

References and Studies

Cyclodextrin: Enzymatic production and food applications

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Relating to "The Science Of WiO™"

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Low-Carb & Fat-FREE Foods

WiO
WEIGHT IS OVER

SmartFoods™



The idea of low-carb or fat-free foods is not new, but making these foods taste great is a miracle. WiO's™ focus is to provide you healthier and great-tasting health foods. WiO's™ concept of low-carb foods and the ability to controlling the types of fats eaten is in harmony with the national consumer trend.

The Holy Grail Of Health

WiO's™ research started in 2008 to create and introduce healthier foods by controlling the amount of carbohydrates and unhealthy fats that are digested but still offer the great taste, texture and eating experience we all are expecting when eating our favorite foods.

High-Carb Unhealthy Fat Solution

WiO™ took a different path from the rest of the pack. Other manufactures simply replaced high carb and fat ingredients in a recipe with low or zero carb/fat alternatives. The challenge with that approach, is taste, texture and safety are often sacrificed. Most low carb/fat foods just do not taste the same. Many consumers are not willing to give up the eating experience that they are used to, just to have low carb/fat foods.

The WiO™ Solution

In simple terms, WiO™ uses natural ingredients that contain carbs and fats, rather than swapping them out with low quality ingredient substitutes, with some that present potential health risks.



WiO's™ Chosen Path

Rather than compromise taste quality and your health, we created a tool for you to limit how much carbs/fats you allow your digestive system to absorb.

Inventing A New Science?

Some people believe that WiO™ has created a new science or biological cellular function in the digestive system. Truth is, we did not. What we did do, was copy the approach and science that the pharmaceutical industry created decades ago.



For more than 40 years, doctors have been prescribing medications that limit the amount of fats and carbs/sugars that are absorbed by the body. In other words, it is not impossible to limit the absorption of carbs/fats—doctors have been doing it for tens of millions of people for almost half a century.

What Did WiO™ Create?

WiO duplicated the inhibiting ability of these well-known drugs but used 100% all-natural plant extracts instead. And we perfected how to make a low carb slice of bread taste good. Today we have over 40 low carb/fat foods that will taste like you want and give your doctor the health results she/he is looking for.

FAQs

Question: Are there any references and studies to back up the science behind WiO™ SmartFoods??

Answer: Absolutely, please refer to our sections on ingredients, technology and specifically modified cyclodextrins, as well as scientific studies and references here.

Question: Can I eat unlimited amounts of WiO SmartFoods™ without gaining fat or increasing insulin levels?

Answer: While you shouldn't eat an unlimited amount of any macro nutrient or food, you should be able to consume a substantial amount of WiO SmartFoods™. Our foods contain calories from the protein, so theoretically, you should count them towards your daily macronutrient intake. Digestibility Corrected represents the amount of macronutrients present in WiO Smart Foods™ that are physically digestible by the body. Regarding Digestibility Corrected Values, the digestion of macronutrients can vary per individual based on the health of the digestive system.

Question: Are there any unwanted side-effects from the fat & carb blockers associated with common carb/fat inhibitors?

Answer: WiO™ uses only 100% natural, non-GMO, organic plant-based alternative to synthetic chemicals or drugs. Our studies show that carb/fats allow the food to pass through the digestive tract safely. So no, there isn't any negative effects associated with the use of our foods (modified cyclodextrin).

Question: Who can benefit the most from consuming WiO Smart Foods™?

Answer: Any person with an addiction to great tasting, healthy foods! Alternatively, people looking to improve their fat loss results and reduce cravings may truly benefit from consuming our Smart foods. Also, those wanting to lower glucose, insulin and triglyceride levels (keto) may benefit.

Question: Does WiO Smart Foods™ need to be refrigerated?

Answer: Great question! WiO™ makes several shelf stable foods. Some do require refrigeration. Just read the label on each food item. As with all foods please store WiO Smart Foods™ in a cool, dry place, away from direct heat or sunlight for best results, unless the label instructed to freeze or refrigerate.

Question: Is WiO's™ inhibiting/blocking ingredients allergic?

Answer: No, WiO™ carb/fat inhibiting ingredients have not been shown to adversely effect in anyway or have any allergic reactions.

