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Batch Pack Ingredients and Development for Low Carb Tortillas

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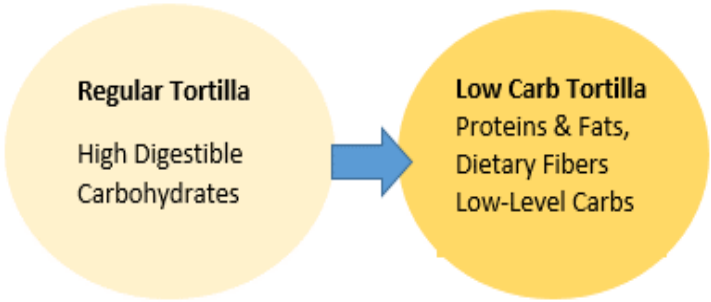
What I'll cover today

- Low Carb Concept
- Low Carb Batch Pack Ingredients
- Ingredients Comparison Low Carb Tortillas vs. Regular Tortillas
- Low Carb Batch Pack Development Phase
- R&D & Customer Support
- Quality Control in Low Carb Batch Pack
- Low Carb Batch Pack Benefits
- Low Carb Derivates
  - Keto-Friendly (Low Carb High Fat) Tortillas
  - High Protein High Fiber Tortillas
  - Paleo or Grain Free Tortillas
- Challenges
- Conclusions

At **Allied Blending**,
We create innovative solutions designed for you

Low Carb Concept

- Carbohydrates are nutrients that provide energy to the body: Fibers, Starches, and Sugars
- Low carbohydrate diets are nutritional programs that limit the consumption of carbohydrates
- Reducing the carbohydrate content for diabetic purposes/weight loss
- Low Carb products don't yet have FDA's food labeling regulations
- **Net Carbs = Total Carbs – Fiber – Sugar Alcohols**
- Dietary Fibers: May 27, 2016 FDA announced the definition of Dietary Fiber
- Net Carbs only include carbs that the body can fully digest for energy
- Low Carb alternatives: **Keto-Friendly Tortillas, High Protein High fiber Tortillas, Paleo Tortillas**



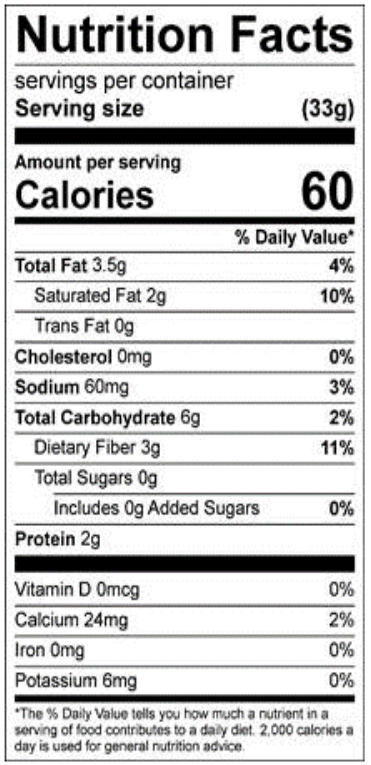
https://www.fda.gov/food/food-labeling-nutrition

Low Carb Concept (cont.)

FDA Label Claims for Low Carb Diets

- Nutritional Labeling Education Act (NLEA), 1990) - permitting the use of claims that characterize nutrient levels in foods.
- Low Carbohydrate food producers should make use of the following nutritional content claims as per FDA regulations:
  - **Sugar-Free**: Less than 0.5 g. of sugar per RACC
  - **Reduced/Less Sugar**: at least 25% less sugar than the original item
  - **No added sugar and without sugar added**: Are allowed if no sugar-containing ingredient is added during processing
- **RACC** is a guidance (No established legally enforceable responsibilities) by the FDA and stands for "Reference Amount Customarily Consumed" It is used for a reference (or standard) when determining the serving size on food or beverage nutrition facts labeling

Reference Amount Customarily Consumed (RACC)



Nutrition Facts

servings per container

Serving size (33g)

