



Fibers for Life.

Dietary Fibers and their Application in Tortilla

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Agenda

- JRS - Company presentation and product portfolio
- Global food trends
- How to overcome the fiber gap
- Dietary fiber benefits
- Practical part I : CL - Fiber enrichment
- Practical part II : CL - Xanthan gum replacement
- Takeaways



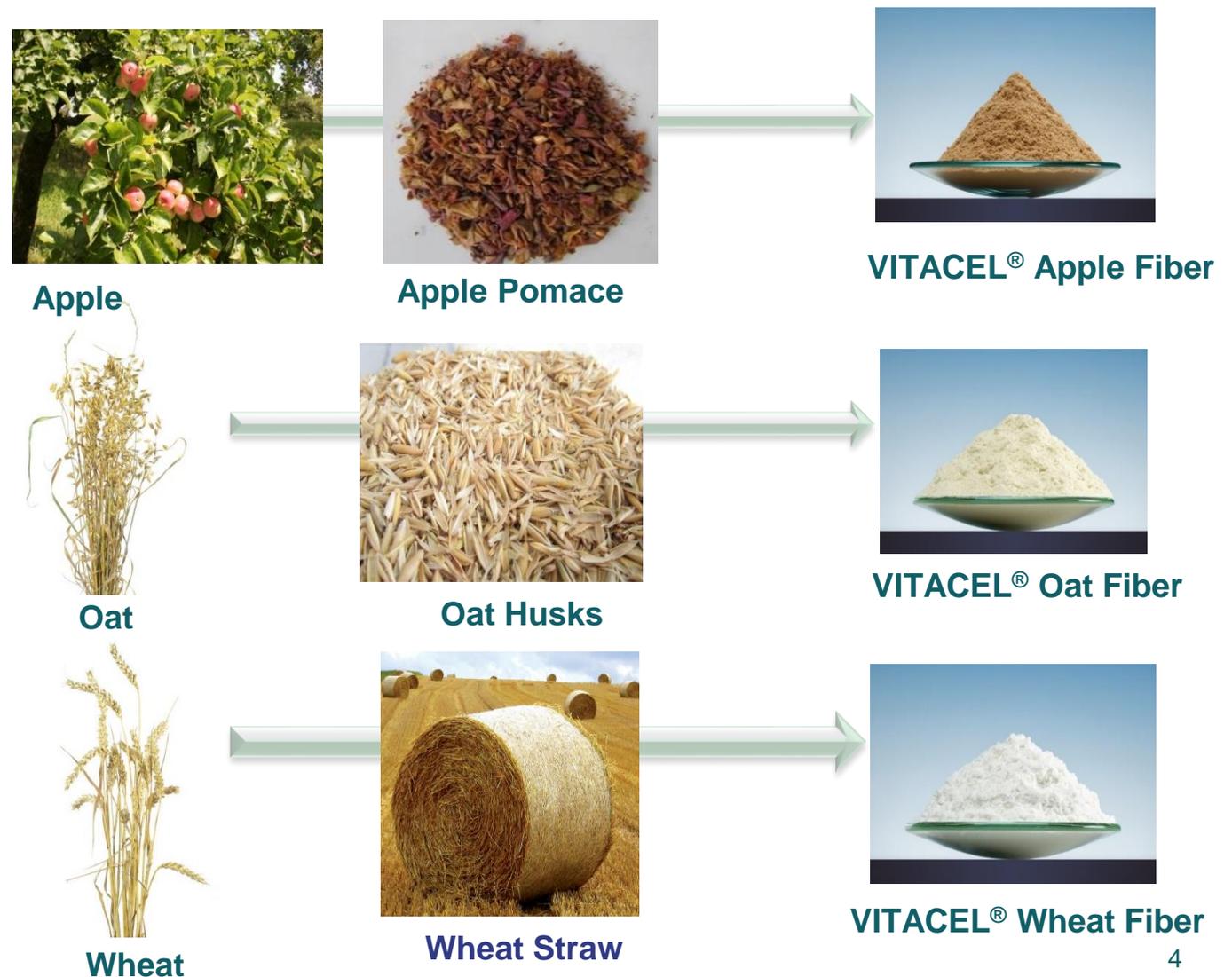
At a Glance - The JRS Company Group

- More than 140 years of experience and special know-how
- Worldwide active, owner-managed family business group with dynamic growth and sustainable standards
- Global network structures – **3500 employees**, more than **90 production and sales locations** worldwide
- Solution provider, system and technology partner



Upcycling & Sustainability

- JRS' fiber products are created from natural, regrowing, plant based raw materials
- Use of secondary raw materials, from agricultural-byproducts
- Sustainability is our guiding principle