Question: Do you ship outside of the USA?

Answer: At this time, we ship to the continental USA. For international distribution we are working closely with several distribution partners. Please refer to our website for international shipping.

Question: What is the biological mechanisms that makes foods zero fat and low carb?

Answer: The simple answer is that the 100% natural plant extracts we have isolated prevents the dietary fats and dietary carbohydrates from being available to digestive* enzyme action. The fats and carbs that are in our foods pass through your digestive system without your enzymes breaking down the carbs/fat for absorption. With the added benefit of no Gastro-Intestinal (GI) distress. You can learn more in detail about the science here.

Question: What does the term digestibility corrected* actually mean?

Answer: The term 'digestibility corrected*' means that the macro nutrients of

carbs and fat are in our foods and do enter your digestive system. However, these nutrients are not fully digested (carbs) by the body; the fats and carbohydrates become encapsulated so it doesn't exposed to the lipase (fat) or amylase (carb) enzyme action, causing the macronutrients to pass through the body undigested* rendering the calories undigested. The term digestibility corrected* refers to the overall values of macronutrients and calories after the product has passed through the body, is being blocked by the carb/fat blocking* technology.

Question: Are WiO products vegan friendly?

Answer: WiO™ has several vegan/vegetarian friendly food item(s). Such as our Healthy Nut peanut butter, breads, pizza, chips, chocolate, muffins etc. None of our ingredients are tested on animals and is therefore theoretically suitable for vegans. However, due to the product being handled and manufactured in a facility that also handles dairy products we do not make the claim of certified vegan on our product(s) label.

Question: Will the fat blocking agent block ALL fats if I eat non-WiO foods during the same meal?

Answer: No, simply because the ratio of fat blocking agent* is specifically dosed to cover the fat content of the food recipe that we made. If you were to add more dietary fats to the serving, there would not be enough of the fat blocking agent* to cover the additional fats ingested.

Question: Does heating the WiO Smart Foods™ products change the fat blocking or carb blocking agent effectiveness?

Answer: You are absolutely fine to heat WiO Smart Foods™ - heat does not negatively affect either, fat or carb blocking agents.

Question: What's the shelf life?

Answer: WiO™ Has several products that are shelf stable with a shelf life of around 2 years when unopened. If kept in the freezer the shelf life can be extended several months.

Question: Can you use WiO Smart Foods™ while pregnant or nursing?

Answer: The consensus is yes, as long as you're not allergic to peanuts, dairy, egg, or whey you shouldn't have any negative effects. As with all dietary changes, you must consult your medical advisor for your personal needs.

Question: Can diabetics or insulin users eat WiO Smart Foods™ without it affecting blood sugar level?

Answer: Theoretically there should be no effect. However, digestion of macronutrients can vary per individual. Since everyone does digest food differently, amount and rate of absorption, we would suggest testing your blood ketones with small amounts of WiO™ products to determine your particular needs.

*Digestibility-Corrected represents the amount of macronutrients present in WiO Smart Foods™ that are physically digestible by the body. Regarding Digestibility Corrected Values, the digestion of macronutrients can vary per individual.

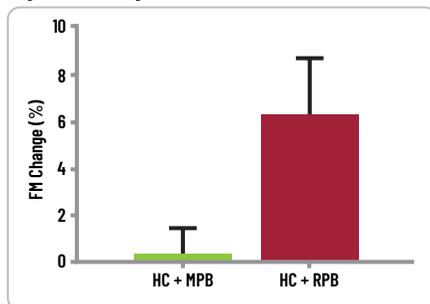


butter by the same amount but spread over 4 weeks also increased fat mass by about a kg. However, in the current study when peanut butter was treated with Modified Cyclodextrins, fat gain was prevented. Our results also agreed with previous research in obese individuals that demonstrated that Modified Cyclodextrins were able to prevent fat gain when overfeeding on a high fat diet.¹⁹

While we did not investigate the exact mechanism of action previous studies have. Specifically, Modified Cyclodextrins are cyclic oligosaccharides derived from corn. These fibers have been shown to form a stable complex with dietary fat.¹⁹ Once formed the complex is resistant to normal lipolytic hydrolysis by lipases and thereby reduces the absorption and bioavailability of dietary fat.¹⁹

Thus, it is likely that the fiber source prevented over assimilation of calories into fat by inhibiting their absorption. In conclusion the alteration of peanut butter with Modified Cyclodextrins was able to prevent fat gain. These results have implications for the prevention of fat gain in numerous populations. Our research has extended previous findings in obese populations to normal healthy weight populations.

