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### ALL ABOUT UPCYCLED FLOUR

Upcycled flour is a nutrient-rich, eco-friendly flour made from food processing byproducts that would otherwise go to waste. These flours are created from spent grains from brewing, fruit and vegetable pulp from juicing, coffee cherries, nut pressings from oil extraction, and even starchy peels from root vegetables. Instead of discarding these byproducts, they transformed into versatile flours that reduce food waste while offering unique nutritional benefits.



While the idea of repurposing food byproducts has existed for centuries, the modern concept of upcycled flour gained traction as the global food industry sought sustainable solutions to combat food waste. Around the early 2000s, artisan bakers and sustainability-focused food brands began experimenting with dried, milled brewer's spent grain to create high-fiber, protein-rich flour. The upcycled food movement then gained momentum in the 2010s with the rise of sustainable food startups and the formation of organizations like the Upcycled Food Association (UFA), which established standards for certifying upcycled ingredients.

The production of upcycled flour varies based on the source ingredient, but the general process follows a few key steps. First, food producers collect nutrient-rich byproducts that are then carefully dehydrated or air-dried to remove moisture while preserving nutrients. Once dried, they are finely ground into flour, ensuring a smooth, consistent texture. Finally, the flour undergoes quality control testing for nutrient content, flavor profile, and safety standards before being packaged for use in baking, food production, or as a supplement in various recipes.

As consumer demand for sustainable, waste-reducing products continues to rise, upcycled flour is becoming an important innovation in the food industry. With the support of environmentally conscious food brands, regulatory organizations, and forward-thinking chefs, upcycled ingredients are moving from niche markets into mainstream food production.

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### HEALTHY INGREDIENT CONTRIBUTION

Upcycled flour is made from food byproducts that would otherwise go to waste, such as fruit and vegetable pulp, spent grains from brewing, or coffee cherry husks. These flours are gaining popularity for their nutritional benefits, sustainability, and functionality in food products.



- **High Fiber Content**
  - Many upcycled flours, such as okara (soy pulp), apple pomace, and spent grain flour, are rich in dietary fiber, which supports digestive health and promotes satiety.
  - Helps regulate blood sugar levels by slowing carbohydrate absorption.
- **Protein-Rich**
  - Upcycled ingredients like spent grain, okara, and sunflower seed flour provide a plant-based protein boost, making them excellent for vegetarians, vegans, and athletes.
- **Antioxidants & Phytochemicals**
  - Some upcycled flours, such as coffee cherry flour (cascara) and grape seed flour, contain high levels of polyphenols and antioxidants, which help fight oxidative stress and inflammation.
  - Grape seed flour is especially high in resveratrol, which may support heart health.
- **Essential Micronutrients**
  - Upcycled banana flour is rich in potassium, essential for muscle function and hydration.
  - Brewer's spent grain flour is high in B vitamins, which support energy metabolism.
  - Coffee cherry flour provides iron and magnesium, aiding oxygen transport and muscle function.
- **Prebiotic & Gut Health Benefits**
  - Some upcycled flours, like banana flour and apple pomace, contain resistant starch and prebiotic fibers, which nourish beneficial gut bacteria and support digestive health.

Nutritional Information/Pastors from <https://www.upcycled.com>

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## TYPES AND VARIETIES

- **Grain & Cereal-Based Flours**
  - **Brewer's Spent Grain Flour (BSG):** Made from malted barley from brewing beer, adds a nutty & malty flavor
  - **Rice Bran Flour:** Made from the outer layer of rice grains during milling, often used in gluten-free baking
  - **Oat Hull Flour:** Made from the fibrous outer husk of oats, often used in cereal, granola & baking mixes
- **Fruit & Vegetable-Based Flours**
  - **Apple Pomace Flour:** Made from dried apple skins and pulp from juicing, adds natural sweetness to baked goods
  - **Banana Flour:** Made from green bananas or banana peels, often used in gluten-free baking & smoothies
  - **Grape Seed Flour:** Made from grape seeds from winemaking, adds a tart & nutty flavor
  - **Coffee Cherry (Cascara) Flour:** Made from dried coffee fruit husks, often used in energy bars, smoothies & baked goods
- **Legume-Based Flours**
  - **Okara Flour:** Made from pulp leftover from soy milk and tofu production, great for baking & plant-based meat products
  - **Chickpea Hull Flour:** Made from the outer skins of chickpeas, often used in high-protein baked goods
- **Nut & Seed-Based Flours**
  - **Sunflower Seed Flour:** Made from pressed sunflower meal after oil extraction, often used in plant-based protein powders
  - **Pumpkin Seed Flour:** Made from pumpkin seed press cake after oil extraction, adds a nutty flavor to baked goods
  - **Almond Flour:** Made from almond meal after oil extraction, often used in both gluten-free & keto recipes
- **Starchy & Functional Flours**
  - **Potato Peel Flour:** Made from dried potato skins, often used as a thickener in soups & sauces
  - **Carrot Pomace Flour:** Made from leftover carrot pulp from juice production, used in crackers, pasta & pet food
  - **Cassava Peel Flour:** Made from fibrous cassava peels, often used in gluten-free baking & thickening sauces



