



Global Ingredients Division

Technical Guide

ALMOND PROTEIN:

# BETTER FOR YOU BAKERY

[www.bdingredients.com](http://www.bdingredients.com)

# TABLE OF CONTENTS

---

<b>Executive Summary</b>	<b>3</b>
<hr/>	
<b>PDAF fills the gaps</b>	<b>4</b>
<hr/>	
<b>Understanding PDAF</b>	<b>6</b>
What is PDAF? .....	6
How PDAF is made .....	7
PDAF composition .....	7
<hr/>	
<b>Technical Information</b>	<b>8</b>
<hr/>	
<b>PDCAAS &amp; Amino Acid Profile</b>	<b>10</b>
<hr/>	
<b>The unmatched appeal of PDAF</b>	<b>11</b>
<hr/>	
<b>Making the case for PDAF in better-for-you bakery</b>	<b>13</b>
<hr/>	
<b>Better-for-you bakery products (Pancakes, Muffins and Cookies)</b>	<b>16</b>
The Value of PDAF in BFY baked goods .....	20
Pancakes .....	21
Product Name: Protein Pancake.....	23
Muffins.....	24
Product Name: Better-for-You Muffins Enhanced with Blue Diamond Almond Protein .....	26
Cookies.....	27
Product Name: Better-for-You Cookie .....	29



## EXECUTIVE SUMMARY

As the demand for better-for-you bakery grows, so too does the demand for nutritious plant-based ingredients. In a crowded field, the most successful of these will have uncompromised flavor and appearance. Plant-based protein offers a viable way to enhance the nutritional portfolio of carbohydrate-rich products like baked goods, including pastries, breads and cookies. Consumers have traditionally monitored their consumption of these items due to perceived negative health and wellness associations, especially pertaining to weight management. It has been difficult to find drop-in alternatives for partially or wholly replacing fundamental ingredients such as wheat flour in the bakery sector because of their multifaceted functionality and the range of interactions they have with the other ingredients. Partially defatted almond protein flour (PDAF) has emerged as a solution to this problem. It has a mild and neutral flavor, superfine texture, light cream color and can play a key role in solutions to replace wheat flour in a wide range of bakery applications. In addition, the nutritional properties of PDAF are appealing to baked good manufacturers and developers. PDAF contains protein and insoluble fiber, and it is ideal for lowering carbohydrates in formulations without negatively impacting taste, texture or the overall eating experience. It is ideal for boosting quality and nutrition in better-for-you, low carbohydrate, gluten-free, keto and paleo versions of everyday consumer favorites.

- ✓ FLAVOR NEUTRAL
- ✓ PALE CREAM COLOR
- ✓ MULTIFUNCTIONAL
- ✓ PLANT PROTEIN
- ✓ INSOLUBLE FIBER
- ✓ NON-GMO PROJECT VERIFIED
- ✓ LOW/LOW-NET CARBOHYDRATES
- ✓ GLUTEN-FREE
- ✓ SOY-FREE
- ✓ KETO-FRIENDLY
- ✓ VEGAN
- ✓ CLEAN-LABEL
- ✓ KOSHER-PAREVE/HALAL
- ✓ SUSTAINABLY PRODUCED
- ✓ GROWN/MADE IN THE USA

## PDAF FILLS THE GAPS

Consumers of all ages are seeking ingredients they can trust. They have become close readers of product labels for clues to product quality. A call-out on the package, especially the front panel, that the protein and fiber are derived from minimally processed defatted almonds can let them know at a glance that they're getting the quality, transparency and authenticity they demand in their bakery products. This is an excellent way to differentiate PDAF from highly processed proteins derived from other ingredients.



## SCALABLE PRODUCTION FOR RAPID GROWTH

Choosing a supplier partner for sourcing a consistent, plant-based protein is a crucial decision that can impact a brand's ability to rapidly scale production and claim market share. Blue Diamond Growers' vertical integration from crop to final product offers decisive key advantages, including transparency, traceability, efficiency and enhanced scalability planning. Fully integrated almond growers will typically work together with large networks of farmer partners, with whom they can establish specialty crop programs and oversee all steps of the ingredient production to ensure consistent quality and uninterrupted ingredient delivery. This creates the highest possible level of trust for this American-grown and manufactured product.

**PDAF offers a gluten-free, nutrient-dense alternative to flour, containing protein and fiber for batter and dough-based baked goods at various levels of incorporation.**

As the better-for-you bakery category continues its surge, product differentiation will be key to capturing market share. PDAF can be a fundamental game-changer for this, whether the focus is on plant-based protein or fiber to maximize sensory experience and ingredient appeal.

The growing status of almonds as a superfood means that opportunity is ripe for integrating this highly-recognized, nut-based protein into better-for-you applications ranging from pancakes and muffins to cookies and bars. PDAF offers a gluten-free, nutrient-dense alternative to flour, containing protein and fiber for batter and dough-based baked goods at various levels of incorporation. As a plant-based protein designed for health-focused consumers, PDAF offers the baking industry a great way to better target consumers who may have cut back on pancakes, muffins, cookies and other baked goods in recent years.

