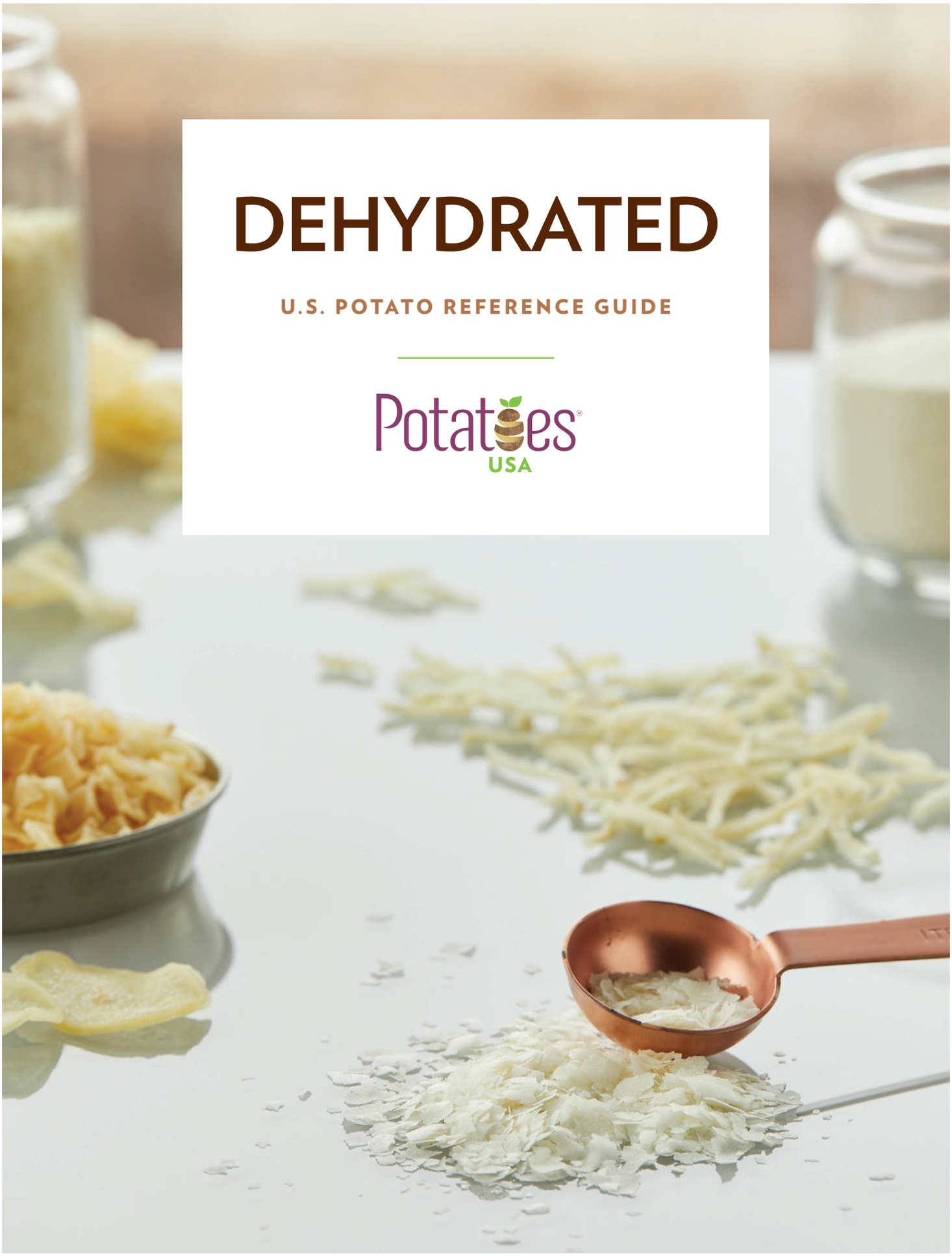

# DEHYDRATED

## U.S. POTATO REFERENCE GUIDE

Potatoes® USA

# INTRODUCTION

### WHY DEHYDRATED POTATOES?

Dehydrated potatoes deliver all the flavor, versatility and nutrition of real, fresh potatoes because they are real potatoes, minus the water.

