey Powder, includes Milk Whey Protein Concentrates (mWPCs) and Milk Whey Protein Isolate (mWPI)

NFDM/SMP .... Nonfat Dry Milk/Skim Milk Powder  
 RM Whey ..... Reduced Minerals Whey  
 WPC ..... Whey Protein Concentrate  
 WPH ..... Whey Protein Hydrolysates  
 WPI ..... Whey Protein Isolate  
 WPPC ..... Whey Protein Phospholipid Concentrate

- (1) Acid and Rennet Casein are not soluble in water and need emulsifying salts to improve their ability to bind water and emulsify
- (2) Instantized versions of milk and whey protein ingredients are recommended for better dispersability
- (3) Permeates include Milk and Whey
- (4) Syrup and Powder



# Dairy Ingredient Selection by Food Application

## BEVERAGES-READY TO DRINK

	WHEY PROTEINS								MILK PROTEINS						CASEINS				CARBOHYDRATES	
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Acid Casein <sup>1</sup>	Rennet Casein <sup>1</sup>	Caseinates	Milk/Whey Permeate	Lactose
<b>HIGH ACID-PH 2.8-3.4</b>																				
Heat Stability	☹☹	☹☹	☹☹	☹☹	☹☹☹	☹	☹☹☹	☹☹☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹☹☹	☹☹☹
Viscosity	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹
Protein Enhancement	☹	☹	☹	☹☹☹	☹☹☹	☹	☹☹☹	☹☹☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹
Clarity	☹	☹	☹	☹	☹☹☹	☹	☹☹☹	☹☹☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹☹☹	☹☹☹
<b>HIGH ACID-PH 3.5-4.5</b>																				
Heat Stability	☹☹	☹☹	☹☹	☹☹	☹☹	☹	☹☹	☹☹☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹☹	☹☹☹
Viscosity	☹	☹	☹	☹	☹	☹	☹	☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹	☹
Protein Enhancement	☹	☹	☹	☹☹☹	☹☹☹	☹	☹☹☹	☹☹☹	☹	☹	☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹	☹
Clarity	☹	☹	☹	☹	☹☹	☹	☹☹	☹☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹☹☹	☹☹☹
<b>LOW ACID- PH 6.5-7.0</b>																				
Heat Stability	☹	☹	☹	☹	☹	☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹	☹☹☹
Viscosity	☹	☹	☹	☹☹	☹☹	☹☹	☹☹	☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹☹	☹	☹
Protein Enhancement	☹	☹	☹	☹☹☹	☹☹☹	☹☹	☹☹☹	☹☹☹	☹☹	☹☹	☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹	☹

### Legend

- ☹☹☹ HIGH
- ☹☹ MEDIUM
- ☹ LOW

AMF/BOil ..... Anhydrous Milk Fat/Butteroil  
 CP ..... Cream Powder  
 DBM ..... Dry Buttermilk  
 DWM/WMP .... Dry Whole Milk/Whole Milk Powder  
 GOS ..... Galacto-oligosaccharides  
 MPC ..... Milk Protein Concentrate  
 MPI ..... Milk Protein Isolate  
 MWP ..... Milk Whey Powder, includes Milk Whey Protein Concentrates (mWPCs) and Milk Whey Protein Isolate (mWPI)

NFDM/SMP .... Nonfat Dry Milk/Skim Milk Powder  
 RM Whey ..... Reduced Minerals Whey  
 WPC ..... Whey Protein Concentrate  
 WPH ..... Whey Protein Hydrolysates  
 WPI ..... Whey Protein Isolate  
 WPPC ..... Whey Protein Phospholipid Concentrate

- (1) Acid and Rennet Casein are not soluble in water and need emulsifying salts to improve their ability to bind water and emulsify
- (2) Instantized versions of milk and whey protein ingredients are recommended for better dispersability
- (3) Permeates include Milk and Whey
- (4) Syrup and Powder