**As a plant-based protein designed for health-focused consumers, PDAF offers the baking industry a great way to better target consumers who may have cut back on pancakes, muffins, cookies and other baked goods in recent years.**

The remainder of this white paper describes PDAF in detail and presents ideas and formulas for PDAF to elevate selected batter and dough-based bakery staples to the “better-for-you” baking category.

## UNDERSTANDING PDAF THE NEXT MULTIFUNCTIONAL POWERHOUSE INGREDIENT FOR BETTER-FOR-YOU BAKERY

Consumer preference for plant-based protein and fiber-rich diets is paving the way for better-for-your-health strategies such as replacing red meat, consuming fewer high-calorie protein sources and increasing fiber intake. This trend has grown markedly in recent years with the expanded consumer awareness of — and concern for — ethical and environmental sourcing. Today’s consumers pay special attention to the sources and types of protein in their food, which is encouraging product developers to seek plant-based proteins from sources beyond wheat, soy and pea. **Almond protein is a natural, clean-label ingredient especially suitable for the growing gluten-free market, a demographic increasingly seeking the benefits of protein- and fiber-enriched products.** Nutritionally-dense PDAF can return baked goods to being a favorite staple rather than an indulgence.

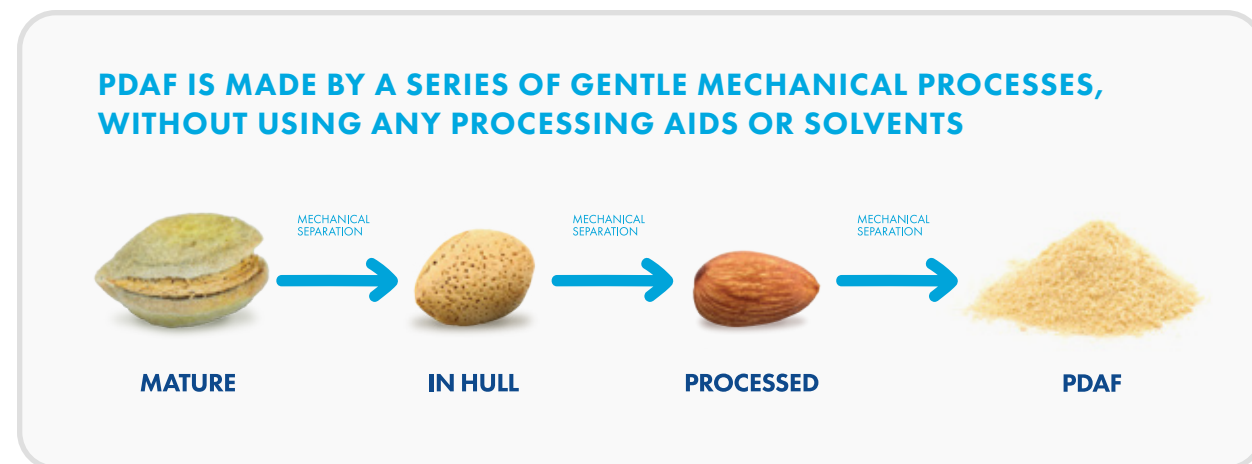
### WHAT IS PDAF?

Partially Defatted Almond Protein Flour Powder (PDAF) is a clean-label, neutral-tasting, plant-based, protein powder derived by removing most of the oil from pasteurized and blanched California-grown almonds that are subsequently ground finely. This series of simple mechanical processes does not employ harsh chemicals or solvents. The resulting finely milled protein flour is nutrient-dense and highly suited to multiple applications requiring a clean, desirable flavor and superfine texture. PDAF allows for the creation of great-tasting products that have a favorable protein profile and its neutral flavor eliminates the need to mask off notes.



## HOW PDAF IS MADE

Unlike traditional protein isolation and concentration methods that rely heavily on pH manipulation (which can denature proteins and affect their functionality), PDAF is made by a series of gentle mechanical processes, without using any processing aids or solvents. The inherent nature and functionality of native proteins in PDAF are not changed, including their configuration, as confirmed by micro-Differential Scanning Calorimetry ( $\mu$ DSC) tests.



## PDAF COMPOSITION

The abundance of plant-based protein varieties makes the selection among those used in better-for-you bakery products increasingly confusing and competitive. Factors to consider include flavor, technical functionality, product differentiation, a specific marketing focus (such as protein and/or fiber content) and safety. With PDAF, product developers have a unique opportunity to combine the taste and health halo of almonds with the only clean-label nut protein available. PDAF contains 45% protein, derived from non-GMO almonds grown in California. PDAF is a source of vitamins and minerals, contains 12% mono- and polyunsaturated lipids and 33% carbohydrates (including 15% insoluble fiber). The great balance of macronutrients (carbohydrates, proteins and fat) in PDAF is key to its performance in dough and batter systems. PDAF contains 1% saturated fat, along with protein, fiber, potassium, calcium, zinc, iron, magnesium, phosphorus, manganese, copper and biotin.