JRS Food Ingredients Toolbox

Cereal Fibers

VITACEL® Wheat Fiber

VITACEL® Oat Fiber/Organic Oat Fiber

VITACEL® Rice Fiber

Fruit / Vegetable Fibers

VITACEL® Apple Fiber/Organic Apple Fiber

VITACEL® Potato Fiber

VITACEL® Pea Fiber

VITACEL® Citrus Fiber

Soluble Fiber

VITACEL® Psyllium/Organic Psyllium

Plant Fiber / Celluloses

VITACEL® Bamboo Fiber

VITACEL® Powdered Cellulose

Fibers

Functional Systems

VIVAPUR® MC and HPMC

VIVAPUR® Alginate

VIVAPUR® Pectin

VIVAPUR® Tara Gum

Compounds

VIVAPUR® BCS 100

VIVAPUR® BBS 2122

VIVAPUR® BBS 2209

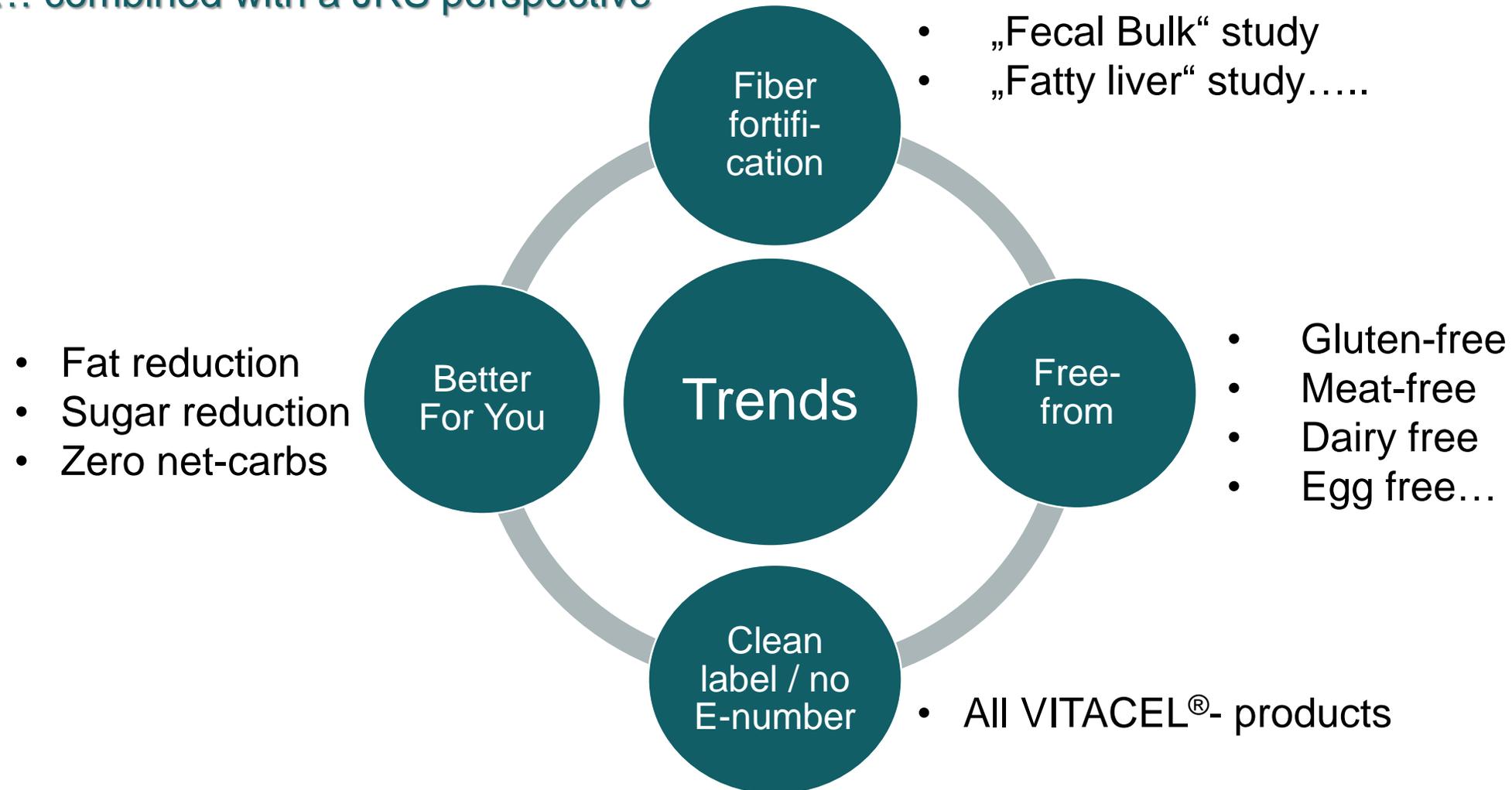
VIVAPUR® BCS 200

JRS Food Ingredients Toolbox

- JRS-Toolbox allows us to support many of the current trends
- In addition to our toolbox, we offer comprehensive service in formulation, application and troubleshooting
- For each request an customized solution
- The great variety of raw materials enables us to formulate tasty baked goods with an outstanding texture