In everything from soups and salads to ready meals and desserts, U.S. dehydrated potatoes are versatile, operationally efficient, hardworking ingredients and naturally gluten-free. Potatoes don't get more value added than this.

### WHY U.S. DEHYDRATED POTATOES?

Around the world, manufacturers and foodservice operators choose U.S. dehydrated potatoes because of their unparalleled reputation for performance and quality.



### QUALITY FROM THE GROUND UP

The high quality of U.S. dehydrated potatoes starts in the fields, where generations of experience combine with the long days, cool nights, rich soils and varied microclimates of potato-growing regions to produce consistent—and consistently flavorful—potatoes. The results: fresh real potatoes = real quality.

### WHERE NATURE MEETS TECHNOLOGY

The advanced methods, technologies and stringent standards that processors use to make U.S. dehydrated potatoes are designed to maintain fresh-potato texture and flavor in the rehydrated product. It's no wonder that the U.S. potato industry sets the pace for superior potato processing.

### A POTATO FOR EVERY PURPOSE

U.S. dehydrated products build on the potato's inherent versatility. Dices, slices, shreds, flakes, granules and flour—and foods made with them—appear on menus and buffet tables, in baked goods and snacks, on dinner plates and in the hearts of consumers worldwide. Whether adding flavor, enhancing nutrition, extending shelf life, improving texture or increasing dough yield, U.S. dehydrated potatoes get the job done.

### POTATOES PAY BACK

Forget washing, peeling and boiling. U.S. dehydrated potatoes deliver maximum utility with minimum preparation. They store easily—no refrigeration needed—and go to work straight from the package. And because they're easy to mix with seasonings both before and after rehydration, they're perfect platforms for flavor innovation. U.S. dehydrated potatoes also save money: They're concentrated and efficient to ship, have a shelf life of up to two years and yield about 5 kg of rehydrated product per 1 kg of dry.

### TO YOUR HEALTH

Did you know that one medium skin-on potato contains 45% of the recommended daily value of vitamin C and as much as or more potassium than bananas; is also a good source of vitamin B6; contributes 8% of the recommended daily value of thiamine, 6% of the recommended daily value of folate, 6% of magnesium, 6% of phosphorous, 6% of iron and 2% of zinc—and all for only 110 calories and no fat, cholesterol or sodium? Even better, U.S. potatoes are naturally gluten free and always have been. U.S. potato processors produce plenty of clean-label dehydrated options to help you deliver potato nutrition that label-reading consumers can really feel good about.

### A SOLUTION FOR EVERY NEED

U.S. potato processors are experienced at packaging dehydrated product to fit customers' needs. From 56.7 g foil packs to 406.8 kg supersacks, bespoke packages are available to facilitate storage in any plant or warehouse. U.S. processors can also tailor dehydrated product to meet rigorous specifications, including blended products intended for export to countries with import restrictions.

# FROM POTATO TO PRODUCT: HOW U.S. DEHYDRATED POTATOES ARE MADE

**Flakes, flours, granules and pieces:** All U.S. dehydrated potato products start out as sound, whole U.S. potatoes—the fluffy, white-fleshed potatoes that consumers love. Several washings and steam-peeling under high pressure prepare the potatoes for subsequent steps on their journey to becoming premium U.S. dehydrated products.

**Granules and flakes:** Washed and peeled potatoes are sliced, precooked when appropriate and then cooled to gelatinize their starch and ensure a mealy, non-sticky texture in the rehydrated product. Further processing steps might include additional cooking, drying and grinding or ricing.

**Slices, dices and shreds:** After peeling and trimming, potatoes are cut to suit their finished-product form and are then washed and blanched prior to final drying.

The following pages explain more about the U.S. dehydrated potatoes' different categories. Read on to learn how they can improve your operation.