## TECHNICAL INFORMATION

### PRODUCT: 00014 ALMOND PROTEIN POWDER, BLANCHED

#### NUTRITION FACTS, PER 100G\*

Calories	417.90 kcal	Vitamin E - Alpha-Toco	1.89 mg
Fat	11.78 g	Vitamin B1 - Thiamin	0.25 mg
Saturated Fat	1.06 g	Pantothenic Acid	0.85 mg
Trans Fatty Acid	0.02 g	Sodium	4.93 mg
Poly Fat	2.94 g	Calcium	560 mg
Mono Fat	7.25 g	Iron	7.36 mg
Cholesterol	0 mg	Potassium	1366.67 mg
Carbohydrates	32.2 g	Phosphorus	970.67 mg
Dietary Fiber (2016)	14.57 g	Magnesium	553 mg
Soluble Fiber (2016)	0 g	Zinc	5.58 mg
Insoluble Fiber (2016)	14.57 g	Selenium	0 mcg
Total Sugars	9.39 g	Copper	2.04 mg
Added Sugar	0 g	Manganese	3.33 mg
Protein	44.36 g	Molybdenum	0.64 mg
Vitamin D - IU	0 IU	Ash	6.03 g
Vitamin A - RAE	0 mcg	Water	4.96 g

#### INGREDIENT STATEMENT

INGREDIENTS: ALMOND PROTEIN POWDER.

\* The nutrition information contained herein is obtained from random production lot sample tested via independent laboratory and is subject to change. Vitamin C is not tested in this product and no data for its content is available at this time.

**PDAF COMPOSITION**

**45%**  
PROTEIN

- ✓ FIBER
- ✓ POTASSIUM
- ✓ CALCIUM
- ✓ ZINC
- ✓ IRON
- ✓ MAGNESIUM
- ✓ PHOSPHORUS
- ✓ MANGANESE
- ✓ COPPER
- ✓ BIOTIN

The surge in better-for-you bakery products such as pancakes, muffins and cookies has led to an unprecedented level of consumer interest in the quality of alternate proteins. These same consumers, however, refuse to compromise on flavor, texture or nutrition. The protein quality can be improved when combined with other complementary proteins. For example, when combined with pea (which is rich in PDAF’s three limiting amino acids), PDAF can create a higher-quality protein suitable in applications like pancakes, muffins and cookies.

## PDCAAS & AMINO ACID PROFILE

### PRODUCT: 00014 ALMOND PROTEIN POWDER, BLANCHED

#### AMINO ACID CONTENT (G/100G POWDER)

Histidine*	0.80 g	Cysteine	0.51 g
Serine	1.69 g	Lysine*	1.26 g
Arginine	4.48 g	Tyrosine	1.23 g
Glycine	2.37 g	Methionine*	0.41 g
Aspartate / Asparagine	4.37 g	Valine*	1.45 g
Glutamate / Glutamine	11.68 g	Isoleucine*	1.31 g
Threonine*	1.15 g	Leucine*	2.81 g
Alanine	1.62 g	Phenylalanine*	2.26 g
Proline	1.66 g	Tryptophan*	0.50 g

\* Indispensable amino acids (10M, 2005)

#### PROTEIN DIGESTIBILITY CORRECTED AMINO ACID SCORE (PDCAAS)

% True Fecal Protein Digestibility	93.78
POCAAS†	<b>0.44</b>

† PDCAAS = Amino Acid Score × % True Fecal Protein Digestibility in vivo.  
Reference Pattern: FAO 1991 Report; 2-5 yr School Children (mg/g protein).

#### ALLERGENICITY

Almond is considered a food allergen under the “tree nuts” category and is thus subject to labeling under the Food Allergen Labeling and Consumer Protection Act (FALCPA), as regulated by the U.S. FDA (U.S. FDA, 2004). Products made with PDAF must declare “almond(s)” in the “Contains” statement.



## THE UNMATCHED APPEAL OF PDAF

Almonds have broad consumer popularity worldwide. Bakery foods made with almonds are perceived as premium and delicious. Adding PDAF also enhances the nutritional profile of bakery goods, offering marketing advantages for today’s increasingly health-conscious consumers. Compared to other plant-based proteins:

- ✓ PDAF IS PLEASANT TASTING WITHOUT OFF NOTES OR GRASSY OR BEANY FLAVORS
- ✓ PDAF HAS A NEUTRAL FLAVOR WHEN COMPARED TO PEA PROTEIN AND ELIMINATES THE NEED TO MASK OFF NOTES
- ✓ PDAF CONTAINS 15% INSOLUBLE FIBER, WHICH IS CONSIDERED A PLUS IN BATTER- AND DOUGH-BASED BAKERY APPLICATIONS
- ✓ PDAF IS MECHANICALLY EXTRACTED WITHOUT THE USE OF HARSH SOLVENTS, SO ITS PROTEIN IS INTACT
- ✓ PDAF IS COMPOSED OF CARBOHYDRATES, PROTEIN AND FAT IN THE NATIVE MATRIX OF ALMONDS
- ✓ PDAF IS FINELY MILLED, WITH A FINE PARTICLE SIZE AND EVEN DISTRIBUTION
- ✓ PDAF PROTEIN DISPERSES IN WATER, WITH AN INCREASE IN VISCOSITY, GELLING AND BINDING PROPERTIES

### A ONE-STOP INGREDIENT

When it comes to a versatile, clean-label ingredient, Blue Diamond Growers® PDAF checks all the boxes. Blue Diamond Growers®, the world’s leading almond cooperative, has elevated the popularity and success of better-for-you bakery, bars, snacks, protein beverages and confections with an almond-based ingredient that offers multifaceted functionalities and versatility. **It can partially replace all-purpose flour as a drop-in ingredient providing a neutral flavor and smooth mouthfeel, with a clean finish to make better-for-you bakery delightful for even the most discerning palates.** It is a new generation of finely-milled defatted almond protein flour — it is superfine and not gritty, and it has been met with enthusiasm by developers.