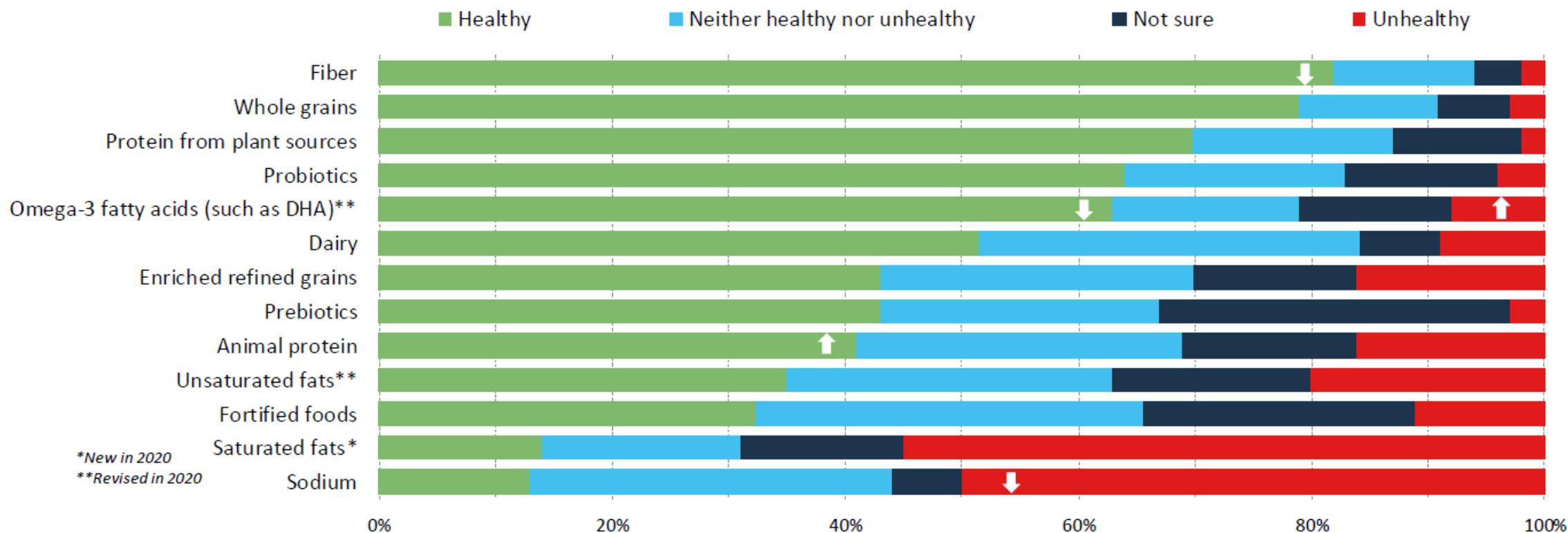
Global food trends from a consumer perspective

... combined with a JRS perspective



Fiber continues to be well positioned with consumers

Perceived Healthfulness of Foods



Source: 2020 Food & Health Survey, International Food Information Council

Why is there still a Fiber Gap?

- Challenge to achieve the RDI even by solely consuming food groups that are rich in fiber.
 - Traditional fiber products – challenged in case of taste and texture.
 - Consumers struggle to know which products provide a healthy dose of fiber.
- more Transparency is needed : e.g. using **Fiber Claims** or **Nutri-Score**

How to close the Fiber Gap?

- Increase the fiber content of daily staple & convenience foods
- Using an intrinsic, added and combined fiber strategy
- Realize a desired fiber content to qualify for a certain fiber claim.
- Fiber enrichment with minor formulation adjustments, while maintaining high quality.

Ideal Fiber for Enrichment

- Low water absorption
- Less influence on original formulation
- High TDF- Content
- Neutral taste, odorless and color
- No gastrointestinal distress – “unlimited” application

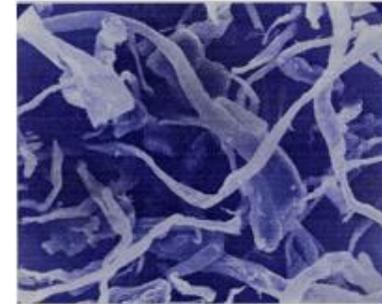
Ingredient	TDF-Content
Whole wheat flour	ca. 10%
Wheat Bran	ca. 40%
Apple Fiber	ca. 55%
Potato Fiber	ca. 65%
Pea Fiber	ca. 65%
Rice Fiber	ca. 90%
Oat Fiber	ca. 90%
Wheat Fiber	ca. 95%

VITACEL® Dietary Fibers enable...

- Nutritional Benefits in foodstuff
 - Dietary fiber enrichment
 - Calorie reduction
- Functional Benefits in foodstuff
 - Water management
 - Formation of a 3D-network
 - Capillary effect
 - Crumb coloring
 - No gastrointestinal discomfort

