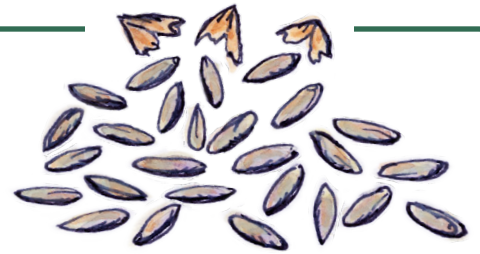


Rye



Did You Know

- Rye is a grass that is grown primarily as a cereal grain.
- Rye is a whole grain that contains lots of fiber and nutrients.
- The whole grains harvested from the rye plant are known as rye berries.
- In the United States, a lot of rye is grown as a cover crop. A cover crop is a plant grown to cover the soil, primarily to improve soil health, prevent erosion, suppress weeds, and enhance biodiversity. Cover crops are not harvested and consumed.



Types of Rye

Rye Berries

Whole rye kernels are usually referred to as “rye berries,” which is the whole grain form of rye (much like wheat berries are the whole grain form of wheat). Rye berries can be cooked and eaten whole in salads, grain bowls, soups or even in a rye version of risotto! The rye berry has a nutty, earthy flavor and its texture is firm yet tender to chew when cooked.



Cracked Rye or Rye Chops

Cracked rye is simply rye berries that have been cut or cracked into smaller, irregular-sized pieces that are quicker to cook than the completely intact rye berry. They are often used in rye breads or cooked into breakfast porridge much like steel cut oats.



Rye Flakes

Rye flakes are rye berries that have been steamed, flattened in a roller and dried, much like old-fashioned rolled oats. They can be eaten like porridge or used as an ingredient in muesli or granola.



Rye Flour

Just like wheat flour, rye flour takes on different forms depending on how much of the bran and germ are removed during the milling process. Rye has many unique qualities. For example, rye flour has less gluten than wheat flour. The texture and flavor of rye breads improve after 24-36 hours (unlike wheat breads which are best eaten shortly after cooling).



Agriculture

This rye field is part of several hundred acres grown at Vilicus Farms in northern Hill County, Montana. Doug Crabtree and Anna Jones-Crabtree (the people pictured standing in the field) are the farmers who own Vilicus Farms. While rye is not widely grown in Montana, it is a staple grain in countries such as Finland and Germany.

Rye thrives in Montana’s cold, dry climate. The crop grown here is winter rye, planted in autumn. It goes dormant during the harsh winter, resumes growth in spring, and is harvested by August.

Buy local! Purchasing Montana-grown grains like rye supports local farmers. It also means fresher food with more flavor, since it travels a shorter distance to reach your plate—and you know exactly where it comes from.



Berry Porridge

HACCP Process: _____ 1 – No Cook 2 – Cook & Same Day Serve _____ 3 – Cook, Cool, Reheat, Serve _____ 4 – SOP Controlled

Ingredients	25 Servings	50 Servings	Directions
Water	3 1/2 qts	7 qts	<ol style="list-style-type: none"> Clean, core, and rough chop the apple. Clean, peel, and rough chop the carrots. Add the apple, carrots, and frozen berries to a food processor and pulse for a few seconds to get a more homogenous texture. Store in the refrigerator in an airtight container until ready to use. In a medium pot, bring water and salt to a boil. Add the oats and fruit mixture to the pot. Bring back up to a gentle simmer, then lower the heat, and cook uncovered for 10 minutes, stirring frequently, or until desired doneness. Remove from the heat, stir in the brown sugar, cinnamon, and precooked rye, and allow to rest for 5 minutes before serving.
Cereals, <i>cracked oats</i>	7 1/2 cups	14 3/4 cups	
Precooked rye berries	2 1/2 cups	5 cups	
Apples, <i>raw, Gala, with skin</i>	2 lbs	4 lbs	
Blueberries, <i>frozen, unsweetened</i>	1 1/3 lbs	2 3/4 lbs	
Carrots	1 1/4 lbs	2 1/2 lbs	
Brown sugar	1/4 cup	1/2 cup	
Cinnamon	1 2/3 Tbs	3 1/4 Tbs	
Kosher salt	3/4 Tbs	1 3/4 Tbs	

Serving Size: 1 cup | **Yield:** 25 or 50 servings

Oven Temperature & Baking Time	Temperature	Minutes
Conventional		
Convection		
Pan Size		

Nutrition Analysis

Calories (kcal)	186.34
Protein (g)	5
Carbohydrate (g)	32.15
Total Fat (g)	4.8
Saturated Fat (g)	0.48
Sodium (mg)	254.55
Dietary Fiber (g)	6.16
Total sugars (g)	10.66

Meal Component Fulfillment *(Based on Serving Size)*

1 Serving Provides:

1/2 cup fruits and vegetable and 1/2 cup grains

Notes

See page 4, **Cooking section**, for a description on how to precook rye berries.

3/4 cup of dry Rye Berries + 3/4 qt water = 2 1/2 cups cups of cooked berries (amount for 25 servings).

1 2/3 cups of dry Rye Berries + 1 2/3 qts water = 5 cups of cooked berries (amount for 50 servings).