Blue Diamond Growers® offers a PDAF with a mild flavor, superfine texture and light cream color, along with a functionality for a wide range of applications. The nutritional properties of this multifaceted and multifunctional ingredient appeal to manufacturers. It provides a source of insoluble fiber with the desired attributes while replacing carbohydrates in better-for-you, low carbohydrate, gluten-free, keto and paleo-friendly products — without compromising taste or texture.



Formulators will appreciate its neutral flavor, free of the vegetal off notes commonly associated with other plant-based proteins allowing the flavor of the finished product to stand out. **PDAF can partially deliver several similar characteristics and functionalities of the starch and protein components of wheat flour without sacrificing the appearance, eating quality or shelf life of bakery products.** It is ideal for formulators seeking ingredients that appeal to better-for-you bakery market sectors and particularly for low carbohydrate, low net-carbohydrate and gluten-free products.

Blue Diamond Growers® PDAF gives you the freedom to blend additional plant-based proteins of your choice while providing a unique combination of functional and product benefits that elevate your offerings.

## MAKING THE CASE FOR PDAF IN BETTER-FOR-YOU BAKERY

Today's food and beverage formulators are under constant pressure to meet the demands for better-for-you foods, and plant-based proteins are at the forefront. Gluten-free, clean-label and non-GMO trends also continue to drive consumer choices. A successful ingredient that meets all those criteria and more, while being suitable for a wide variety of food and beverage applications, exists in PDAF.

PDAF is a multifunctional, non-GMO project verified and certified vegan plant-based protein ingredient. It also is neutral to mildly flavored, as well as gluten-free and soy-free. PDAF offers a vast array of new product development and reformulation opportunities in the better-for-you bakery sector, delivering both functional and health benefits, as well as satisfying the rapidly expanding consumer demand for plant-based products.



**Blue Diamond Growers® offers a PDAF with a mild flavor, superfine texture and light cream color, along with a functionality for a wide range of applications.**

## WHAT'S DRIVING BETTER-FOR-YOU BAKERY?

The demand for plant-based nutrition is creating an opportunity for better-for-you bakery options with protein and fiber. Having these desired ingredients in the bakery aisle helps consumers get more from their favorite bakery products. Three key drivers make a compelling case for enhancing bakery products:

- 1** AWARENESS OF WELLNESS BENEFITS IS PAVING THE WAY FOR NATURALLY BOOSTING PROTEIN AND FIBER IN CARBOHYDRATE-LADEN PRODUCTS, SUCH AS BAKED GOODS — ESPECIALLY IN HIGH-GLYCEMIC, GLUTEN-FREE VERSIONS.
- 2** DEMOGRAPHIC SHIFTS AND DIETARY CHANGES ARE FOCUSING ON BETTER-FOR-YOU VERSIONS OF TRADITIONAL FOODS.
- 3** RAPID ADVANCES ARE BEING MADE IN TECHNOLOGIES RELATED TO PROTEIN-BASED INGREDIENTS THAT PROVIDE BOTH FUNCTIONAL AND NUTRITIONAL BENEFITS.

The evolution of these fundamentals gives commercial bakers an opportunity to diversify their product portfolios to include better-for-you versions of consumers' favorite bakery products. In the past, protein- and fiber-rich ingredients often negatively affected taste and eating experience, diminishing consumer interest. Partially Defatted Almond Protein Flour offers product developers and manufacturers an ideal solution to this challenge.



## GLUTEN-FREE BETTER-FOR-YOU BAKED GOODS

PDAF can add protein and fiber in gluten-free applications. The synergistic interactions of PDAF with base materials such as tapioca, rice, corn and potato, and other ingredients popular for replacing gluten include high water-binding capacity for a moist, soft and smooth product; oil-binding capacity for improved eating experience and storage without affecting the nutrition label negatively; and absence of gritty dry textures. PDAF has a neutral flavor without the bitterness or beany, grassy off notes of other plant proteins. PDAF is declared as “almond protein powder” in the ingredient list, and its multifaceted functionalities can reduce the need for additional functional ingredients and flavor maskers. In addition to the positive functional attributes of PDAF, the ingredient features a significant nutritional benefit. PDAF provides a protein boost along with a higher fiber content compared to other plant proteins. The functional benefits of PDAF include ideal texture from its moisture and fat absorption properties, a subtle flavor that is synergistic with all other flavors and the absence of the gritty and chalky textures of most plant proteins when used in gluten-free applications.



## BETTER-FOR-YOU BAKERY PRODUCTS (PANCAKES, MUFFINS AND COOKIES)

Creating quality better-for-you baked goods can pay off when consumer expectations for taste, quality and nutrition are met. Consumers seek high-quality products in bakeries and especially value products made with minimally processed ingredients. Utilizing PDAF as an ingredient can help deliver premium appeal and “better-for-you” claims to bakery applications such as pancakes, muffins and cookies, without raising concerns about taste and texture.