*Standard potato flakes are among the most well-known and widely used potato products available. They're bright white in color and, when reconstituted, have the dry, mealy texture and delicious flavor that consumers expect from freshly cooked mashed potatoes. They belong atop any list of all-purpose ingredients for use in foodservice, bakery and general food manufacturing.*

# POTATO FLAKES: STANDARD FLAKES

**RECOMMENDED USES**

Standard flakes have, literally, hundreds of applications. Use them to create delicious mashed potatoes in a snap and innovate from there. Customize traditional mashed potatoes by mixing with signature meats and vegetables and topping with sauces like curry or miso. Use mashed potatoes as key ingredients in irresistible potato croquettes, Asian fishballs and more. And try updating everyday pizza by adding mashed potatoes to the crust—and then topping with more mashed potatoes. And don't forget: Standard flakes make great additions to breadings and coating systems.

**REHYDRATION**

Reconstitute standard flakes in 77°C water and cold milk for a smooth, mealy texture. Avoid using boiling water, as it hydrates the dried cells so quickly that they rupture to create a sticky texture. Always follow the manufacturer's instructions for the dehydrated product you're using, as rehydration specifications may vary.

**CHARACTERISTICS**

**REHYDRATED TEXTURE:** Mealy; similar to fresh mashed potatoes
**FREE SOLUBLE STARCH:** Moderate
**VISCOSITY:** Moderate
**WATER ABSORPTION:** Moderate
**CELL DAMAGE:** Low-moderate
**ADDITIVES:** Mono and diglycerides; optionally SAPP and sulfite

*Standard potato flakes can be ground to various sizes—often called "ground standard flake." In fact, they can be ground so finely that they resemble flour. But make no mistake: Ground standard flakes are not potato flour. The best use for ground standard flakes is as an all-purpose ingredient in foodservice, baking and general manufacturing.*

# POTATO FLAKES: VARIOUS GRINDS

**RECOMMENDED USES**

Standard potato flakes of various grind sizes are handy in pastas—especially gluten-free varieties—and in fabricated snacks. Many baked goods, pancakes and even tortillas made with potato flakes consistently come out moister than those without. Any binder or breading formulation can benefit from the addition of ground and standard flakes. And when used as a thickener, ground flakes are much less likely to clump than flour.

**REHYDRATION**

Ground standard flakes are not meant to be rehydrated for standalone use, but rather for use as an ingredient for further formulation. Always follow the manufacturer's instructions for the dehydrated product you're using, as rehydration specifications may vary.

**CHARACTERISTICS**

**REHYDRATED TEXTURE:** Sticky
**FREE SOLUBLE STARCH:** Moderate-high
**VISCOSITY:** Moderate-high
**WATER ABSORPTION:** Moderate-high
**CELL DAMAGE:** Moderate-high
**ADDITIVES:** Mono and diglycerides; optionally SAPP and sulfite

*Low peel–low leach (LP–LL) potato flakes are similar to standard flakes but differ in not being precooked and cooled during production. This preserves their flavor but makes the rehydrated product unsuitable for mashed potatoes because of their starchy texture. As their name suggests, LP–LL flakes are also very lightly peeled to retain more potato flavor. Light peeling affects the color of the dehydrated product, too, making it more off-white than white. Finally, LP–LL flakes are ground to a higher bulk density than standard flakes for efficient packaging and shipping.*

# POTATO FLAKES: LOW PEEL–LOW LEACH FLAKES

### RECOMMENDED USES

LP–LL flakes are typically used to manufacture all sorts of fabricated potato snacks, including sheeted and extruded snacks. When mixed with water and other ingredients, they yield a cohesive dough that's easily handled and formed in snack production. LP–LL flakes also add texture, nutrition and flavor to cookies, biscuits, crackers, pizza dough and more.

### REHYDRATION

Rehydration isn't recommended except in the production of a mix, such as a snack dough. Always follow the manufacturer's instructions for the dehydrated product you're using, as rehydration specifications may vary.