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## SELECTING AND STORING

- Selecting Upcycled Flour:
- **Purpose & Functionality**
    - **Baking:** choose flours with good binding properties, such as spent grain flour, banana flour, or okara flour.
    - **Gluten-Free Needs:** choose flours such as banana flour, rice bran flour, or sunflower seed flour
    - **High-Protein Applications:** choose flours such as okara, chickpea hull, or almond flour
    - **Added Fiber & Antioxidants:** choose flours such as apple pomace, grape seed, or coffee cherry flour
  - **Processing & Quality**
    - Look for minimally processed varieties to retain nutrients
    - Choose organic or non-GMO options if available
    - Check for certifications such as upcycled certification, non-GMO, gluten-free
  - **Sensory Aspects**
    - **Taste:** some flours have nutty, earthy, or slightly bitter notes
    - **Texture:** Fine milled flours are better for baking while coarser varieties work well in heartier recipes
  - **Expiration & Freshness**
    - Always check the packaging and best-before dates
    - Purchase in smaller quantities if you will not use frequently



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## CULINARY USES

Upcycled flour is a sustainable and nutrient-dense ingredient that can enhance baking, cooking, beverages, and even plant-based products. Different types of upcycled flour offer unique flavors, textures, and functionalities in food formulations.

- **Baking & Pastry Applications**
  - Adds fiber & unique flavors to bread, cookies, and cakes.
  - **Examples:** Spent Grain, Apple Pomace, Banana, Grape Seed, Rice Bran.
  - **Tip:** Replace 10–30% of wheat flour for added nutrition.
- **Pasta & Dough**
  - Boosts texture, elasticity, & protein in noodles and dumplings.
  - **Examples:** Spent Grain, Chickpea Hull, Cassava Peel.
  - **Tip:** Use up to 25% upcycled flour for better nutrition.
- **Beverages & Smoothies**
  - Adds fiber, antioxidants, & protein to drinks.
  - **Examples:** Coffee Cherry, Okara, Banana Flour.
  - **Tip:** Blend 1–2 tbsp into smoothies or lattes.
- **Soups & Sauces**
  - Works as a gluten-free thickener in gravies and curries.
  - **Examples:** Potato Peel, Okara, Banana Flour.
  - **Tip:** Mix 1–2 tsp for a creamy texture.
- **Plant-Based Foods**
  - Enhances protein & texture in vegan meats and protein bars.
  - **Examples:** Okara, Sunflower Seed, Chickpea Hull Flour.
  - **Tip:** Combine with plant proteins for better binding.
- **Snacks & Energy Bars**
  - Adds fiber, crunch & antioxidants to snack bars.
  - **Examples:** Grape Seed, Coffee Cherry, Spent Grain.
  - **Tip:** Replace 10–20% of flour in snack recipes.



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## INTERESTING FACTS



- An estimated 1.3 billion tons of food are wasted globally every year
- If upcycled food waste were a country, it would be the third-largest emitter of greenhouse gases after the U.S. and China
- Brewer's spent grain made up 85% of total brewing waste before brewers started turning it into high-protein flour
- Some craft bakeries now pair spent grain bread with the same beer it came from for a full-circle experience
- Banana flour was originally used in parts of Africa before gluten-free diets made it trendy worldwide
- You can use banana flour as a natural egg replacer by simply mixing it with water
- Some coffee farms make more money selling the coffee cherry flour than the actual coffee beans
- Grape seed flour's naturally purple or reddish tint gives baked goods a unique color
- Even in medieval Europe, bakers mixed leftover grain husks into bread to stretch flour supplies
- Okara flour has three times more fiber than wheat flour making it great for gut health
- Scientists are exploring ways to turn cocoa pod husks into upcycled chocolate-flavored flour