2 KEY CONCEPTS

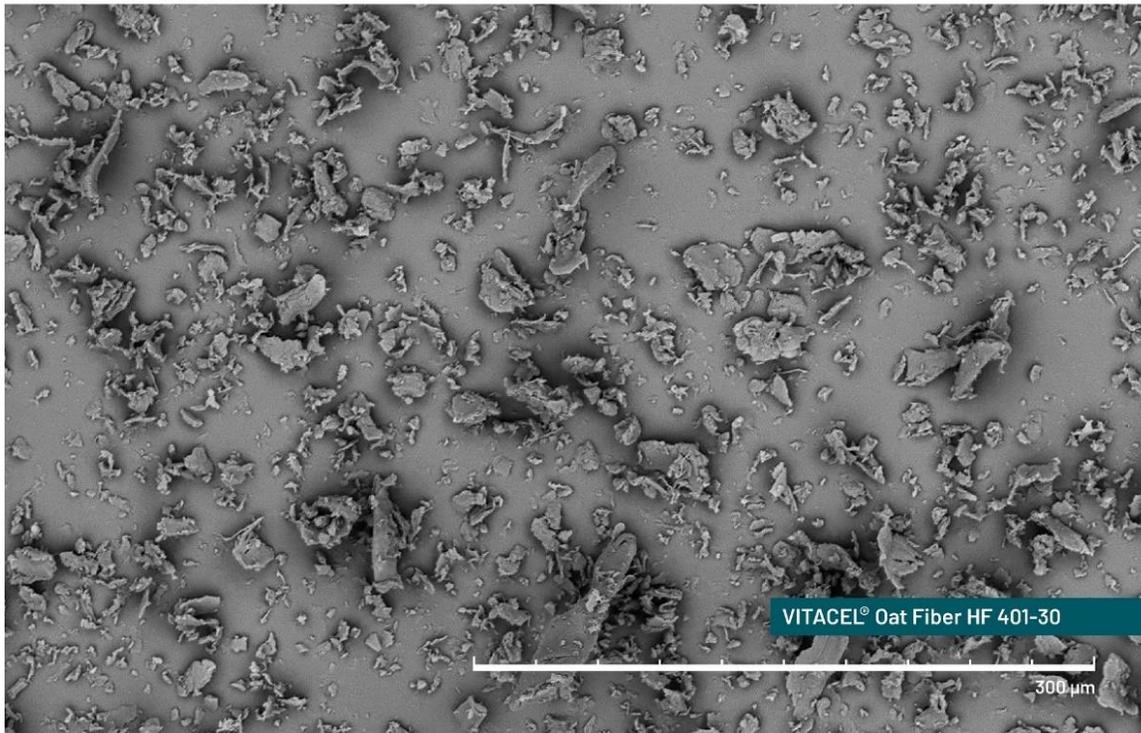
3D NETWORK



CAPILLARY EFFECT



Nutritional Benefits – Fiber Enrichment



VITACEL®HF 401-30



VITACEL®WF 600-30

Fiber Enrichment – short fiber I

Parameters	Control-Cellulose	HF 401-30 (3 g)	HF 401-30 (6 g)	WF 600-30 (3 g)	WF 600-30 (6 g)
Dough Texture	Soft, pliable. No stickiness				
Divider	Dough balls didn't adhere on the unit				
On Press	Tortilla disks didn't adhere on unit				
On Oven	Tortilla disks didn't adhere on unit				
Tortila pH	5,28	5,23	5,24	5,25	5,26
Tortilla Texture	Soft, flexible without cracking when folded, and puffed.	Soft, flexible without cracking when folded, and puffed.	Soft, flexible without cracking when folded, and puffed.	Soft, flexible without cracking when folded, and puffed.	Soft, flexible without cracking when folded, and puffed.

Fiber Enrichment – short fiber II

Stickiness Test	Control (5 g)	HF401-30 (3 g)	HF401-30 (6 g)	WF600-30 (3 g)	WF600-30 (6 g)
7 days	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but not damage occurred.
Moisture					
0 days	33,70%	35,69%	35,26%	35,83%	36,26%
7 days	35,18%	35,54%	36,22%	36,36%	35,64%
Water Activity (Aw)					6
0 days	0,9716	0,9765	0,9734	0,9746	0,9765
7 days	0,9771	0,9721	0,9749	0,9759	0,9775
Rollability					
0 days	Rollable with no cracks				
7 days	Rollable with no cracks				
Folding					
0 days	Foldable, no cracks				
7 days	Foldable, no cracks				

Fiber Enrichment with Cellulose = Control → Source of Fiber (5 g fiber/100 g Tortilla)



Nutrition Facts	
servings per container	
Serving size	(100g)
Amount per serving	
Calories	220
	% Daily Value*
Total Fat 6g	8%
Saturated Fat 3g	15%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 380mg	17%
Total Carbohydrate 37g	13%
Dietary Fiber 5g	18%
Total Sugars 1g	
Includes 0g Added Sugars	0%
Protein 9g	
Vitamin D 0mcg	0%
Calcium 128mg	10%
Iron 3mg	15%
Potassium 120mg	2%
*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.	
Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4	

Ingredient list for Reference (control):

Wheat Flour, Water, Shortening, Wheat Gluten, **Cellulose**, Soy Flour, less than 2% (Mono & Diglycerides, Corn Starch, Calcium Propionate, Salt, CMC Gum, Fumaric Acid, Sodium Aluminum Phosphate, Sorbic Acid, Sodium Acid Pyrophosphate, Xanthan Gum, Sodium Metabisulfite).



Fiber Enrichment with VITACEL® WF 600-30

Source of Fiber (3 g fiber/100 g Tortilla)



Nutrition Facts	
servings per container	
Serving size	(100g)
Amount per serving	
Calories	230
	% Daily Value*
Total Fat 6g	8%
Saturated Fat 3g	15%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 390mg	17%
Total Carbohydrate 34g	12%
Dietary Fiber 3g	11%
Total Sugars 1g	
Includes 0g Added Sugars	0%
Protein 9g	
Vitamin D 0mcg	0%
Calcium 130mg	10%
Iron 3mg	15%
Potassium 122mg	2%
*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.	
Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4	

Fiber Enrichment with VITACEL® HF 401-30 → Source of Fiber (3 g fiber/100 g Tortilla)



Nutrition Facts	
servings per container	
Serving size	(100g)
Amount per serving	
Calories	230
	% Daily Value*
Total Fat 6g	8%
Saturated Fat 3g	15%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 390mg	17%
Total Carbohydrate 34g	12%
Dietary Fiber 3g	11%
Total Sugars 1g	
Includes 0g Added Sugars	0%
Protein 9g	
Vitamin D 0mcg	0%
Calcium 130mg	10%
Iron 3mg	15%
Potassium 122mg	2%
*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.	
Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4	

Fiber Enrichment with VITACEL®WF 600-30 → High in Fiber (6 g fiber/100 g Tortilla)



Nutrition Facts	
servings per container	
Serving size	(100g)
Amount per serving	
Calories	230
% Daily Value*	
Total Fat 6g	8%
Saturated Fat 3g	15%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 380mg	17%
Total Carbohydrate 33g	12%
Dietary Fiber 6g	21%
Total Sugars 0g	
Includes 0g Added Sugars	0%
Protein 8g	
Vitamin D 0mcg	0%
Calcium 125mg	10%
Iron 2mg	10%
Potassium 102mg	2%
*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.	
Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4	