Amount per serving

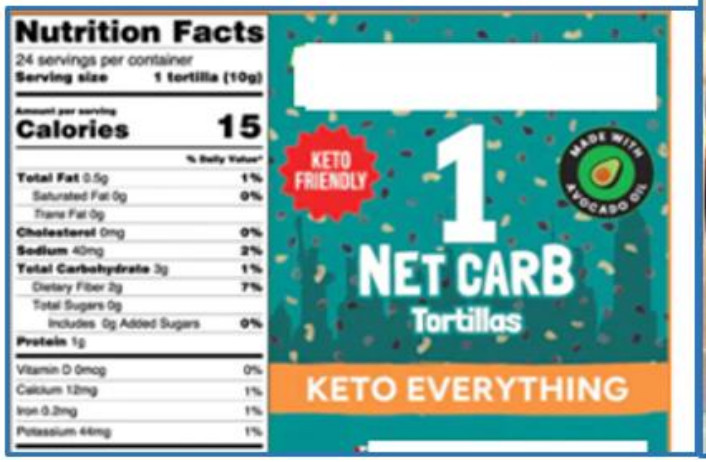
Calories 60

	% Daily Value*
Total Fat 3.5g	4%
Saturated Fat 2g	10%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 60mg	3%
Total Carbohydrate 6g	2%
Dietary Fiber 3g	11%
Total Sugars 0g	
Includes 0g Added Sugars	0%
Protein 2g	
Vitamin D 0mcg	0%
Calcium 24mg	2%
Iron 0mg	0%
Potassium 6mg	0%

*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

https://www.fda.gov/nutrition-labeling-and-education-act-nlea-requirements-attachment-1

Typical Claims & Nutritional Facts - LC Tortillas



Low Carb Batch Pack Ingredients

- Flour's Role in Wheat Flour Tortillas
    - Network
    - Functionality
    - Texture & Color

- **When starting a formulation, the primary focus is to build the structure needed for processing and for finished product characteristics**
- Nutritional Target. Formulators should first determine their nutritional targets and then decide if that target allows room for flour or sweeteners. (i.e: Net Carbs 1g. or 3g. or 6g.)
- **Net Carbs = Total Carbs – Fiber – Sugar Alcohols**
- The key to formulating Low-Carb tortillas is to use carbohydrates that are not digestible and cannot be converted into fatty acids or alternative nutritional ingredients

Cellulose	**Modified Food Starch (Resistant Starch)**
Wheat Protein Isolates	**Oat Fibers**
Wheat Gluten	**Soy Flour**

Low Carb Batch Pack Ingredients (cont.)

- **Using Wheat-based ingredients and Protein**
  - Wheat Proteins, Wheat Gluten

- **Add Dietary Fibers**
  - Resistant Wheat Starch
  - Great solution to lower net carbs
  - Also help with the network structure

  - In addition to intact and intrinsic fibers. FDA has identified the following **non-digestible carbohydrates** as meeting the dietary fiber definition:

    Beta-glucan soluble fiber, Psyllium husk, Cellulose, Guar gum, Pectin, Locust bean gum, Hydroxypropylmethylcellulose

- **Fibers under enforcement discretion** include Mixed plant cell wall fibers (oat hull fiber, pea fiber, corn hull fiber, potato fiber, citrus fiber, wheat fiber, sugar cane fiber and apple fiber, among many others), Arabinoxylan, Alginate, Inulin and inulin-type fructans, High amylose starch (resistant starch 2), Galactooligosaccharide, Polydextrose, Resistant maltodextrin/dextrin, Cross linked phosphorylated RS4, Glucomannan, Acacia (gum arabic)

https://www.fda.gov/food/food-labeling-nutrition/?-and-answers-dietary-fiber#fda_actions

Low Carb Batch Pack Ingredients (cont.)