Figure 2. Change in Fat Mass (%)



*=significantly greater than HC + MPB (p<0.05)

However, when peanut butter was treated with Modified Cyclodextrins, subjects did not gain fat. These findings agreed with Antonio, et al.,¹⁸ who found that overfeeding with regular peanut



Table 1. Fat Mass (kg) Raw Data

Sample	Pre	Post	Delta	%Change
HC + MPB	20.08 ± 2.65	20.14 ± 2.70	0.06	0.26
HC + RPB	19.50 ± 2.78	20.50 ± 2.56*	1.00	6.30**

* = significantly greater than Pre (p<0.05).

** = significantly greater than HC + MPB (p<0.05).



Can I Lose Weight?

In another test, a fitness competitor with a propensity for easy weight gain, added a full jar per day of WiO™ peanut butter (extra 2,000 calories per day) in addition to her normal diet. After 10 days she lost 2 lbs.

Is it FDA Approved?

What is the science called that can perform this miracle? Digestibility-Correction. The concept of “digestibility-correction” (DC) is not new, the term was adopted by the FDA back in 1993 and listed in the CFR (Code of Federal Regulations). DC is a principle recognized and approved by both the FDA and USDA. The CFR even gives an example of the term “Digestibility-Corrected” (DC).

The CFR example explains that proteins in baby food are not absorbed by all persons at the time frame or value, (DC) applied to all nutrients, not just protein as applicable.

According to the CFR food manufactures are regulated to inform the consumer if their products may be digested at the cellular level at a different rate than what the Nutrition Facts label indicates. In short, the carbs and fats are IN the food, but your digestive system will not absorb all of what you are eating.

Two Nutritional Labels

WiO™ was advised (to be compliant) by government agencies to provide both nutritional labels to make you, the consumer aware. One label shows what is IN the food (the recipe) and the other will explain what your body will absorb because of the addition of our carb/fat inhibitors.



DIGESTIVE FACT: Shows what will be absorbed

Digestive Facts ⁺	Amount/serving	% Daily Value*	Amount/serving	% Daily Value*
	Total Digested Fats 0g	0%	Sodium 490mg	20%
Saturated Fat 0g	0%	Total Digested Carbs 3g	4%	
Trans Fat 0g		Dietary Fiber 6g	24%	
Polyunsaturated Fat 0g		Total Sugars 1g		
Monounsaturated Fat 0g		Total Added Sugars 0g		
Total Digested Cholesterol 0g	0%	Protein 6g		
Calories per serving 36	• Calcium 10%	• Vitamin A 8%	• Iron 15%	• Vitamin C 2%

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

NUTRITION FACTS: Shows what caloric value is IN the food

INGREDIENTS: WiO Smart & Sweet® (Tagatose, Soluble Fiber, Erythritol, Stevia), Butter, Sour Cream, WiO Smart Flour, Eggs, Cate, Lemon Juice, WiO Fat Blocker® (Chiral hydrophilic polysaccharide plant extract), Vanilla, Salt, Baking Powder, Baking Soda, Lemon Juice, Natural Preservatives: Acetic Acid (bacterial fermented vinegar concentrate), Lactic Acid (milk acid concentrate), WiO Macro Carbohydrate Enzyme Inhibitor® (Cissus veldt grape extract), (Lemon) Emulsion. Processed on equipment that also packages products that may contain egg, nuts, milk, wheat.

NUTRITION FACTS WITHOUT DIGESTIBILITY CORRECTED:

Nutrition Facts: Serving size: 1 muffin. Servings per container: 4. Amount per Serving: Calories 342, Fat Cal. 162, Total Fat 18g (27% DV), Saturated Fat 12g (62% DV), Trans Fat 0g (0% DV), Cholesterol 65mg (21% DV), Sodium 490mg (20% DV), Potassium 0mg (0% DV), Total Carbs. 39g (13% DV), Dietary Fiber 4g (15% DV), Sugars 5g, Protein 6g. Percent Daily Values are based on a 2,000 calorie diet.