Fiber Enrichment with VITACEL® HF 401-30

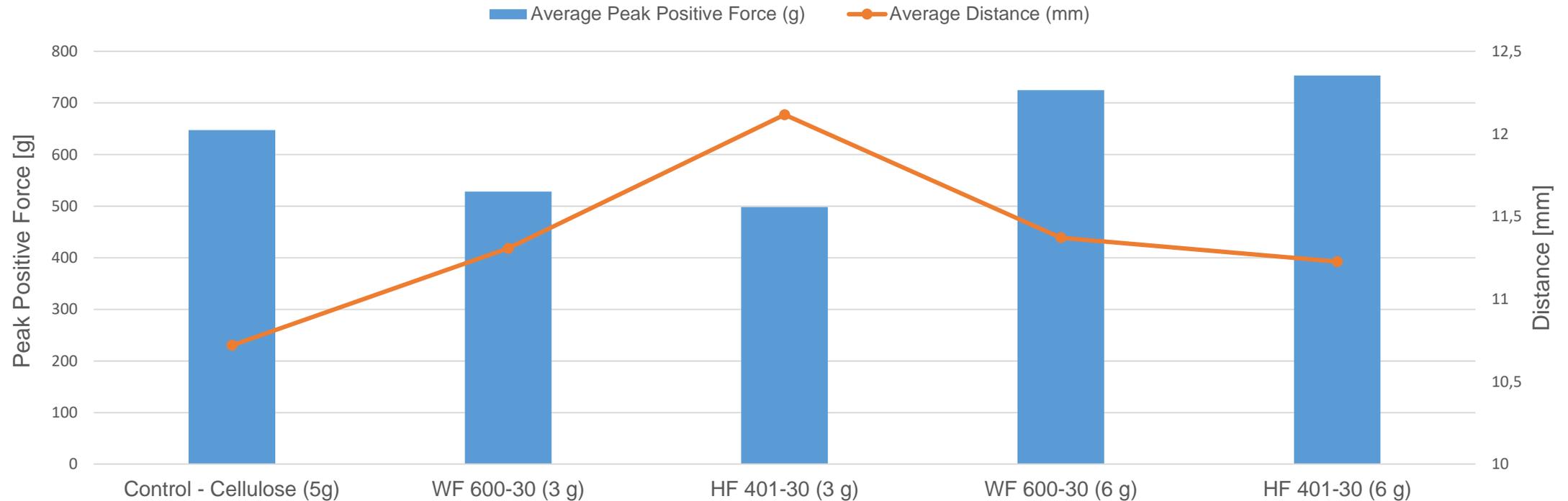
→ High in fiber (6 g fiber/100 g Tortilla)



Nutrition Facts	
servings per container	
Serving size	(100g)
Amount per serving	
Calories	230
	% Daily Value*
Total Fat 6g	8%
Saturated Fat 3g	15%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 380mg	17%
Total Carbohydrate 33g	12%
Dietary Fiber 6g	21%
Total Sugars 0g	
Includes 0g Added Sugars	0%
Protein 8g	
Vitamin D 0mcg	0%
Calcium 124mg	10%
Iron 2mg	10%
Potassium 101mg	2%
*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.	
Calories per gram: Fat 9 • Carbohydrate 4 • Protein 4	

Nutritional Benefits - Fiber Enrichment

“Tortilla Burst Rig”- measurements after 7 days: different Types and Amounts of Fiber