- **Adding Functional Systems**

Ingredients	Effects
Salt	Flavor
Alternative sweeteners	Flavor without extra calories, Toast Points.,
Leavening System Sod-Bicar, Pot-Bicar (Low Sodium). Leavening Acids: SAS, SALP, MCP, SAPP28)	Based on usage and their reactions gives the appearance/specific desired results. Also, It influences texture and physical properties.
Preservatives: (Calpro, SodiPro, PotaSorb, SorbAcid, Natural Preserva..)	Shelf-Life Extenders Mold Inhibitors
Acidulants (FA, CA)	pH adjustment
Dough Conditioners Emulf (Mo&Di, SSL, Lecith.) Gums (Guar), Enzymes.	Improve dough machinability, dough formation Shelf-Life Extension (better texture) Help in decreasing staling and product sticking
Reducing Agents	Reduce dough Elasticity. Facilitate production

Low Carb Batch Pack Ingredients (cont.)

- **Shortening (added at the tortilla manufacturing facility)**
  - Solid shortening or Liquid Oil
  - Reduce the overall concentration of carbs
  - Machinability; texture and flavor
  - Dough Stickiness
  - Interacts with starch and protein; slows Staling
  - Reduces tortilla Sticking
  - Usually, the usage is higher compared to a regular tortilla bake recipe

- **Water (added at the tortilla manufacturing facility)**
  - It could be your first or second ingredient in your bake recipe
  - Usage Rate will depend on the absorption capacity of the Protein and Fiber sources used
  - Required for the dough network formation
  - Determine the moisture content of the finished product Texture and Shelf Life

Ingredient Comparison Low Carb vs. Regular Tortilla

Typical Wheat Flour Tortilla	Effects	Low Carb Tortilla	Effects
Wheat Flour	Major Ingredient Determine tortilla quality Gluten Network – Viscosity, elasticity, Stretching/Extensibility	**Protein & Dietary Fibers:** Modified Food Starch**,** Wheat Gluten, Cellulose, Oat Fiber, Wheat Protein	Wheat Fl. Replacement **Dietary Fibers** Network – Viscosity, elasticity, Stretching/Extensibility
Water	Hydration. Network form	Water	Hydratn. Network form.
Shortening / Oil	Dough machinability; tortilla texture.	Shortening /Oil	Dough machinability; tortilla texture.
Sugar	Flavor and toast points	**Alternative Sweeteners:** Sugar Alcohols, Artificial Sweeteners	Flavor and teste.
Salt	Flavor	Salt	Flavor
Leavening System (SBC, SAS, SALP, SAPP28)	Appearance. Also, It influences texture and physical properties	Leavening System (SBC, SAS, SALP, SAPP28)	Appearance. Also, It influences texture and physical properties

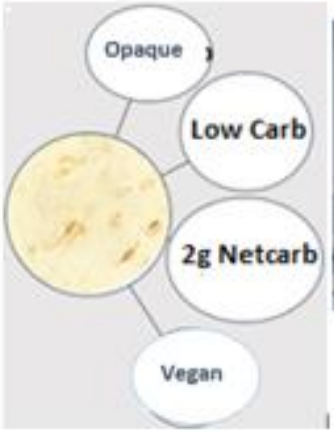
Ingredient Comparison Low Carb vs. Regular Tortilla (Cont.)

Typical Wheat Flour Tortilla	Effects	Low Carb Tortilla	Effects
Preservative System (CalPro, PS, SA, Nat Preserv.)	Shelf=Life Extenders Mold Inhibitors	Preservative System (CalPro, PS, SA, Nat Preserv.)	Shelf-Life Extenders Mold Inhibitors
Acidulants (FA, CA)	pH adjustment	Acidulants (FA, CA)	pH adjustment
Conditioners: Emulsifiers (Mono & Di), Gums (Guar, CMC, Xanthan)	Improve dough machinability, Shelf Life Stability (better texture), help in decreasing staling and product sticking.	Conditioners: Emulsifiers (Mono & Di), Gums (Guar, CMC, Xanthan)	Improve dough machinability, Shelf Life Stability (better texture), help in decreasing staling and product sticking.
Reducing Agents (SMBS, L-Cys)	Reduce dough Elasticity	Reducing Agents (SMBS, L-Cys)	Reduce dough Elasticity

Low Carb Batch Pack Product Development Phase

- A need arises for a low-carb tortilla or flatbread
- **Net Carbs** value requirement
- Product attributes are identified
- Nutritional or ingredient requirements are identified
- Formula design and verification (**Genesis Software**)

Attributes & Nutritional Claims



Formula design & Genesis Software Verif.

