



SOFT PRETZEL MADE WITH HI-MAIZE RESISTANT STARCH



Ingredients: Warm water 2/3 cup, kosher salt 1/2 tsp, all purpose flour 1 1/2 cup +3 T, Hi-maize resistant starch 3T, granulated sugar 1 1/4 tsp, unsalted butter 1 T, active dry yeast, 1/2 tsp, cold water 10 cups, baking soda 2/3 cup.

Nutrition Facts: Calories 120, Fat 1g, Cholesterol 5mg, Sodium 170mg, Total Carbohydrates 28g, Dietary Fiber 3g, Sugars 2g, Protein 3g

1. Combine the warm water, sugar, and kosher salt in the bowl of a stand mixer and sprinkle the yeast on top.
2. Allow to sit for 5 minutes or until the mixture begins to foam.
3. Add the flour and softened butter, and using the dough hook attachment, mix on low speed until well combined. Change to medium speed and knead until the dough is smooth and pulls away from the side of the bowl for approximately 4-5 minutes.

Remove the dough from the bowl, clean the bowl and then oil it well with the vegetable oil.

4. Return the dough to the bowl, cover with plastic wrap, and place in a warm place for approximately one hour or until the dough has doubled in size.
5. Preheat the oven to 450°F. Line 2 half-sheet pans with parchment paper and lightly brush with canola oil. Set aside.
6. Bring 10 cups of water and 2/3 cups of baking soda (Part B in the recipe) to a rolling boil in a large pot.
7. Divide dough into eight equal pieces (approx. 55 grams a piece) and form into pretzel shape.
8. Place pretzels into the boiled water, individually, for 30 sec. Remove from water and place on pan. Brush the top of each pretzel with egg yolk and water mixture and sprinkle with rock salt.
9. Bake until dark golden brown in color, approximately 10 minutes.

References:

- 1.) Wikipedia: Resistant Starch. http://en.wikipedia.org/wiki/Resistant_starch
- 2.) Witwer, R. Hi-maize Resistant Starch, Hi-maize Whole Grain Corn Flour & Satiety (2010) National Starch Food Innovation
- 3.) Robertson, M.D., Wright, J.W., Loizon, E., Debard, C., Vidal, H., Shojaee-Moradie, F., Russell-Jones, D., and A.M. Umpleby. Insulin-sensitizing effects on muscle and adipose tissue after dietary intake in men and women with metabolic syndrome (2012). *Journal of Clinical Endocrinology & Metabolism*

For more information contact:

Janana Snowden, Ph.D.

(225) 771-2734

janana_snowden@suagcenter.com

Or

Fatemeh Malekian, Ph.D.

(225) 771-0251

fatemeh_malekian@suagcenter.com



Southern University and A&M College System

AGRICULTURAL RESEARCH
AND
EXTENSION CENTER

Ashford O. Williams Hall
P.O. Box 10010
Baton Rouge, LA 70813
(225) 771-2262
www.suagcenter.com

Southern University Agricultural Research and Extension, an entity of the Southern University System, Leodrey Williams, Chancellor, Ronald Mason Jr., System President, Bridget A. Dinvaute, Chairman, Board of Supervisors. It is issued in furtherance of the Cooperative Extension Work Act of December 1971, and the Agricultural Research Program, in cooperation with the U.S. Department of Agriculture. All educational programs conducted by the SU Agricultural Research and Extension Center are provided to all persons regardless of race, national origin, or disability. Two Hundred copies of this publication were printed in-house by the

Resistant



Starch

“A Powerful Nutrient”

Prepared by Dr. Janana J. Snowden
Dr. Fatemeh Malekian, Dr. Bridget Udoh,
Anya Iford and Salaria Dumas

WHAT IS RESISTANT STARCH?

Resistant starch (RS) is an insoluble fiber that resists digestion in the small intestine and reaches the large intestine of healthy individuals. It is made from high amylose corn.

Resistant starch is referenced as the third type of dietary fiber due to its ability to provide the benefits of both insoluble and soluble fibers. It is found naturally in many carbohydrate-rich foods. RS is an important type of dietary fiber with large bowel and general health promoting properties as a result of its interaction with large bowel microflora (prebiotic effect).

TYPES OF RESISTANT STARCH

There are four types of resistant starch.

RS1– This type is physically inaccessible or digestible and is found in seeds, legumes, and unprocessed whole grains.

RS2– Found in its natural granular form, such as uncooked potatoes, green banana flour and high amylose corn. It is also called Hi-Maize Resistant starch.

RS3- Formed when foods containing starch are cooked and cooled such as legumes, bread, cornflakes, and cooked-and-chilled potatoes, pasta, and sushi rice.

RS4– Has been chemically modified to resist digestion. This type has a wide variety of structures that are not found in nature.

HEALTH BENEFITS OF RESISTANT STARCH

- Increases dietary fiber
- Supports a healthy weight
- Helps maintain healthy blood sugar levels
- Promotes digestive health

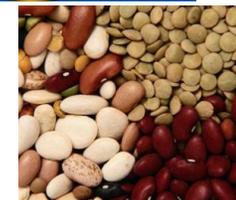
Most of the benefits of resistant starch encourages healthy intestinal microflora by providing fuel for the resident bacteria. It is through this process that bowel health is maintained.

It has been indicated through laboratory studies that resistant starch protects against experimental colo-rectal cancer and also contributes to eye health and ulcerative colitis.

Very little RS is currently consumed (4-6 grams/person/day) by the people of a western-style diet and not enough dietary fiber overall. It has been estimated that an intake of at least 20g/person/day is desirable to improve health status. It is suggested that for women 25 g and for men 30 grams of dietary fiber/person/day which includes RS.



FOODS HIGH IN RESISTANT STARCH



Resistant Starch is found in:

Food such as pulses (including beans, Peas, lentils and chickpeas)

Foods which have been cooked then cooled (including cooked/cooled Potatoes, cooked/cooled pasta

Wholegrain breads, cereals, and bananas

The development of modern food processing techniques has led to the wide availability of highly refined foods such as cereals. The content of dietary fiber and RS is lowered during processing.

AMOUNTS PER SERVING

Food	Serving Size	Resistant Starch
Beans	1/2 cup cooked	9.8
Banana, raw	1 medium, peeled	4.7
High amylose RS2 corn resistant starch	1 tablespoon (9.5 g)	4.5
Cold potato	1/2" diameter	3.2
Lentils	1/2 cup cooked	2.5
Cold pasta	1 cup	1.9
Pearl barley	1/2 cup cooked	1.6
Oatmeal	1 cup cooked	0.7
Wholegrain bread	2 slices	0.5