Both label formats are approved by the FDA/USDA



Are Carbohydrates and Fats a Health Risk?

YES, they could be. The answer is moderation. We all need some fats in our diet. Too much or the wrong kind of fats can pose a serious health risk. Carbohydrates are NOT an essential macro-nutrient. Which means, your body can use the energy from carbs, but your body doesn't need carbohydrates to be healthy. And thousands of studies prove that too much carbs cause a long list of health risks.

And That's the Problem

What is the right ratio of carbs/fat/protein to achieve a healthy moderation? Carbs and fats can work together synergistically. Regardless of which macro ratio you decide to follow you will see the tremendous advantage of WiO's™ technology. Literally giving you the power to control the ratio of carbs vs. fat vs. protein. Giving you the power to find the perfect balance that just right for you.

How Is It Possible?

First, WiO™ had to create a modified cyclodextrin fiber. Regular cyclodextrin can bind to fat and glucose temporarily. WiO™ worked for over a decade to enhance the binding power of this special fiber to allow it to permanently inhibit

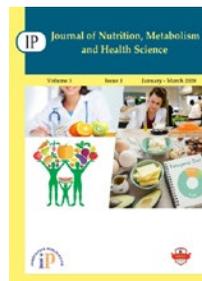
the digestion of carbs and fats.

Is It Safe?

WiO's™ modified cyclodextrin has obtained European and U.S. import/export food safety status. Several studies have shown that cyclodextrin has proven to be safe for human consumption. One of the reasons its safe is because it is not metabolized. Which means, that your body does not absorb our modified fiber, it passes through your body carrying the carbs and fats way for elimination as waste.

Where Is The Scientific Proof?

In an extreme test of the metabolic properties of the product, a U.S. research laboratory conducted a unique human clinical study that has never previously been performed. In all previous cyclodextrin studies subjects ingested the fiber separately from the food. In this study a modified-cyclodextrin needed to be formulated to include the fiber IN the food recipe when it was being produced. Eliminating the need to take the fiber in a pill, capsule, or powder form.



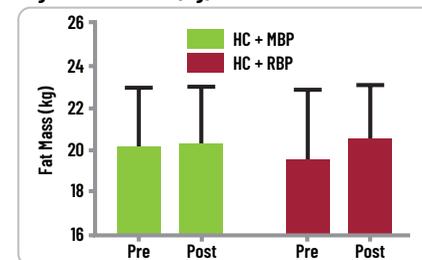
In a double-blind placebo randomized study, two groups of healthy men and women were tested. One group consumed one (1) 12 oz. jar of regular (popular U.S. brand) peanut butter in addition to their regular diet each day for 14 days. The other group did the same but used peanut butter that was made with WiO's™ modified cyclodextrin carb/fat inhibiting technology.

After the 14-day period, the first group increased their body fat by more than 6%. The group that consumed the WiO™ formulated peanut butter gained no weight or body fat.

Discussion and Conclusions

The purpose of this pilot study was to examine the effects of a hyper-caloric diet with regular peanut-butter (HC +RPB) versus a hyper-caloric diet with modified peanut butter (HC + MPB), consumed over 2 weeks each, on body composition and metabolism in a cross over design using 6 healthy subjects. The primary findings of the study were that 2 weeks of overfeeding of regular peanut butter resulted in an approximately 1 kg or a 6.3 % increase in fat mass.

Figure 1. Fat Mass (kg).



*=significantly greater than Pre (p<0.05).

Fat Mass (FM).

Fat Mass significantly increased from Pre- to Post-Test in the HC + RPB condition (p<0.05, meandiff = +1.00kg, 95% CI: 0.11 to 1.88kg) whereas no significant changes were demonstrated in the HC + MPB condition

(Figure 1). Additionally, the relative Pre-Test to Post-Test percent change was significantly greater in HC + RPB (p<0.05, meandiff = 6.04%, 95% CI: 0.43 to 12.50%, Figure 3) compared to HC+MPB. The raw data expressed as mean and standard error is displayed in Table 1.