Bake test and product evaluation

Low Carb Batch Pack Product Development Phase (cont.)

- A Nutritional Statement and Product Data Sheet is created for the customer
- Sample batch packs will be sent for a trial run at the customer's facility
- Customer finished product sample is evaluated, and any necessary revisions to the formula are made
- Final formula is approved

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PRODUCT DATA SHEET
#S4079-C
Low Carb Batch Pack
08/29/2023

Item Description: Low Carb Batch Pack is a blend of dry ingredients designed to improve the texture and functionality of flour tortillas, while offering the convenience and accuracy of a measured BatchPak™

Ingredients: Protein, Dietary Fiber, Guar Gum, Mono-Diglycerides, Calcium Propionate, Sodium Bicarbonate, Salt, Fumaric Acid, Sodium Aluminum Sulfate, Sodium Aluminum Phosphate, Sorbic Acid.

Allergens: Wheat.

Storage: Store in a cool (50-80 degrees F), dry location and separated from strong smelling substances.

Shelf life: 120 days at suggested storage conditions.

Packaging: 50 pound poly-lined bag.

Typical Analysis: No extraneous matter

Application/Usage:

Low Carb Batch Pack	50 lbs
White Wheat Flour	16.25 lbs
Sodium Metabisulfite	0.0061 lbs
Water	58 lbs
Oil /Shortening	10 lbs

Nutrition Facts

servings per container
Serving size (100g)

Amount per serving
Calories 180

	% Daily Value*
Total Fat 5g	6%
Saturated Fat 3g	15%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 1000mg	43%
Total Carbohydrate 54g	20%
Dietary Fiber 52g	186%
Total Sugars 0g	
Includes 0g Added Sugars	0%
Protein 24g	
Vitamin D 0mcg	0%
Calcium 391mg	30%
Iron 2mg	10%
Potassium 30mg	0%

*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Kosher/Halal Status: Manufactured under the direction of the Union of Orthodox Jewish Congregations of America and Islamic Services of America.

Food Safety Certification: Allied Blending LP participates in annual Global Food Safety Initiative (GFSI) certification.

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Low Carb Batch Pack Product Development Phase (cont.)

- **Net Carbs Product Verification**
  - Verification vs. Nutritional Facts generated by Genesis R&D Label Software
  - Use of Independent Labs and their TDF (Total Dietary Fiber) methods
    - Results vary depending on the test method
    - AOAC 985.29 method (Enz. & Gravimetrical Test)
    - AOAC 991.43 method (Enz. & Gravimetrical Test)
    - AOAC 2011.25 method (Grav + HPLC).
    - AOAC 2022.01 (Rapid Integral Method, HPLC)
    - AOAC 2001.03 with AOAC 991.43 digestion - Fiber, Total with Resistant Oligosaccharides test –
    - Provide Mock Labeling & Technical Information

Nutrition Facts

servings per container
Serving size (18g)

Amount per serving
Calories 45

	% Daily Value*
Total Fat 2.5g	3%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol --mg	--%
Sodium --mg	--%
Total Carbohydrate 8g	3%
Dietary Fiber 4g	14%
Total Sugars --g	
Includes --g Added Sugars	--%
Protein 1g	
Vitamin D --mcg	--%
Calcium --mg	--%
Iron --mg	--%
Potassium --mg	--%