- ✓ PROTEIN PLUS
- ✓ FIBER FORTIFICATION
- ✓ FAT FUNCTIONALITY
- ✓ RHEOLOGY
- ✓ WATER-BINDING CAPACITY
- ✓ OIL-BINDING CAPACITY
- ✓ PARTICLE SIZE DISTRIBUTION
- ✓ SENSORY
- ✓ COLOR

### PROTEIN PLUS

Incorporating a protein ingredient into food formulations such as dough and batter can be challenging as proteins have an affinity for water and they interact with other ingredients, affecting product characteristics including flavor, texture and appearance.

Depending on the product application, replacing 10–18% wheat flour with PDAF can boost the protein on the finished product by as much as 65–150%. Moreover, the retention of the native protein-starch-fat matrix in PDAF increases water absorption, helping to balance function and flavor.



The affinity of plant proteins for water often presents a challenge during shelf life. Added protein tends to make dough and batter dense and leaves the finished product more susceptible to drying out and/or hardening, with increased crumbliness. The right balance of PDAF with moisture and other ingredients containing protein and carbohydrates within a bakery formulation helps to avoid this issue.

### FIBER FORTIFICATION

PDAF contains 14% insoluble fiber. The fiber in PDAF is a 100% insoluble dietary fiber which can be a positive contribution to pancakes and muffins.



The fiber in almonds and PDAF qualifies as a dietary fiber under the FDA's 2016 definition and can be declared as dietary fiber in a product's nutrition facts panel.

### FAT FUNCTIONALITY

The mono- and polyunsaturated fats in PDAF play an important role in driving the desired sensory experiences in better-for-you bakery products. It enhances taste, texture, appearance and aroma in baking. Importantly, it does not cause off flavors or dryness often associated with other plant-based proteins and fibers. The lipids in PDAF provide a clean and neutral taste.



In better-for-you bakery products, PDAF can promote browning during baking. A key feature in cookies is the crisp and soft texture, which is positively affected by the lipids in PDAF. At higher levels of incorporation, the lipids in PDAF also contribute to two other key sensory properties — color and appearance. PDAF dispersed throughout a cookie dough can help create an appealing appearance.

### RHEOLOGY

Rheology describes the state of flow and change in semi-fluid solids such as batters, including critical aspects of cohesiveness, strength and pattern of deterioration. This helps determine viscosity, mixing time, cooking temperature and other baking parameters of the ingredient mixture. Farinograph properties such as peak viscosity, rate of hydration, mixing time and mixing stability are used to gauge the suitability of an ingredient for bakery products like pancakes, muffins and cookies.



### FARINOGRAPH: PROPERTIES OF WHEAT FLOUR WITH 10% PDAF



The addition of PDAF helps strengthen the dough and increases viscosity — attributes highly valued in industrial dough systems. Most importantly, the addition of up to 10% PDAF does not change rheology significantly and therefore does not significantly change the baking characteristics in the finished product (see table, below).

INGREDIENT	Peak viscosity (BU)	Hydration rate (min)	Mixing time (min)	Mixing stability (min)
Wheat flour 100%	550	4.8	8.0	10.6
Wheat flour + PDAF (10%)	620	5.0	8.8	7.9

### WATER-BINDING CAPACITY

Water-binding capacity (WBC) is the ability of proteins to prevent water from being released or expelled from their cell structure. Proteins with a high WBC can retain moistness and improve texture to prevent dryness and crumbliness, two major complaints often associated with better-for-you baked goods.

The protein matrix in PDAF increases the viscosity of the pancake batter, making it more cohesive. With PDAF, the resulting pancake is cohesive and moist. PDAF has a higher WBC than most plant-based proteins and may reduce the need for binding agents in gluten-free formulations or the need for additional thickening additives in batter systems.



### OIL-BINDING CAPACITY

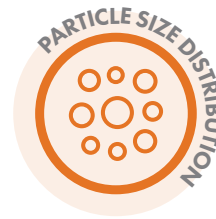
Oil-binding capacity influences texture in better-for-you bakery products. The ability of the proteins in PDAF to bind and interact cohesively with fats, results in a better eating experience. For product developers, this means less added fat is needed to enhance palatability and allows for a more appealing nutrition label.



Cohesiveness without gumminess is important in gluten-free formulations that lack the oil-binding capacity of gluten and wheat proteins. The protein and fiber matrix in PDAF aids adherence to fat during processing and storage to prevent the crumb from hardening and crumbling.

### PARTICLE SIZE DISTRIBUTION

Particle size range and distribution of base ingredients influence their interaction with water and oil. Because PDAF is finely milled, it blends well with other ingredients, flows easily through manufacturing equipment and hydrates rapidly and consistently.



### SENSORY

Most alternative protein sources considered healthier and more sustainable are perceived by consumers as having flavor and other organoleptic issues, such as off notes and unappealing aroma and color. PDAF is made from 100% California-grown almonds and is mechanically processed to maintain the unique flavor, aroma and color attributes consumers expect from almonds and almond ingredients.