Peak Positive Force (g): Force required to rupture the tortilla

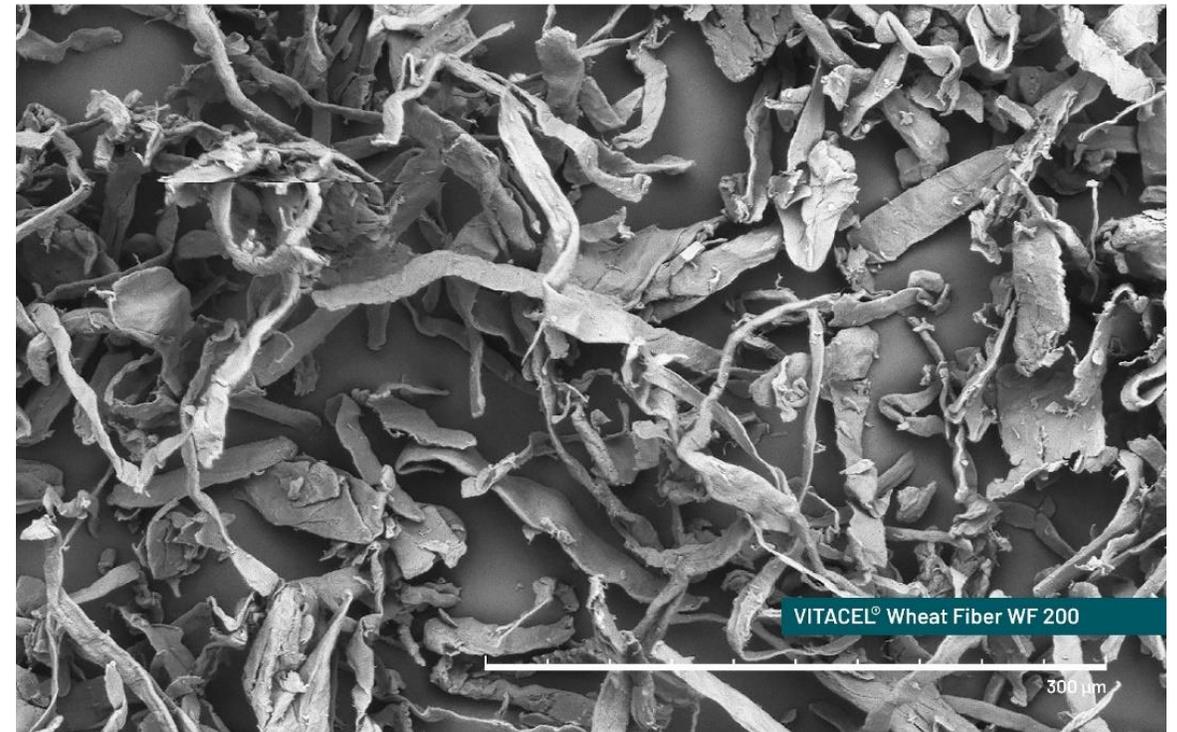
Distance (mm) : Rupture Distance

WF 600-30(6g) and the WF401-30 (6g) could be a good replacement for cellulose and provide a “high fiber” tortilla with good texture.

Functional benefit – Xanthan Gum Replacement



VITACEL®WF 600



VITACEL®WF 200

Functional benefit – Xanthan Gum Replacement

Xanthan Gum	WF 200	WF 200	WF 600	WF 600
0,22%	1,0%	2,0%	1,0%	2,0%

Control bake recipe :

Wheat Flour: = 900 g

Batch Pack (Xanthan Gum incl.) = 52 g

Shortening = 90 g

Glycerine = 29 g

Water = 430 g

VITACEL WF 200

With WF 200(1%) - additional water = 5 g

With WF 200(2%) - additional water = 8 g

Vitacel WF 600

With WF 600(1%) - additional water = 10 g

With WF 600(2%) – additional water = 40 g

Xanthan Gum replacement – long fiber I

Parameters	Control-Xanthan	WF200 (1%)	WF200 (2%)	WF600 (1%)	WF600 (2%)
Dough Texture	Soft, pliable. No stickiness				
Divider	Dough balls didn't adhere on the unit				
On Press	Tortilla disks didn't adhere on unit				
On Oven	Tortilla disks didn't adhere on unit				
Tortilla pH	5.76	5.82	5.78	5.75	5.81
Tortilla Texture	Soft, flexible without cracking when folded, and puffed.				

Xanthan Gum replacement – long fiber II

Stickiness Test	Control	WF 200 (1%)	WF 200 (2%)	WF 600 (1%)	WF 600 (2%)
7 Days	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but not damage occurred.
14 Days	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but not damage occurred.	Tortillas made a zippering sound when separated, but one damage occurred.

Xanthan Gum replacement – long fiber III

Parameters	Control	WF200(1%)	WF200(2%)	WF600(1%)	WF600(2%)
Moisture					
0 Days	24.18	24.70	27.49	26.50	26.20
7 Days	26.71	25.90	27.29	26.46	26.40
14 Days	27.08	27.04	26.74	28.48	26.86
Water Activity (Aw)					
0 Days	0.8924	0.9306	0.9220	0.9163	0.9113
7 Days	0.9198	0.9161	0.9327	0.9249	0.9188
14 Days	0.9252	0.9253	0.9247	0.9412	0.9215
Rollability					
0 Days	Rollable with no cracks	Rollable with no cracks	Rollable with no cracks	Rollable with no cracks	Rollable with no cracks
14 Days	Rollable with no breaks	Rollable with one small crack.	Rollable with no cracks	Rollable with no cracks	Rollable with no cracks

Xanthan Gum replacement – long fiber III

Parameters	Control	WF200(1%)	WF200(2%)	WF600(1%)	WF600(2%)
Folding					
0 Days	Foldable, no cracks	Foldable, no cracks	Foldable, no cracks	Foldable, no cracks	Foldable, no cracks
7 Days	Foldable, no cracks	Foldable, no cracks	Foldable, no cracks	Foldable, no cracks	Foldable, no cracks
14 Days	Foldable, no cracks	Foldable, one crack. Picture 8.	Foldable, no cracks	Foldable, no cracks	Foldable, no cracks

Xanthan Gum Replacement – Control (0,22%)



Control bake recipe :

Wheat Flour: = 900 g

Batch Pack (Xanthan Gum incl.) = 52 g

Shortening = 90 g

Glycerine = 29 g

Water = 430 g

Xanthan Gum Ersatz - VITACEL®WF 200 (1%)



Bake recipe :

Wheat flour : = 900 g

Batch Pack (Xanthan Gum incl.) = 52 g

Shortening = 90 g

Glycerine = 29 g

Water = 430 g

Additional water = 5 g

Xanthan Gum Ersatz - VITACEL® WF 200 (2%)



Recipe :

Wheat Flour: = 900 g

Batch Pack (Xanthan Gum incl.) = 52 g

Shortening = 90 g

Glycerine = 29 g

Water = 430 g

Additional water = 8 g

Xanthan Gum Ersatz - VITACEL®WF 600 (1%)



Recipe :

Wheat Flour: = 900 g

Batch Pack (Xanthan Gum incl.) = 52 g

Shortening = 90 g

Glycerine = 29 g

Water = 430 g

Additional water = 10 g

Xanthan Gum Ersatz - VITACEL®WF 600 (2%)



Recipe :