*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

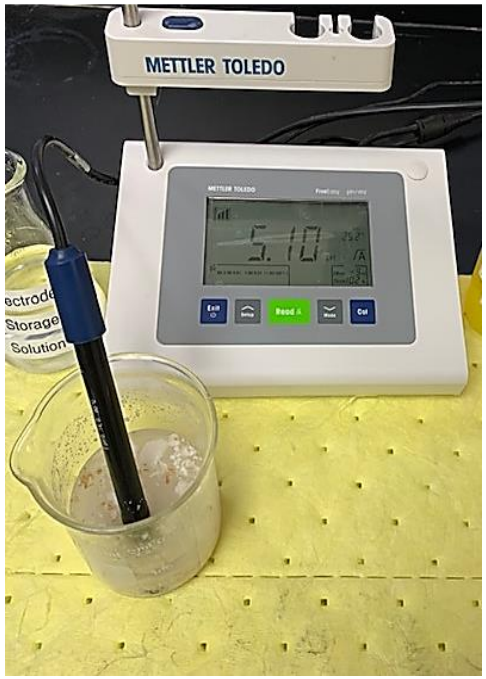
R&D and Customer Support

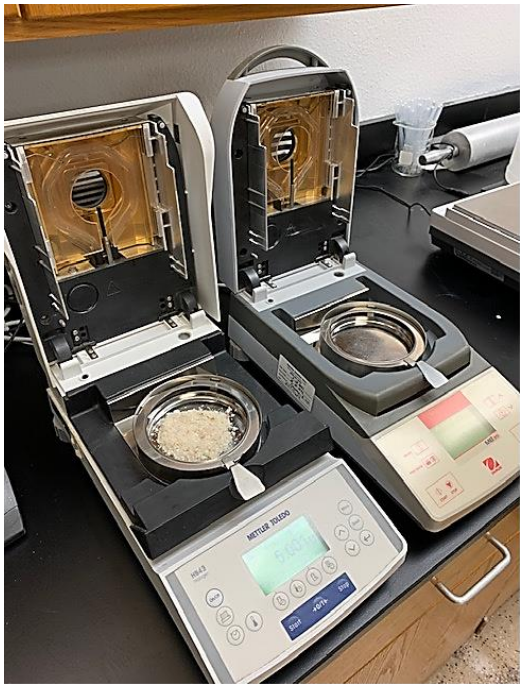
- Work with customer to make proprietary formulations to fit customer's needs
  - Appearance, Taste. Shelf Life, Nutritional Content, Regulatory Requirements
- Optimization of Ingredients functionalities for cost saving and/or best results
- Technical Support
  - Choose the best ingredients (cost and quality)
  - On-site: Troubleshooting for common processing issues

Quality Control in Low Carb Batch Pack

- **All finished Low Carb Batch Packs are subject to rigorous QC Testing**

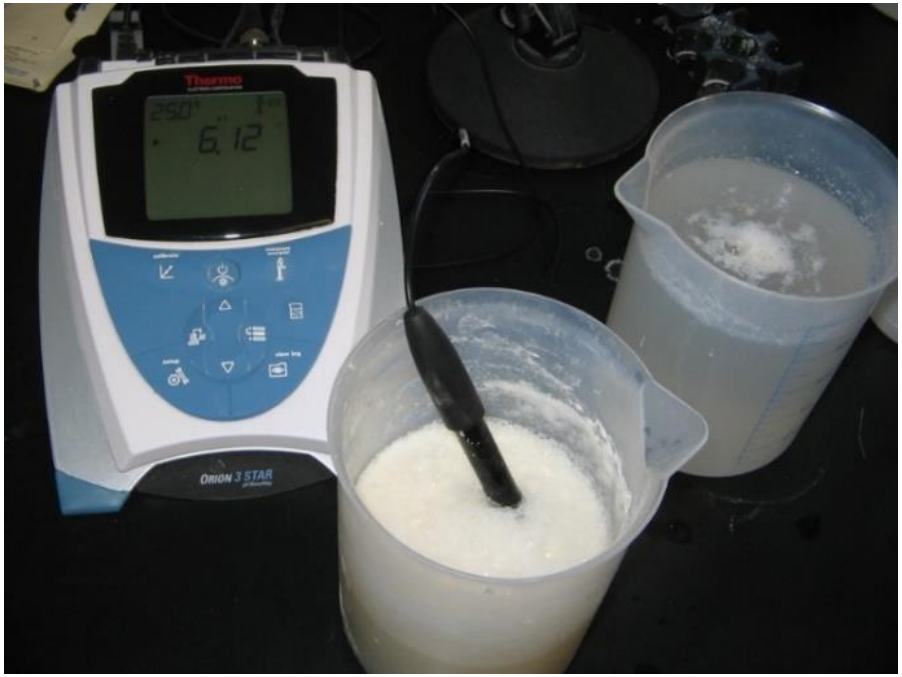
  - **pH**
  - **CO_2**
  - **Moisture**





Quality Control in Low Carb Batch Pack (cont.)