# Dairy Ingredient Selection by Food Application

## BEVERAGES-READY TO MIX

	WHEY PROTEINS								MILK PROTEINS						CASEINS				CARBOHYDRATES	
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Acid Casein <sup>1</sup>	Rennet Casein <sup>1</sup>	Casein-ates	Milk/Whey Permeate	Lactose
Clarity At Acid pH	☹☹	☹☹	☹☹	☹	☹☹☹	☹	☹☹☹	☹☹☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹	☹☹☹	☹☹☹
Viscosity	☹	☹	☹	☹	☹	☹	☹	☹	☹☹	☹☹	☹☹	☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹	☹
Protein Enhancement <sup>2</sup>	☹	☹	☹	☹☹☹	☹☹☹	☹☹	☹☹☹	☹☹☹	☹☹	☹☹	☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹

### Legend

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# Dairy Ingredient Selection by Food Application

## CONFECTIONERY

	WHEY PROTEINS								MILK PROTEINS						CASEINS		CARBOHYDRATES		FATS	
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Caseinates	Milk/Whey Permeate	Lactose	AMF/Boil	CP
<b>CHOCOLATE AND COMPOUND COATING</b>																				
Emulsification	1	1	2	2	2	2	2	1	2	2	2	3	3	3	3	3	1	1	/	/
Sweetness Reduction	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	/	/
Whipping	1	1	2	2	3	1	3	3	1	2	1	2	2	2	2	3	1	1	/	1
Protein Enhancement	1	1	2	3	3	3	3	3	2	2	2	3	3	3	3	3	/	/	/	/
Flavor Enhancement	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	3	3
<b>NON-CHOCOLATE CONFECTIONERY</b>																				
Browning	3	3	2	1	1	1	1	1	2	2	2	2	1	1	1	1	3	3	/	/
Emulsification	1	1	2	2	2	2	2	1	2	2	2	3	3	3	3	3	1	1	/	/
Whipping	1	1	2	2	3	1	3	3	1	2	1	2	2	2	2	3	1	1	/	/
Gelation	1	1	1	2	2	3	3	3	/	/	/	/	/	/	/	/	/	/	/	/
Heat Stability	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	2	3	/	/
Water Binding	1	1	1	2	2	2	2	1	2	2	2	2	3	3	3	3	1	1	/	/
Protein Enhancement	1	1	1	3	3	2	3	3	1	1	1	3	3	3	3	3	/	/	/	/
Flavor Enhancement	2	2	1	1	1	1	1	1	2	2	2	1	1	1	1	1	3	1	/	/

### Legend

- 3 HIGH
- 2 MEDIUM
- 1 LOW

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- (4) Syrup and Powder



# Dairy Ingredient Selection by Food Application

## FROZEN DESSERTS

	WHEY PROTEINS								MILK PROTEINS						CASEINS		CARBOHYDRATES		FATS	
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Casein-ates	Milk/Whey Permeate	Lactose	AMF/BOil	CP
<b>Whipping</b>	👉	👉	👉👉	👉👉	👉👉👉	👉	👉👉👉	👉👉	👉	👉👉	👉	👉👉	👉👉	👉👉	👉👉	👉👉👉	👉	👉	👉👉👉	👉👉👉
<b>Emulsification</b>	👉	👉	👉👉	👉👉	👉👉	👉👉	👉👉	👉	👉👉	👉👉	👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉	👉	👉		
<b>Fat Replacement</b>	👉	👉	👉👉👉	👉👉👉	👉👉👉	👉👉	👉👉👉	👉	👉👉	👉👉	👉👉	👉👉	👉	👉	👉	👉				
<b>Protein Enhancement</b>	👉	👉	👉	👉👉👉	👉👉👉	👉👉	👉👉👉	👉👉👉	👉	👉	👉	👉👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉				