### CHARACTERISTICS

**REHYDRATED TEXTURE:** Sticky
**FREE SOLUBLE STARCH:** High
**VISCOSITY:** High
**WATER ABSORPTION:** High
**CELL DAMAGE:** High
**ADDITIVES:** Mono and diglycerides

*Like potato flakes, granules are prepared using top-quality sliced, cooked and dried potatoes. Additional production steps include the gentle mixing of the cooked potato mash with dry "add-back" granules to absorb moisture and yield a granular dried product with individual or small agglomerates of potato cells. This granular structure increases the product's bulk density and shipping economy; potato granules also reconstitute exceptionally well thanks to the cell-wall toughening that occurs during multiple cycles of cooking and partial rehydration involved in their production.*

# POTATO GRANULES: STANDARD GRANULES

**RECOMMENDED USES**

Standard granules are popular with hospitals, schools, nursing homes and similar institutions for their economy and consistent quality. They're suitable for use in nearly every application where standard flakes are used, including in the making of mashed potatoes. In manufacturing, granules appear in extruded, dried, shred-like products such as hash browns; dry mixes for extruded fries and other shaped products; fried, baked and pelleted snack products like chips, sticks and crackers; flavorings and thickeners; and breading, soups and frozen dinners.

**REHYDRATION**

Add granules to boiling water and whip. Always follow the manufacturer's instructions for the dehydrated product you're using, as rehydration specifications may vary.

**CHARACTERISTICS**

**REHYDRATED TEXTURE:** Mealy; fluffy; similar to fresh mashed potatoes
**FREE SOLUBLE STARCH:** Low
**VISCOSITY:** Low
**WATER ABSORPTION:** Low
**CELL DAMAGE:** Low
**ADDITIVES:** Citric acid; optionally sodium bisulfite, BHT, sodium acid pyrophosphate; mono and diglycerides

*U.S. potato processors offer a wide variety of dehydrated potato slices, dices and shreds for foodservice and manufacturing. These products are remarkably convenient, delivering fresh potato flavor and nutrition without washing, peeling, slicing, dicing or shredding. Once rehydrated, they cook up as firmly as freshly prepared potatoes, which wins them favor with consumers who appreciate their real potato identity, flavor and texture.*

# POTATO PIECES: SLICES, DICES, SHREDS

**RECOMMENDED USES**

Use dehydrated potato slices, dices and shreds in any formulation that calls for potatoes: soups and stews; potato salads; hash browns; and casseroles, such as scalloped or au gratin potatoes. Food manufacturers can also explore new possibilities for potato pieces in dried and canned soups and stews, and in the extruded pellets used to make some snacks.

**REHYDRATION**

Rehydrate dehydrated potato pieces by covering with water, heating to 88°C and simmering until tender. Generally, rehydration time varies between 10 and 20 minutes depending on product size, specification and supplier. Always follow the manufacturer's instructions for the dehydrated product you're using, as rehydration specifications may vary.

**CHARACTERISTICS**

**REHYDRATED TEXTURE:** Similar in shape, texture and appearance to fresh-cut potato pieces
**FREE SOLUBLE STARCH:** Varies
**VISCOSITY:** Varies
**BROKEN CELL COUNT:** Very low
**ADDITIVES:** Optionally sodium acid pyrophosphate, sodium bisulfite, calcium chloride

*Put simply, potato flour is cooked, dried, ground potatoes with no additives. Yet, while potato flour may look like finely ground potato flakes, the two products are very different. True potato flour produces a stickier product when liquid is added and is best used in small amounts to extend other flours. As far as particle size goes, granular potato flour will pass through a 40 mesh, or 420 micron, screen, while fine flour passes through an 80 mesh, or 177 micron, screen.*

# POTATO FLOUR: GRANULAR AND FINE FLOUR

### RECOMMENDED USES

Both granular and fine potato flours make excellent thickeners in sauces and gravies and in breading for fried foods. They also contribute to a softer, moister texture in most baked goods, including biscuits, pancakes, breads, muffins and cookies.

### REHYDRATION

Don't rehydrate potato flour as a standalone product unless preparing a gruel. Potato flour isn't suitable for making mashed potatoes, either. It is best used as an ingredient. Always follow the manufacturer's instructions for the dehydrated product you're using, as rehydration specifications may vary.

