Cookies Formulated with Red Lentil Flour

Red Lentil Flour in Cookies

Cookies are a popular snack food product that can be made using a range of cereals including wheat and oats. The inclusion of red lentil flour in combination with these grains is an excellent way to enhance the nutritional profile of the blended flour. Different milling methods and the use of whole or split seeds have been shown to affect functional and physical characteristics of the resulting flour which effects cookie quality. Careful consideration should be given to red lentil flour specifications to ensure optimal quality in the end product.

Cookie Formulation and Processing

Cookies containing 30% red lentil flour were produced following a standardized method using the formulation provided in Table 1. The flour blend was made using a commercially available soft wheat flour.

Sugar, salt, sodium bicarbonate, and nonfat dry milk powder were mixed and added to shortening to form a creamed mass. A solution of high fructose corn syrup and water were mixed and then added to ammonium bicarbonate. This solution was added to the creamed mass and mixed for 1 minute in a lab scale Kitchen Aid mixer. The blended wheat/red lentil flour was added and mixed for a total of 2 minutes, scraping down the mixing bowl every 30 seconds. Dough was equally divided, rounded by hand, and placed on a greased cookie sheet where it was rolled into cookies with a 7 mm thickness and then cut using a 60 mm cookie cutter. Cookies were then baked for 8 minutes at 375°F.

Table 1. Formulation for Cookies Containing 30% Red Lentil Flour

Ingredient	Quantity (g)
Sugar	94.5
Salt	2.8
Sodium bicarbonate	2.3
Non-fat dry milk powder	2.3
Shortening	90
High fructose corn syrup	3.4
Ammonium bicarbonate	1.1
Wheat/Red Lentil Flour (13% mb)	225
Water[1]	Variable

1 Water addition based on flour moisture content

Table 2. Physical and Functional Specifications of Whole and Split Red Lentil Flour and Corresponding Cookie Quality

		Whole/Split Flour Properties		Whole/Split Flour Cookie Properties	
Red Lentil Flour Milling Method	Average Particle Size (µm)	Water Absorption Capacity (g/g)	Total Dietary Fibre Content (%)	Thickness (mm)	Force to break Hardness (kg)
Soft wheat flour	61.3	0.68	ND[1]	12.4	5.2
Stone	400.3/333.4	1.43/1.14	12.4/6.5	10.8/10.5	1.5/3.4
Pin — Coarse	298.2/126.1	1.27/0.95	13.1/6.6	11.7/11.0	1.7/3.6
Pin — Fine	25.8/24.0	1.35/0.94	12.1/6.1	12.1/11.9	1.5/4.1
Roller	260.3/54.4	1.18/0.85	12.4/4.8	11.2/11.6	1.6/4.4
Hammer	289.6/265.5	1.24/1.02	12.9/11.1	11.1/10.6	1.5/3.6

1 No data available for wheat flour.

Results and Recommendations

Differences were observed among cookies made with split and whole flours as well as among the different milling methods (Table 2). Split red lentil flours were better suited for producing cookies that did not break or snap easily compared to cookies made with whole flours produced by the same milling method. Red lentil flours with a larger average particle size produced cookies that were thinner, had a greater spread and generally required less force to break than cookies made with red lentil flours with a finer particle size. The presence of the hulls in the whole flours had a major impact on cookie quality as it significantly changed the water absorption capacity and resulted in softer cookies.

The most noticeable difference in cookies formulated with red lentil flour was colour. Due to the reddish hue of red lentil flour, red lentil flour cookies were redder than the cookies made with wheat flour. The presence of the hull also caused cookies made with whole red lentil flours to be specked. This was especially apparent in cookies made using whole red lentil flours with a large average particle size, such as the stone and hammer milled whole flours. This work illustrated that red lentil flour can be successfully incorporated into cookie formulations. Consideration should be given to red lentil flour properties in order to produce a cookie that meets the desired quality parameters.

Cookies Formulated with 30% Whole Red Lentil Flour Produced Using Different Milling Methods
L-R: 100% Wheat Control, Stone, Pin — Coarse, Pin — Fine, Roller, Hammer

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