## NUTRITION BARS

	WHEY PROTEINS								MILK PROTEINS						CASEINS			CARBOHYDRATES		
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Caseins <sup>1</sup>	Casein-ates	Milk/Whey Permeate	Lactose	GOS
<b>Protein Enhancement</b>	👉	👉	👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉	👉👉	👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉👉		👉👉			
<b>Reduce Bar Hardening</b>	👉	👉	👉	👉👉	👉👉	👉👉	👉👉	👉👉	👉	👉	👉	👉	👉	👉	👉		👉	👉	👉	👉👉

### Legend

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 CP ..... Cream Powder  
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- (4) Syrup and Powder

# Dairy Ingredient Selection by Food Application

## PROCESS CHEESE/IMITATION CHEESE

	WHEY PROTEINS								MILK PROTEINS						CASEINS				CARBOHYDRATES	
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Acid Casein <sup>1</sup>	Rennet Casein <sup>1</sup>	Caseinates	Milk/Whey Permeate	Lactose
<b>Emulsification</b>	👉	👉	👉👉	👉👉	👉👉	👉👉	👉👉	👉	👉👉	👉👉	👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉👉	👉	👉
<b>Water Binding</b>	👉	👉	👉	👉👉	👉👉	👉👉	👉👉	👉	👉👉	👉👉	👉	👉👉	👉👉	👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉👉	👉	👉
<b>Gelation</b>	👉	👉	👉	👉👉	👉👉	👉👉	👉👉	👉	👉👉	👉👉	👉	👉👉	👉👉	👉👉	👉👉👉	👉👉👉	👉👉👉	👉👉👉	👉	👉
<b>Sodium Reduction</b>																			👉👉👉	

## PUDDING/MOUSSE

	WHEY PROTEINS								MILK PROTEINS						CASEINS		CARBOHYDRATES		FATS	
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Caseinates	Milk/Whey Permeate	Lactose	CP	
<b>Water Binding</b>	👉	👉	👉👉	👉👉	👉👉👉	👉	👉👉👉	👉👉	👉	👉👉	👉👉	👉	👉	👉👉	👉👉	👉👉	👉	👉		
<b>Whipping</b>	👉	👉	👉	👉👉	👉👉👉	👉	👉👉	👉	👉👉	👉👉	👉	👉👉👉	👉👉	👉👉	👉👉👉	👉👉	👉	👉	👉👉	👉👉
<b>Emulsification</b>	👉	👉	👉	👉👉	👉👉👉	👉	👉👉	👉	👉	👉	👉	👉👉	👉👉	👉👉	👉👉	👉👉				
<b>Protein Enhancement</b>	👉	👉	👉	👉👉	👉👉👉	👉	👉👉	👉	👉	👉	👉	👉👉	👉👉	👉👉	👉👉	👉👉				

### Legend

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# Dairy Ingredient Selection by Food Application

## SALTY SNACKS

	WHEY PROTEINS								MILK PROTEINS					CASEINS				CARBOHYDRATES		
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Acid Casein <sup>1</sup>	Rennet Casein <sup>1</sup>	Caseinates	Milk/Whey Permeate	Lactose
<b>Browning</b>	☹☹☹	☹☹☹	☹☹	☹☹	☹	☹	☹	☹	☹☹	☹☹	☹☹	☹	☹	☹					☹☹☹	☹☹☹
<b>Sodium Reduction</b>																			☹☹☹	
<b>Flavor Enhancement</b>	☹☹☹	☹☹	☹☹	☹	☹	☹	☹	☹	☹☹☹	☹☹	☹☹	☹	☹	☹	☹			☹	☹☹☹	☹
<b>Protein Enhancement</b>	☹	☹	☹	☹☹☹	☹☹☹	☹☹	☹☹☹	☹☹☹	☹	☹	☹☹	☹☹☹	☹☹☹	☹☹☹	☹☹☹			☹☹☹		