### CHARACTERISTICS

**REHYDRATED TEXTURE:** Very sticky
**FREE SOLUBLE STARCH:** Very high
**VISCOSITY:** High
**WATER ABSORPTION:** High
**CELL DAMAGE:** Very high
**ADDITIVES:** Typically none

# Who Uses U.S. Dehydrated Potatoes?

*A better question might be "Who doesn't use U.S. dehydrated potatoes?" Few products are as versatile as these hardworking ingredients, which you'll find in restaurants, delicatessens, coffee shops, institutions, bakeries and food-manufacturing operations the world over. They offer as many reasons for using them as there are ways to use them!*

### SNACK MANUFACTURERS

U.S. dehydrated potatoes are stealthy—but essential—ingredients in some of the world's most popular snacks.

### GENERAL FOOD MANUFACTURERS

Dehydrated potatoes save time, cost and labor in any fresh, frozen or canned food that uses potatoes.

### BAKERIES

Why do bakeries regularly stock dehydrated potato ingredients? For starters, they create a moister texture, improve yields and are handy gluten-free alternatives.

### HOSPITALS, NURSING HOMES, SCHOOLS AND INSTITUTIONS

Dehydrated potatoes make the preparation of large amounts of nutritious food quicker and more affordable.

### COMMERCIAL FOODSERVICE OPERATIONS

In restaurant kitchens, every minute—and incremental cost—counts. Dehydrated products let staffs prepare potatoes quickly: no washing, peeling, cooking or mashing.

### RETAIL CONSUMERS

From instant mashed potatoes to potato starch, dehydrated potato products offer consumers convenient and versatile options for home cooking.

# U.S. Dehydrated Potatoes: Functionality at a Glance

| FUNCTION | BENEFIT | SNACK MANUFACTURERS | GENERAL FOOD MANUFACTURERS | BAKERIES | INSTITUTIONS (HOSPITALS, SCHOOLS, ETC.) | RESTAURANTS |
|---|---|---|---|---|---|---|
| BINDER | The free starch present in dehydrated potato flakes and flour holds meat together. | | ● | | ● | ● |
| BREADING | Use potato flakes alone or combined with flour, cornmeal and/or crushed corn flakes to create breading for fish, meat or vegetables. For fried foods, the use of U.S. dehydrated potatoes lends a crispy texture without the "flinty" texture sometimes associated with other breading. | | ● | | ● | ● |
| COLOR ENHANCER | In baked goods such as breads and cakes, the addition of U.S. dehydrated potatoes can enhance crust color, producing a thicker, darker crust. | | ● | ● | ● | ● |
| DECORATION | Prepared mashed potatoes can be squeezed from pastry tubes to decorate casseroles and improve food presentation. | | ● | | ● | ● |
| EXTENDER | Flakes or flour can be added to burgers or patties before cooking, thus requiring less meat per burger. | | ● | | ● | ● |
| FLAVOR OR TEXTURE ENHANCER | Flakes and granules can be used to produce potato-flavored snacks and baked goods. When used in bakery products at inclusion levels of at least 10%, they impart a unique potato flavor and soft mouth feel to the product. Snack foods generally use a much higher level of inclusion. | ● | ● | ● | ● | ● |
| HUMECTANT OR SHELF-LIFE EXTENDER | At low inclusion levels of less than 5%, dehydrated potatoes serve as an anti-staling or crumb-softening agent in bakery applications, with no alteration of the taste profile. Because of their moisture retention abilities, potato products slow the drying effect associated with staling. | | | ● | | |
| TEXTURE ENHANCER | At inclusion levels of around 10%, dehydrated potatoes will produce products with a unique potato flavor and soft eating characteristics. For instance, the addition of potato flakes to recipes creates a moister texture for cakes, doughnuts, breads, rolls and pastry items. Added to snacks, they aid in creating a light, crisp texture. | ● | ● | ● | ● | ● |
| THICKENING AGENT | Add potato flakes or granules directly from the package to broths, gravies, sauces and stews to thicken. Flakes are much more forgiving than flour, which tends to create lumps. | | ● | | ● | ● |
| UNIFORMITY | Dehydrated potato flakes and granules can be used in salty snacks such as fabricated chips to create a more uniform shape. Dehydrated diced potatoes can be used in soups and other dishes for the same reason. | ● | ● | | ● | ● |
| YIELD IMPROVEMENT | The weight of the added potatoes and the resulting absorption increases for hydration may substantially increase dough yield for baked goods. | | | ● | ● | ● |
| GLUTEN-FREE FORMULATION | Dehydrated potato flakes, granules and flour can replace gluten-containing ingredients in a range of applications where gluten-free demand runs high. | ● | ● | ● | ● | ● |