- Sodium Content



- Foreign Material

Quality Control in Low Carb Batch Pack (cont.)

- **Bake Test -** Finally Low Carb Batch Packs are “Bake Tested” to assure proper batch pack function and quality are met

Low Carb Tortillas

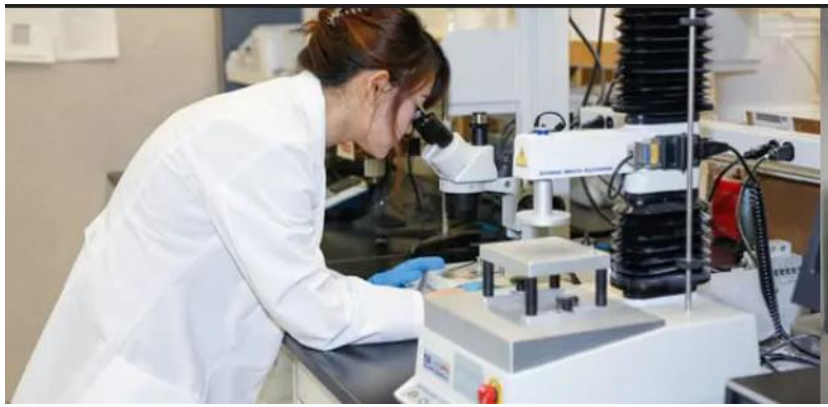
Low Carb Batch Pack Benefits

- **Ingredient Management Cost**
  - Inventory Reduction
  - Convenience in storage & manufacturing
  - Makes ingredient product rotation easier to manage
  - Warehouse Reduction
  - Labor Cost-Savings

- **Quality & Food Safety**
  - Low Carb Batch Pack can be packaged in bags sized exactly for the desired batch weight
  - Product Consistency
  - Yield Improvement, less rejection
  - Liabilities shift to supplier
  - Incoming Ingredient Inspection and evaluation
  - Supplier Quality Assurance program management and Good Documentation Practices

Low Carb Batch Pack Benefits (cont.)

- **Research and Development Costs**
  - Work with customers to make proprietary formulations to fit customers' needs.
  - Technical support.
  - Time savings to developing new product formulas.
  - Knowledge of current food regulations and labeling.
  - No need to hire technical/educated personnel to do R&D work.



Keto-Friendly (Low Carb High Fat) Tortillas

- Growing number of Keto products, including Keto-Friendly tortillas
- Wheat protein isolates and concentrates, Soy protein
- Dietary Fibers: Oat Fiber, Cellulose and Resistant Starches
- Low carb tortillas (between 2-6 net carb) are Keto-friendly
- Consumed in moderation, can be important when following a Keto diet:
  - 20-50 grams daily carb limit (2000 cal./day)
  - Total fat consumption (ketogenic) 70-80% (2000 cal./day)

(Senior, W., 2022 & https://fitnessunicorn.com/is-mission-carb-balance-keto/)

High Protein High Fiber Tortillas

- Increase the protein & fiber contents in tortilla formulations
- Adding high protein plant-based ingredients & non-digestible carbohydrates
- The Daily Value for Protein is 50g per day on 2,000 calories diet (FDA)
- The Daily Value for Fiber is 25g per day on 2,000 calories diet (FDA)
  - High Protein: ≥ 20% of the DV (EU: at least 20 % of food energy value is provided by protein)
  - High Fiber: ≥ 20% of the DV (EU: 6g. fiber per 100g. product, or at least 3g. per 100 kcal)
- Full of essential nutrients and amino acids to fuel an active lifestyle
  - **Cellulose**
  - **Modified Food Starch (Resistant Starch)**
  - **Pea Protein Isolates**
  - **Wheat Protein Isolates**
  - **Soy Protein Isolates**
  - **Oat Fibers**
  - **Vital Wheat Gluten**