Wheat Flour: = 900 g

Batch Pack (Xanthan Gum incl.) = 52 g

Shortening = 90 g

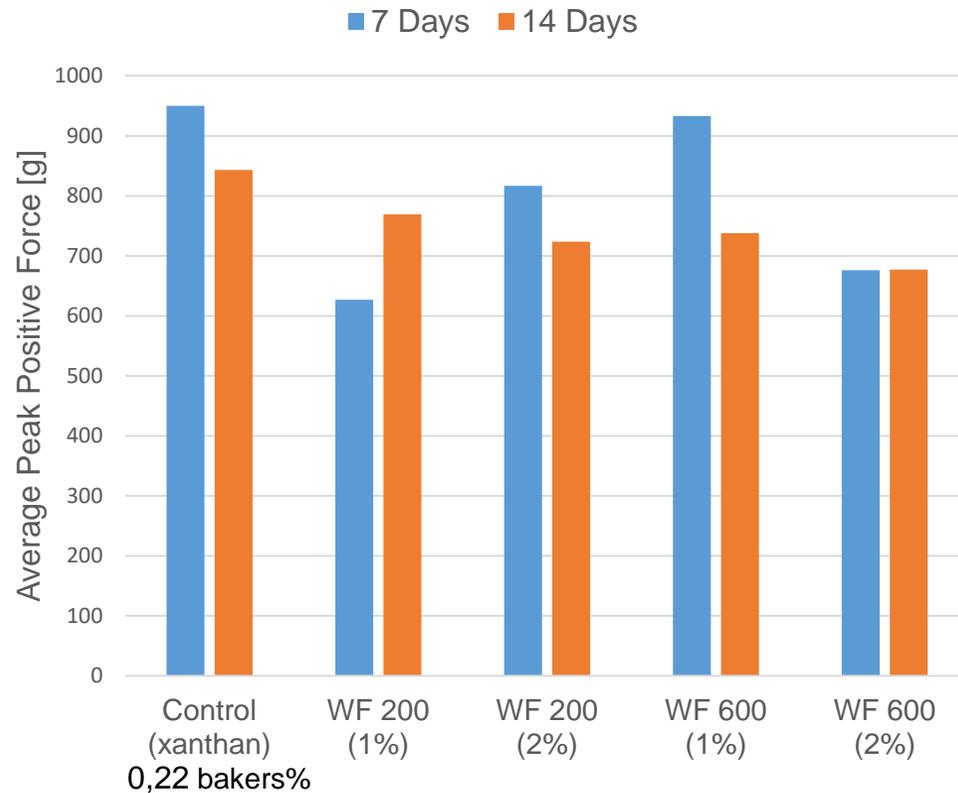
Glycerine = 29 g

Water = 430 g

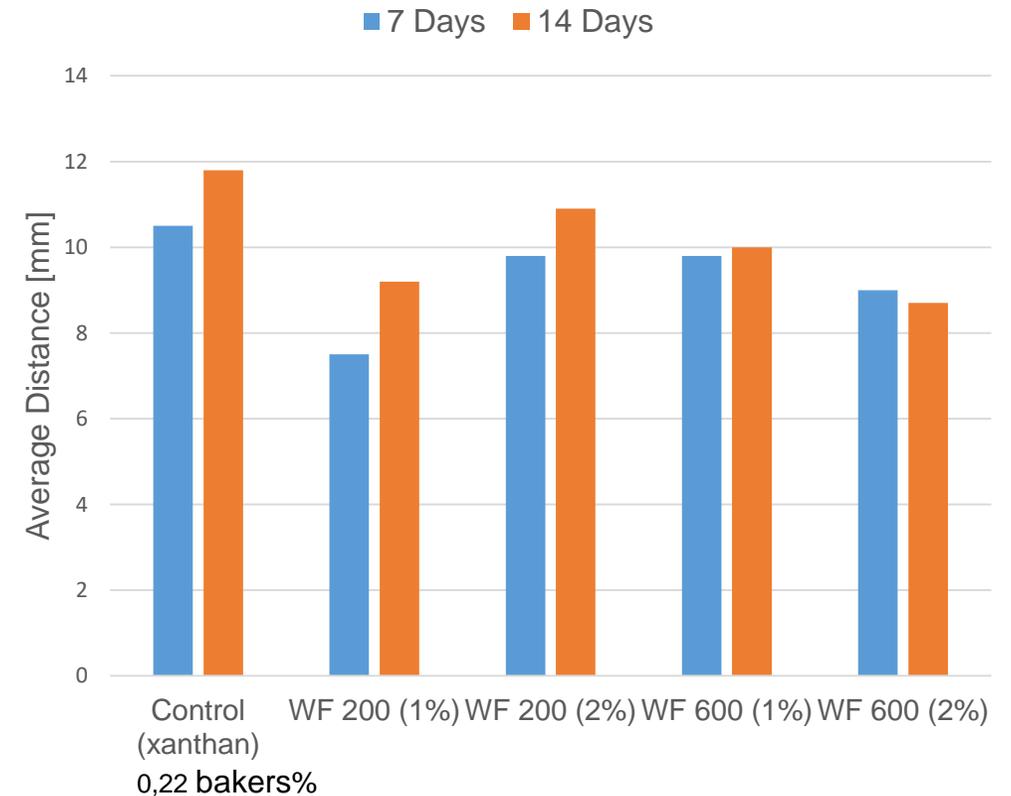
Additional water = 40 g

Functional Benefits - Xanthan Gum Replacement with VITACEL®WF 600 / VITACEL®WF 200