# Frequently Asked Questions

**ARE DEHYDRATED POTATO PRODUCTS 100% POTATOES?**

Yes. U.S. dehydrated potato products are made from 100% whole, high-quality U.S. potatoes.

**CAN DEHYDRATED POTATOES BE PART OF NUTRITIOUS FORMULATIONS?**

U.S. dehydrated potatoes can be part of a nutritious, balanced diet. They are an excellent source of vitamin C and a good source of potassium and vitamin B6. They contribute 8% of the recommended daily value of fiber. They're also naturally gluten free and always have been. Potatoes USA can help you with technical assistance in product and recipe development. Contact your local Potatoes USA representative for more information.

**HOW LONG CAN I STORE DEHYDRATED POTATOES?**

U.S. dehydrated potato products have a maximum shelf life of 18 to 24 months. To optimize that shelf life, keep product in a cool—below 27°C—dry area with minimal exposure to humidity.

**WILL DEHYDRATED POTATOES INCREASE MY FORMULATION COSTS?**

On the contrary; in some cases, using U.S. dehydrated potatoes lowers costs. When substituted for fresh, they save labor and reduce waste. Depending on the formulation, their functionality can even allow for reduced use of inputs such as eggs, sugar, oil or dough improvers. And when comparing costs, remember that dehydrated potatoes yield more servings per metric ton than fresh, thanks to their 5:1 rehydration ratio.

**DO COMPANIES IN MY MARKET OR REGION SUPPLY DEHYDRATED POTATO PRODUCTS? HOW CAN I FIND THEM?**

Many U.S. processors have local importers or distributors throughout the world. Potatoes USA can relay your requests to members of the U.S. industry who, in turn, will contact their local distributors.

**WHAT PROMOTIONAL SUPPORT DO YOU OFFER FOR ESTABLISHMENTS THAT ADOPT U.S. DEHYDRATED POTATOES?**

Potatoes USA has developed marketing programs that promote products made with U.S. dehydrated potatoes, and we can assist you in creating and supporting your own promotion plan. Please contact your local Potatoes USA representative to learn more.

**MY COMPANY WOULD LIKE TO TEST U.S. DEHYDRATED POTATOES; HOW CAN I RECEIVE SAMPLES?**

Potatoes USA will assist you in getting samples. Just contact your local representative to get the process started and get creative!

# Potatoes USA: Your Resource for U.S. Potatoes

**Potatoes USA is the marketing organization representing the 2,500 commercial potato growers operating in the United States. In addition to dehydrated potatoes, we promote four other categories of potatoes and potato products: fresh table-stock potatoes, fresh chipping potatoes, seed potatoes and frozen potato products.**

Whether you're seeking ideas, information, tools or inspiration, Potatoes USA can provide support to:

- Educational and training materials
- On-site and technical training
- Point-of-sale materials
- Individualized seminars
- Promotional support
- Recipe and formula development assistance
- Product samples

Contact your local Potatoes USA representative office to find out about services available in your market. We're also happy to put you in touch with exporters of U.S. potatoes and potato products. And to answer your potato questions and fuel your imagination, visit PotatoesUSA.com.

For more information about dehydrated exporters and suppliers, visit:

http://potatoesusa.com/contact/us-potato-exporters-suppliers/dehydrated-exporters-and-suppliers

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