### COLOR

PDAF has a light cream-colored tint — a hue particularly desirable for bakery applications to avoid off colors in the final product. No artificial whiteners or adjustment of the formulation to counter any green or brown hues are needed. PDAF may be incorporated into lighter baked products without causing off colors.

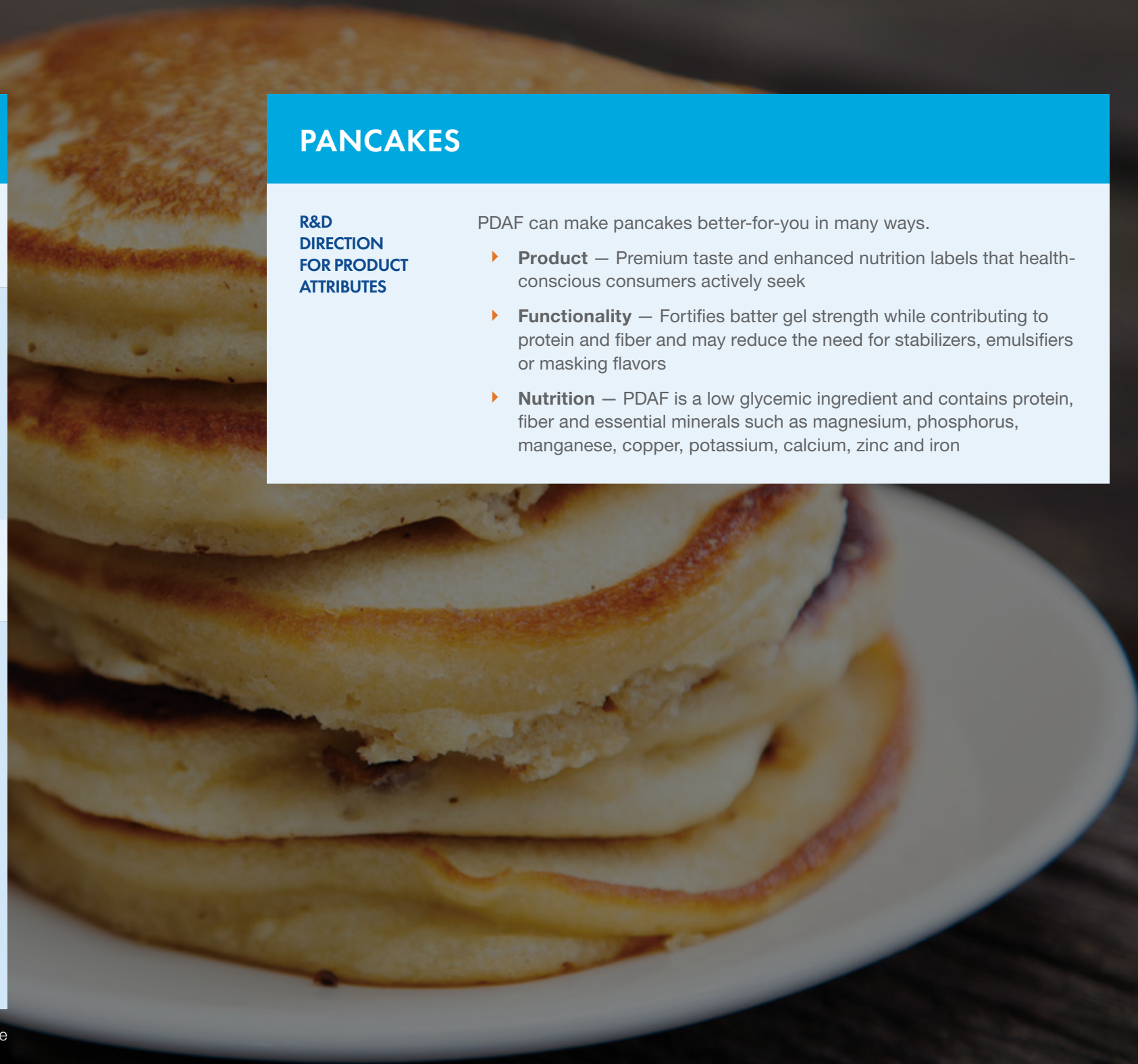


## THE VALUE OF PDAF IN BFY BAKED GOODS

Blue Diamond Growers® Partially Defatted Almond Protein Flour delivers desired results: consistent product quality and a health-focused consumer appeal for your products. PDAF is optimized to produce the flavor, texture, appearance, nutritional benefits and other premium attributes you want in your better-for-you baked products.







## PANCAKES

### THE UNMET NEED

Better-for-you pancakes that provide additional nutritional benefits and a great eating experience.

### THE OPPORTUNITY

PDAF has the potential to enhance conventional pancakes in several ways:

- ▶ Contribute a premium, neutral-flavored protein to foods that are typically low in protein
- ▶ Add fiber to achieve targeted thresholds or to reduce net carbs
- ▶ Help achieve threshold levels of calcium, iron and potassium

### CONSUMER BENEFITS

Nutritious, tasty way to boost protein and fiber without sacrificing taste or convenience.