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## RECIPE

**Okara Protein Muffins**  
Yield: 12 Muffins

**Nutritious | High-Protein | Vegan-Friendly**

Made with upcycled okara flour, these muffins are moist, fluffy, and packed with plant-based protein. Naturally sweetened with banana and maple syrup, they're perfect for breakfast or a post-workout snack. Add chocolate chips or nuts for extra texture or scoop of protein powder for a protein boost—a delicious way to support food sustainability.



**Ingredients:**  
1 cup all-purpose flour  
½ cup okara flour  
1 tsp baking soda  
½ tsp salt  
½ cup mashed banana (or applesauce)  
½ cup maple syrup  
½ cup almond milk  
2 tbsp melted coconut oil  
½ tsp vanilla extract  
½ cup chocolate chips or nuts

**Directions:**  
1. Preheat oven to 350°F (175°C) and line a muffin tin.  
2. Mix all dry ingredients together.  
3. In another bowl, mix banana, syrup, milk, oil, and vanilla.  
4. Combine wet and dry ingredients, then fold in chocolate chips.  
5. Fill muffin tins and bake for 18–20 minutes.

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## QUIZ



After you read through this month's Ingredient of the Month, take this quiz to test your knowledge. In order to earn continuing education hours (CEHs) from the American Culinary Federation (ACF), the test must be completed through the ACF's Online Learning Center. Seventy-five percent accuracy is required to earn one hour of continuing education credits toward professional certification.

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**QUIZ**

Question #1

What is the primary goal of upcycled flour production?



- A. To create a new luxury food product for high-end restaurants
- B. To reduce food waste while offering unique nutritional benefits
- C. To replace all traditional flour in the market
- D. To increase the production of genetically modified ingredients

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**QUIZ**

Question #2

Which of the following upcycled flours is especially high in dietary fiber?



- A. Brewer's spent grain flour
- B. Okara flour
- C. Apple pomace flour
- D. All of the above

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**QUIZ**

Question #3

Coffee cherry flour provides iron and magnesium, which help with oxygen transport and muscle function.



- A. True
- B. False

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**QUIZ**

Question #4

Potato peel flour is used primarily as:



- A. A protein supplement
- B. A meat substitute
- C. A thickener in soups and sauces
- D. A sweetener in baking

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**QUIZ**

Question #5

What is okara flour made from?



- A. Dried coffee fruit husks
- B. Ground chickpeas
- C. Pressed nut meal
- D. Pulp from soymilk production

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**QUIZ**

Question #6

What is a key sensory consideration when using upcycled flour?



- A. Upcycled flour is always sweeter than traditional flour
- B. Some upcycled flours have nutty, earthy or bitter notes
- C. Upcycled flour never affects the texture of food
- D. All upcycled flours taste the same

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**QUIZ**

Question #7

Upcycled flour can add elasticity and texture when used in pasta and dough applications.

A. True  
B. False



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**QUIZ**

Question #8

How much food is wasted globally every year?

A. 500 million tons  
B. 1.3 billion tons  
C. 2.5 billion tons  
D. 5 billion tons



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**QUIZ**

Question #9

Where was banana flour originally used before becoming popular in gluten-free diets?

A. Southeast Asia  
B. Canada  
C. Africa  
D. Europe



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**QUIZ**

Question #10



What is the recommended baking temperature for the Okara Protein Muffins?

- A. 325°F (163°C)
- B. 350°F (175°C)
- C. 375°F (190°C)
- D. 400°F (204°C)

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**JOIN US NEXT MONTH!**



Stay tuned for the next ACF Ingredient of the Month! Be sure to visit the Online Learning Center (OLC) to download a copy of each month's ingredient presentation. Don't forget to take the official IOTM quiz through the OLC to earn one hour of continuing education credits toward professional certification.

For more information:

- [www.acfchefs.org](http://www.acfchefs.org)
- [www.acfchefs.org/olc](http://www.acfchefs.org/olc)
- [www.acfchefs.org/iotm](http://www.acfchefs.org/iotm)

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