“Tortilla Burst Rig”- measurements



“Tortilla Burst Rig”- measurements

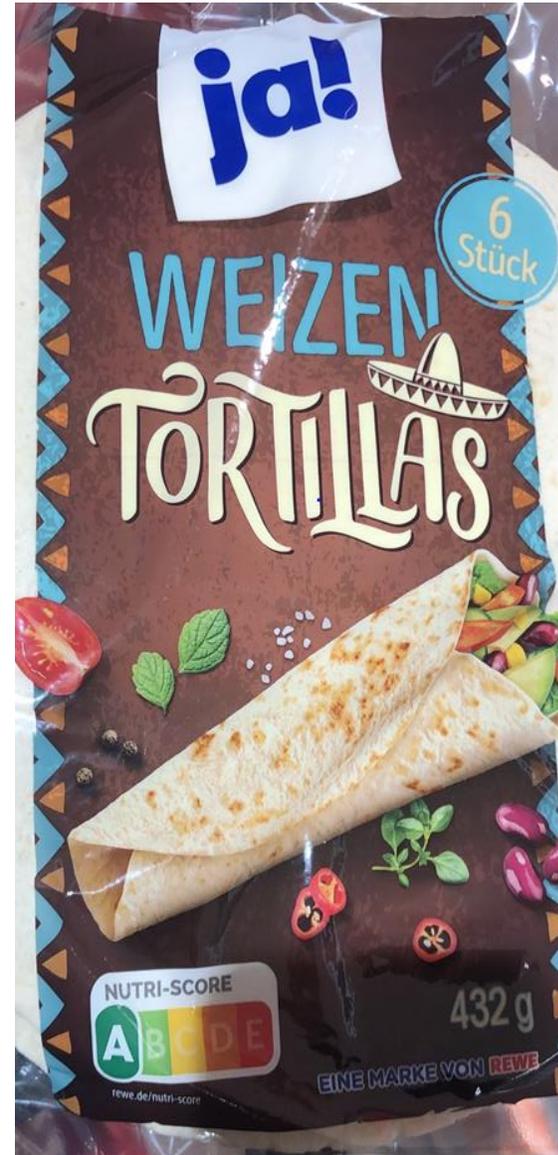


WF 600 (1%) shows the closest profile to the control sample.

What is Nutri-Score?

- „Front-of-pack“ (FOP) nutrition label
- Addition to the mandatory nutrient table
- Developed by independent researchers
- Comparability within a product category

„Do not compare apples with oranges“.



Fiber Enrichment and Nutri-Score

- First Nutri-Score point starts with 1g fiber/100g product
- Maximum score for fiber (5 points) \geq 4,8g fiber/100g product
- Fiber is always considered in the total score \neq protein



How to improve your Nutri-Score

Spreadsheet: solid food, p-points

Points	Fruits, vegetables, pulses, nuts, rapeseed, walnut, olive oils (%)	Fiber (AOAC-method)	Protein (g/100g)
0	≤40	≤0.9	≤1.6
1	>40	>0.9	>1.6
2	>60	>1.9	>3.2
3	-	>2.8	>4.8
4	-	>3.7	>6.4
5	>80	>4.7	>8

Spreadsheet: solid food, n-points

Points	Energy (kJ/100g)	Saturated fatty acids (g/100g)	Sugars (g/100g)	Sodium (mg/100g)*
0	≤335	≤1	≤4.5	≤90
1	>335	>1	>4.5	>90
2	>670	>2	>9	>180
3	>1005	>3	>13.5	>270
4	>1340	>4	>18	>360
5	>1675	>5	>22.5	>450
6	>2010	>6	>27	>540
7	>2345	>7	>31	>630

Favorable nutrients:

- Dietary Fibers
- Protein
- Vegetables, fruits, nuts...



Unfavorable nutrients:

- Sugars
- Salt (Sodium)
- Saturated fat

Nutri-Score Example: Pizza Salami

Nutrient	Standard	Points	WF	Points
Energy (kJ/100g)	1042	3	1019	3
Saturated fatty acids (g/100g)	4.4	4	4.2	4
Sugars (g/100g)	0.7	0	0.7	0
Sodium (mg/100) (salt)	692	7	660	7
Fruits, vegetables, pulses, nuts, rapeseed, walnut, olive oils (%)	-	0	-	0
Fiber (AOAC)	2.0	2	4.3	4
Proteins (g/100g)	10.8	(5)	10.6	(5)



Nutri-Score Example: Pizza Salami

	Standard	WF enriched
N-points	14	14
P-points	2	4

$$14 - 2 = 12$$



$$14 - 4 = 10$$



Application – Gluten-free Tortilla

Recipe

Ingredients	%
Water	37.1
Rice flour	29.0
Tapioca starch	14.5
VIVAPUR® BBT 2006*	6.3
Sunflower oil	4.3
Glycerin	3.9
Egg albumin powder	1.9
Sugar	1.0
Kitchen salt	0.7
Vinegar, 5 %	0.5
Xanthan gum	0.5
Baking powder	0.3
	100.0

Nutrition declaration (per 100 g) According to EU legislation

Energy	1018 kJ 241 kcal
Fat	5.2 g
Saturated fats	0.6 g
Carbohydrates	48.2 g
Sugars	1.3 g
Dietary fibers	3.1 g
Protein	4.0 g
Salt	0.9 g



Applied JRS products:

VIVAPUR® BBT 2006: rice starch, bamboo fiber, hydroxypropyl methylcellulose (E464)

Source of fiber: >3 g dietary fiber / 100 g product.

Takeaways:

- CL-Fiber Enrichment - Cellulose replacement with VITACEL[®] HF 401-30
- CL-Functionality - Xanthan Gum replacement with VITACEL[®] WF 600
- Fiber „moves“ the Nutri-Score



Thanks for your attention!



Fiber Intake & fecal
Bulk Enhanced Response