### Legend

- ☹☹☹ HIGH
- ☹☹ MEDIUM
- ☹ LOW

- AMF/BOil ..... Anhydrous Milk Fat/Butteroil
- CP ..... Cream Powder
- DBM ..... Dry Buttermilk
- DWM/WMP .... Dry Whole Milk/Whole Milk Powder
- GOS ..... Galacto-oligosaccharides
- MPC ..... Milk Protein Concentrate
- MPI ..... Milk Protein Isolate
- MWP ..... Milk Whey Powder, includes Milk Whey Protein Concentrates (mWPCs) and Milk Whey Protein Isolate (mWPI)

- NFDM/SMP .... Nonfat Dry Milk/Skim Milk Powder
- RM Whey ..... Reduced Minerals Whey
- WPC ..... Whey Protein Concentrate
- WPH ..... Whey Protein Hydrolysates
- WPI ..... Whey Protein Isolate
- WPPC ..... Whey Protein Phospholipid Concentrate

- (1) Acid and Rennet Casein are not soluble in water and need emulsifying salts to improve their ability to bind water and emulsify
- (2) Instantized versions of milk and whey protein ingredients are recommended for better dispersability
- (3) Permeates include Milk and Whey
- (4) Syrup and Powder



# Dairy Ingredient Selection by Food Application

## SOUPS AND SAUCES

	WHEY PROTEINS								MILK PROTEINS						CASEINS				CARBOHYDRATES	
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Acid Casein <sup>1</sup>	Rennet Casein <sup>1</sup>	Caseinates	Milk/Whey Permeate	Lactose
<b>Water Binding-Viscosity</b>	●	●	●	●●	●●	●●	●●	●	●●	●●	●●	●●	●●●	●●●	●●●	●●●	●●●	●●●	●	●
<b>Emulsification</b>	●	●	●	●●●	●●●	●●	●●●	●●●	●	●	●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●
<b>Heat Stability</b>	●	●	●	●	●	●	●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●	●●●
<b>Sodium Reduction</b>	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●●●	●
<b>Flavor Enhancement</b>	●●●	●●	●●	●	●	●	●	●	●●●	●●	●●	●	●	●	●	●	●	●	●●●	●
<b>Protein Enhancement</b>	●	●	●	●●●	●●●	●●	●●●	●●●	●	●	●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●	●

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# Dairy Ingredient Selection by Food Application

## YOGURT AND CULTURED PRODUCTS

	WHEY PROTEINS								MILK PROTEINS						CASEINS				CARBOHYDRATES	
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Acid Casein <sup>1</sup>	Rennet Casein <sup>1</sup>	Caseinates	Milk/Whey Permeate	Lactose
<b>Water Binding-Reduce Syneresis</b>	●	●	●●	●●●	●●●	●●	●●●	●●	●●	●●	●	●●	●●	●●	●●			●●		
<b>Gel Strength</b>	●	●	●	●●	●●	●●	●●	●	●●	●●	●	●●	●●●	●●●	●●●	●●●	●●●	●●●	●	●
<b>Heat Stability</b>	●	●	●	●	●	●	●	●●●	●●●	●●●	●●	●●●	●●●	●●●	●●●			●●●	●●	●●●
<b>Protein Enhancement</b>	●	●	●	●●●	●●●	●●	●●●	●●●	●	●	●	●●●	●●●	●●●	●●●			●●●		

## WHIPPED TOPPINGS

	WHEY PROTEINS								MILK PROTEINS						CASEINS		CARBOHYDRATES		FATS
	Whey	RM Whey	WPC34	WPC80	WPI	WPPC	MWP	WPH	DWM/WMP	NFDM/SMP	DBM	MPC70	MPC80	MPI	Micellar Casein	Caseinates	Milk/Whey Permeate	Lactose	CP
<b>Whipping</b>	●	●	●●	●●	●●●	●●	●●	●	●●	●●	●	●●●	●●●	●●●	●●●	●●●	●	●	●●●
<b>Emulsification</b>	●	●	●	●●●	●●●	●●	●●●	●●●	●	●	●●	●●●	●●●	●●●	●●●	●●●			

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- (3) Permeates include Milk and Whey
- (4) Syrup and Powder