### FUNCTIONAL BENEFITS

PDAF gels at very low concentrations compared to other plant proteins and helps to provide the desired characteristics such as texture, taste and appearance. The result is fluffy and moist pancakes. Functional benefits of PDAF include:

- ▶ **Emulsification** — Improves mixability, contributes to desired crumb structure
- ▶ **Flavor** — Provides a slightly sweet neutral flavor that complements most added characteristic flavors like vanilla, cinnamon and maple
- ▶ **Fortification** — Provides fiber, protein and minerals
- ▶ **Texture** — The native matrix of protein, carbs and fat helps enhance flavor. It also helps retain moisture for desirable texture in finished products

Continued on next page

## PANCAKES

### R&D DIRECTION FOR PRODUCT ATTRIBUTES

PDAF can make pancakes better-for-you in many ways.

- ▶ **Product** — Premium taste and enhanced nutrition labels that health-conscious consumers actively seek
- ▶ **Functionality** — Fortifies batter gel strength while contributing to protein and fiber and may reduce the need for stabilizers, emulsifiers or masking flavors
- ▶ **Nutrition** — PDAF is a low glycemic ingredient and contains protein, fiber and essential minerals such as magnesium, phosphorus, manganese, copper, potassium, calcium, zinc and iron



## PRODUCT NAME: PROTEIN PANCAKE

<b>PAN:</b> Griddle	<b>TEMP:</b> 350°F	<b>TIME:</b> 1:45 minutes/ 1:30 minutes
------------------------	-----------------------	---

Combine all dry ingredients in large mixing bowl. Mix until all ingredients are evenly distributed. Set aside.

INGREDIENT	PERCENT %	BATCH WEIGHT (G)
All-Purpose Wheat Flour	20.6%	206.00
Almond Protein Powder	6.9%	69.00
Egg White Powder	0.6%	6.00
Double-Acting Baking Powder	1.6%	16.00
Granulated Sugar	2.2%	22.00
Salt	0.6%	6.00

In second bowl, combine eggs, oil and buttermilk until well blended.

Vegetable Oil	4.2%	42.00
Buttermilk	52.5%	525.00
Whole Eggs	10.8%	108.00

Add wet ingredients to dry ingredients. Mix until smooth. Deposit 3-inch diameter batter (approximately 50g) on to griddle. Cook on pre-heated griddle to 375°F, flip pancake after 75 seconds and cook for an additional 30 seconds.

<b>TOTAL</b>	<b>100%</b>	<b>1000.00</b>
--------------	-------------	----------------

## MUFFINS

Muffins use no yeast and rely on leavening agents such as baking powder or baking soda to create an airy and light texture.

### THE UNMET NEED

Better-for-you muffins and quick breads that are convenient, healthy and a source of protein and insoluble fiber for the entire family at any time.

### THE OPPORTUNITY

PDAF has the potential to enhance conventional muffins and quick breads in many ways:

- ▶ Contributes a premium plant-based protein to foods that are typically not high in protein without impacting flavor
- ▶ Adds fiber to achieve targeted thresholds or to reduce net carbs
- ▶ Helps achieve threshold levels of potassium, calcium, zinc and iron

### FUNCTIONAL BENEFITS

Muffins rely on chemical leavening for aeration and a characteristic crumbly but moist texture. In addition to boosting protein, PDAF contributes additional fiber. Product appearance, taste, crumb quality and texture can all be enhanced by PDAF at 5–10% levels of incorporation. The advantage of PDAF is its gel strength and native matrix of protein, carbohydrates and fat may reduce the amount of fat in the formulations. Functional benefits of PDAF include:

- ▶ **Aroma** — Does not have a negative effect on the product's aroma
- ▶ **Viscosity** — The protein and fiber matrix stabilize the batter during baking, so inclusions are dispersed throughout the finished product
- ▶ **Emulsification** — Improved mixability contributes to soft crumb, and oil-binding properties may help retain moisture over time
- ▶ **Flavor** — Its neutral flavor does not impact the taste of the finished baked good; no need for masking agents
- ▶ **Fortification** — Provides protein, fiber and minerals
- ▶ **Texture** — Helps retain moistness, helps provide rich taste and texture without drying, hardening or crumbliness, and may extend shelf life

Continued on next page



## MUFFINS

Muffins use no yeast and rely on leavening agents such as baking powder or baking soda to create an airy and light texture.

### R&D DIRECTION FOR PRODUCT ATTRIBUTES

PDAF incorporation at 5-10% can enhance muffins.

- ▶ **Product** — Enhances premium taste and nutrition label for the daily protein and fiber benefits that health-conscious consumers seek
- ▶ **Functionality** — Fortifies the batter gel strength while contributing protein and fiber and may reduce the need for stabilizers, emulsifiers or masking flavors
- ▶ **Nutrition** — PDAF is a low glycemic ingredient and contains protein, fiber and essential minerals such as magnesium, phosphorus, manganese, copper, potassium, calcium, zinc and iron

## PRODUCT NAME: BETTER-FOR-YOU MUFFINS ENHANCED WITH BLUE DIAMOND ALMOND PROTEIN

**PAN:**  
Standard Muffin

**TEMP:**  
400°F

**TIME:**  
23 minutes

Preheat oven to 400°F. Oil spray muffin tin or line with paper liner. Combine all dry ingredients in large mixing bowl. Mix until all ingredients are evenly distributed. Set aside.