(https://www.baystatemilling.com/rothwell-grainessentials-center/what-is-protein-quality)

Paleo or Grain Free Tortillas

- **Paleo Diet**
  - Contributes to reducing inflammation, increasing energy
  - Help with weight loss, stabilize blood sugar
- **Paleo diet excludes:**
  - Gluten and other grains (oats, rice, and corn)
  - Legumes (soy, peanuts, lentils, and beans)
  - Refined oils (like canola, soybean, cottonseed)
  - Dairy and sugar
- Cassava flour, coconut, cauliflower, and almond flour as choice ingredients
- Paleo Oils (Olive, Walnut, Flaxseed, Macadamia, Avocado, Coconut Oil)
- While these are solid and exciting, they still seem to be niche-based and not yet mainstream.

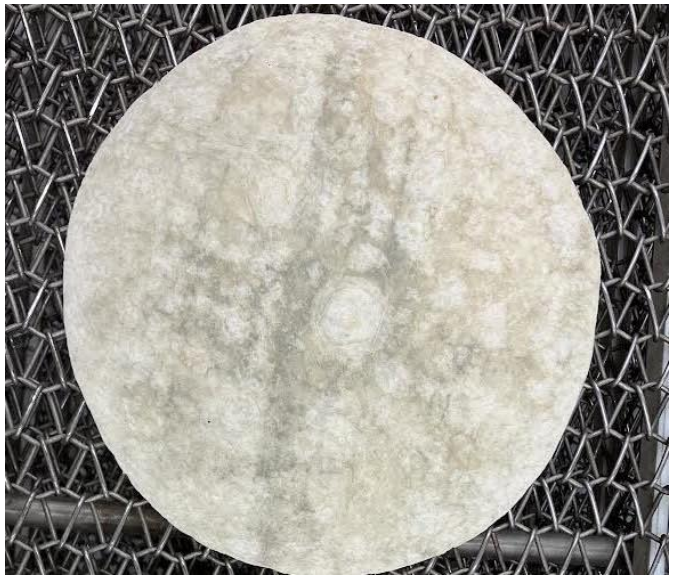
(Wood, E., 2018 & Mayer, J., 2021)

Challenges

- Processability, finished product quality, and shelf stability
  - Designed to work on existing equipment and processes

Protein & Fiber

Net Carbs Network



Water

Shortening

Attributes/ Characteristics

Processing Parameters (Mixing, Press, Oven)

Challenges (cont.)

- Creating low-carb Tortillas include differences in : Texture, flavor, and dough rheology

Slack dough

After Press -
Broken edges & Hole Issues

Broken edges

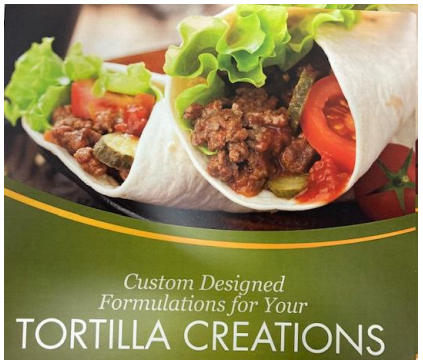
Challenges (cont.)

- The consumers are not willing to trade healthier for diminished quality or taste
- Tortilla formulators continue to simplify and use more natural ingredients
    - Removing or replacing highly functional ingredients used for specific purposes
- Price differentials in reformulations analyzed for cost/benefit
- Cost differentials must be compensated by marketing and claims
- Market newly developed healthier tortillas for tortilla industry
- Without Regulations/guidelines: Misleading information


(Agah, S., 2022)

Conclusions

- With health being front and center for consumers, we are seeing many shifts to nutritious ingredients and healthier tortilla products
- Low-carb diet brings about numerous health benefits
- Developing solid formulations that focus on self-care (health, nutrition & ingredient transparency)
- Offering good taste, texture, and superior functionality is critical to ensure consumer acceptance and ultimately market success
- Allied Blending LP has been partnering with consumers for years to develop healthy and nutritious formulas
- Our R&D team and technical services group work together with you to develop and implement Low Carb tortilla formulas that are desired by consumers



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Thank You