Source: true-north-kitchen.com/the-essential-guide-to-cooking-and-baking-with-rye-with-recipes

Rye Meatballs

HACCP Process: _____ 1 – No Cook 2 – Cook & Same Day Serve _____ 3 – Cook, Cool, Reheat, Serve _____ 4 – SOP Controlled

Ingredients	25 Servings	50 Servings	Directions
Ground beef	4 2/3 lbs	9 1/2 lbs	<ol style="list-style-type: none"> 1. Rough chop and then pulse the onions, cooked rye, and garlic in a food processor to the desired consistency, scraping the sides often. 2. In a mixing bowl, add the ground beef, onion mixture, flour, nutritional yeast, salt, pepper, and oregano. Knead until all ingredients are fully combined. 3. Portion into about 1.3 - 1.5 oz meatballs and arrange evenly onto a parchment lined sheet tray. 4. Bake at 400°F for 10 minutes. Remove from the oven and rotate each meatball. Cook for another 10 minutes or until the internal temperature reaches 160°F.
Precooked rye berries	1 1/4 cups	2 1/2 cups	
Yellow onions	1/2 lb	1 lbs	
Oat Flour	1 1/4 cups	2 1/2 cups	
Nutritional yeast	1 1/3 cups	3 cups	
Garlic, <i>peeled</i>	15 2/3 cloves	31 1/2 cloves	
Black pepper	1/3 Tbs	1 Tbs	
Dried oregano	1 1/2 Tbs	3 Tbs	
Kosher salt	3/4 Tbs	1 1/2 Tbs	

Serving Size: 3 Meatballs each | **Yield:** 25 or 50 servings

Oven Temperature & Baking Time	Temperature	Minutes
Conventional	400°F	20
Convection		
Pan Size		

Nutrition Analysis

Calories (kcal)	181.81
Protein (g)	20.81
Carbohydrate (g)	8.99
Total Fat (g)	6.52
Saturated Fat (g)	2.46
Sodium (mg)	250.17
Dietary Fiber (g)	2.1
Total sugars (g)	0.6

Meal Component Fulfillment *(Based on Serving Size)*

1 Serving Provides:

2 oz Protein, 1/2 cup grains

Notes

See page 4, **Cooking section**, for a description on how to precook rye berries.

1/3 cup of dry Rye Berries + 1/3 quart water = 1 1/4 cups cups of cooked berries (amount for 25 servings)

1 cup of dry Rye Berries + 1 quart water = 2 1/2 cups of cooked berries (amount for 50 servings)

Storage

Rye berries, cracked rye, and/or rye flakes should be stored at room temperature in an airtight container. They will keep for at least 6 months in a cool, dry spot. For longer storage, you can freeze the uncooked rye berries in an airtight container or freezer bag for up to a year. Cooked rye berries can be stored in an airtight container in the refrigerator for up to 5 days. For longer storage, transfer the completely cooled, cooked rye berries to a freezer bag. Tightly seal and freeze for up to 3 months.



Cooking

Cooking Rye Berries:

Rinse 1 cup of rye berries in a fine mesh strainer. Fill a medium saucepan with water and bring to a boil. Add ½ teaspoon of fine salt and the rye berries. Bring back to a boil and then reduce to a simmer. Cook until the rye berries are tender but still firm, about 45- 60 minutes. The only way to know that they are done to your liking is to taste them. If you would like them to be softer, keep cooking.



Should I Soak Rye Berries Prior to Cooking?

Some recipes suggest soaking the rye berries overnight in a covered bowl of cold water prior to cooking. The idea is to reduce the cooking time and make them easier to digest and the nutrients more bioavailable. Soaking is not necessary, but you certainly can if you are thinking ahead.

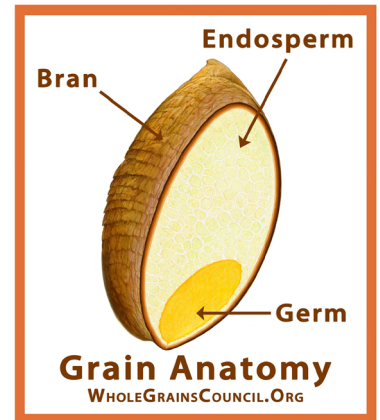
Cooking Rye Chops or Flakes: Bring 3 cups of water to boil. Add 1 cup of flakes or chops. Reduce to a simmer and cook until tender approximately 25-30 minutes for flakes, 35 minutes for chops. Add water as necessary to avoid sticking to the bottom of the pan.

Baking with Rye Flour: As a general rule, you can substitute up to one-third of the all-purpose flour in a recipe with rye flour and not have to make any significant modifications to the recipe or the baking process.

Nutrition Information

Rye is high in fiber. If you eat one half cup of rye, it can provide up to 50% of what you need for the whole day! What is especially cool about rye is that it contains an abnormal amount of fiber in the endosperm, not just the bran. Rye is considered an excellent source of protein and is rich in vitamins and minerals.

Rye is low on the glycemic index. The rise of blood glucose after eating rye is less compared to that produced from wheat. Rye is much lower in gluten than wheat, but it is still not recommended for those with a gluten allergy.



Dig Deeper

For sources and photo credits along with more recipes, lessons, quick activities, resources, and guides, visit: mtharvestofthemoth.org.

Here are sources of the rye information in this handout

- wholegrainscouncil.org
- ancientgrains.com/rye/rye-nutritional-benefits
- true-north-kitchen.com/the-essential-guide-to-cooking-and-baking-with-rye-with-recipes
- ryerevival.org/rr-history
- vilicusfarms.com



4 Montana Harvest of the Month: Rye



The Montana Harvest of the Month Program showcases Montana grown foods in Montana communities. This program is a collaboration between Montana Farm to School, Montana Office of Public Instruction, Montana Team Nutrition Program, National Center for Appropriate Technology, Montana State University Extension, Montana State University, Montana Department of Agriculture, Montana Partnership to End Childhood Hunger, and Vilicus Farms. More information and resources are available at mtharvestofthemoth.org. This funding was made possible through the *Investing in Montana School Food-System Transformation to Reach 33 x 33* initiative under The Montana Partnership to End Childhood Hunger.