INGREDIENT	PERCENT %	BATCH WEIGHT (G)
All-Purpose Wheat Flour	21.0%	210.00
Almond Protein Powder	11.7%	117.00
Egg White Powder	1.0%	10.00
Double-Acting Baking Powder	1.8%	18.00
Granulated Sugar	8.7%	87.00
Salt	0.8%	8.00
Natural Flavor	0.2%	2.00

In second bowl, combine eggs, water and milk until well blended.

Vegetable Oil	9.2%	92.00
2% Milk	38.1%	381.00
Whole Eggs	7.5%	75.00

Add wet ingredients to dry ingredients. Mix until just evenly moistened. Avoid overmixing. Portion out evenly in muffin cups, approximately 73g each. Bake in conventional oven for about 23 minutes or until toothpick comes out clean. Oven temperatures may vary.

<b>TOTAL</b>	<b>100%</b>	<b>1000.00</b>
--------------	-------------	----------------



## COOKIES

*Cookies are small, sweet, crispy or cake-like baked treats characterized by a high sugar and fat content with a low moisture. Cookies (known as biscuits in other parts of the world) are not always a health-conscious option but are an unbreakable childhood habit that continues into adulthood.*

### THE UNMET NEED

Better-for-you cookies (conventional and gluten-free) that are a guilt-free snack that provides nutritional benefits such as protein and fiber.

### THE OPPORTUNITY

PDAF has the potential to enhance cookies in a few ways:

- ▶ Contribute a premium plant-based protein to foods that are typically not high in protein without impacting the flavor
- ▶ Add fiber to achieve targeted thresholds or to reduce net carbs
- ▶ Help achieve threshold levels of several essential minerals

### CONSUMER BENEFITS

Nutritious, tasty way to boost protein and fiber without sacrificing taste.

### FUNCTIONAL BENEFITS

Cookies are inherently high in fat and sugar because their taste and texture rely on these ingredients. To formulate cookies that meet the crucial ingredient guardrails of the health-conscious is challenging for many developers. PDAF offers an opportunity to add nutritional benefits to with a functional clean-tasting protein, insoluble fiber, along with minerals that are essential for all ages. The native protein, carbohydrate and fat matrix in PDAF may reduce the amount of fat needed for the desired flavor and texture because of its superior taste and functionality. Functional benefits of PDAF include:

- ▶ **Emulsification** — Improves mixability, contributes to desired crumb structure
- ▶ **Flavor** — A neutral flavor with delicate notes that allows other flavors to shine through
- ▶ **Fortification** — Contains fiber, protein and minerals
- ▶ **Texture** — The native matrix of protein, carbs and fat helps enhances rich taste and texture. It also helps retain moisture for desirable texture in finished products

Continued on next page

## COOKIES

*Cookies are small, sweet, crispy or cake-like baked treats characterized by a high sugar and fat content with a low moisture. Cookies (known as biscuits in other parts of the world) are not always a health-conscious option but are an unbreakable childhood habit that continues into adulthood.*

### R&D DIRECTION FOR PRODUCT ATTRIBUTES

PDAF can help differentiate cookies, turning an indulgent treat into a better-for-you snack.

- ▶ **Product** — Enhances premium taste and nutrition label for the daily protein and fiber benefits that health-conscious consumers seek
- ▶ **Functionality** — Contributes protein and fiber and may reduce the amount of fat required for desired cookie crumb and texture
- ▶ **Nutrition** — PDAF is a low glycemic ingredient and contains protein, fiber and essential minerals such as magnesium, phosphorus, manganese, copper, potassium, calcium, zinc and iron



## PRODUCT NAME: BETTER-FOR-YOU COOKIE

**PAN:** Cookie Sheet with Parchment      **TEMP:** 350°F      **TIME:** 13 minutes

Preheat oven to 350°F. Line baking sheets with parchment. Cream together butter and sugar in large mixing bowl and mix until light and fluffy.

INGREDIENT	PERCENT %	BATCH WEIGHT (G)
Ultra-Fine Sugar	28.1%	281.00
Unsalted Butter	23.4%	234.00

Add egg and vanilla. Mix until well blended.

Natural Vanilla Extract	1.6%	16.00
Whole Eggs	5.9%	59.00

Combine flour, protein, baking powder, baking soda and salt in separate bowl until evenly distributed.

All-Purpose Wheat Flour	22.3%	223.00
Almond Protein Powder	17.8%	178.00
Double-Acting Baking Powder	0.2%	2.00
Baking Soda	0.2%	2.00
Salt	0.5%	5.00

Add the dry ingredients about 1/2 cup at a time and mix until combined. Scoop cookie dough into 30-gram ball and flatten on parchment-lined cookie sheet. Bake for approximately 13 minutes or until lightly browned. Cool on baking sheet for 2 minutes. Remove to wire rack to cool completely.

<b>TOTAL</b>	<b>100%</b>	<b>1000.00</b>
--------------	-------------	----------------

Connect with us now for more applied almond expertise.

REQUEST A SAMPLE



REQUEST A MEETING



FOLLOW US ON LINKEDIN







Global  
Ingredients  
Division

[www.bdingredients.com](http://www.bdingredients.com)

© 2023 Blue Diamond Global Ingredients Division. All Rights Reserved.

**PRODUCT OF CALIFORNIA**