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ORIGINAL RESEARCH

Optimizing glycemic variability in type 2 diabetes through simple dietary and culinary recommendations to modulate starch digestibility: a randomized controlled trial - Evidence review

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1. ABSTRACT

The analyzed study evaluated whether making dietary starch more slowly digestible, through specific products and practical meal preparation advice, could stabilize glycemia in people with suboptimally controlled type 2 diabetes. In 51 participants followed for 12 weeks, the high-slowly-digestible-starch diet reduced the amplitude of major glycemic fluctuations—measured via continuous glucose monitoring—more than the control diet. Reported adherence was 96%; glycated hemoglobin decreased in both groups, with a non-statistically significant trend toward a greater reduction in the experimental group.In section 3.1, “Glycemic variability,” of “The Choice to Live in Health or Illness” by Dr. A. Colonnese and R. Panzironi, the publication contributes to the narrative that simple changes in carbohydrate quality can help stabilize the glycemic profile. A previous small controlled study observed a reduction in several variability indices with foods rich in slowly digestible starch. Meta-analysis of randomized trials on low glycemic index or low glycemic load diets support a moderate, generally modest, improvement in some glycemic indicators. However, another small crossover study on resistant starch yielded unfavorable results, highlighting that the type of starch, duration, amount of effectively available carbohydrates, and dietary context are decisive factors. Overall, the evidence for glycemic stabilization is moderate, but it does not prove long-term clinical effects.

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MISSION

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Through articles, reviews, in-depth analyses and expert contributions, the Journal champions evidence-based medicine and science, fostering a correct interpretation of scientific data and countering misinformation. Every piece of content is developed with the aim of translating the complexity of research into understandable, useful and applicable information, while keeping intact the principles of accuracy, transparency and scientific independence.

Free from political, industrial and commercial influence, the journal stands as an authoritative and independent editorial space, dedicated to promoting scientific culture, professional development and the growth of health awareness among the public.

2. ANALYZED STUDY

The research question was whether a realistic nutritional intervention, based on the selection and preparation of starchy foods capable of releasing glucose more gradually, could reduce glycemic variability in type 2 diabetes. The hypothesis was that slowing down starch digestion would primarily attenuate post-meal blood glucose spikes and, consequently, the fluctuations observed throughout the day.The relevance to the book's section is precise. In “The Choice to Live in Health or Illness” by Dr. A. Colonnese and R. Panzironi, the study is cited to support the idea that a concrete change in the quality of carbohydrates can stabilize the glycemic profile without requiring a particularly complex program. The publication directly evaluates this segment of the narrative: quality and digestibility of starch lower glucose excursions recorded by continuous monitoring.As a randomized controlled trial, the research is suitable for comparing the average effects of the two dietary strategies over the 12-week period. However, it cannot prove that the reduction in variability indices prevents heart attacks, strokes, or other long-term complications. Furthermore, it cannot establish which individual component of the intervention—among the provided products, dietary advice, and culinary instructions—was decisive.

3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

The available material is only the abstract. The study was a randomized, parallel-group, single-blind, controlled trial: participants were randomly assigned to a diet rich in slowly digestible starch or a diet with a lower content of such starch; single-blind indicates that one of the parties involved in the trial was unaware of the treatment assignment. The study was completed by 51 people with type 2 diabetes and suboptimal glycemic control, followed for 12 weeks.Both groups received commercial starchy products, differing in their content of slowly digestible starch, along with specific dietary and culinary advice. Slowly digestible starch is a fraction of starch that is converted into glucose more gradually during digestion; in practical terms, it should reduce the speed of the glycemic rise after a meal. The comparison was a diet with a low content of slowly digestible starch.Glycemia fluctuations were measured using continuous glucose monitoring, a technology that records numerous values throughout the day. The primary endpoint reported was MAGE, i.e., the mean amplitude of glycemic excursions. Standard deviation, coefficient of variation, CONGA, and MODD were also evaluated; these are indices that describe, respectively, the dispersion of values, oscillations relative to the mean, changes over predetermined time intervals, and differences between consecutive days. Glycated hemoglobin and cardiometabolic parameters were also measured.The detailed inclusion and exclusion criteria, the separate baseline characteristics of the groups, the daily quantities of products provided, the complete analytical method, the statistical plan, any medication adjustments, and the absolute values of the endpoints are not reported in the available material.

4. RESULTS

The main result indicates that the group with a high intake of slowly digestible starch experienced less significant glycemic fluctuations compared to the control group. Specifically, MAGE was reduced to a significantly greater extent in the experimental group; the abstract reports an estimated difference of b=30.4, with a 95% confidence interval from 12.4 to 48.5 and P=0.0025. Since the abstract explicitly describes a reduction in MAGE with the high slowly digestible starch diet, the data should be interpreted as an advantage of this strategy in limiting major glycemic fluctuations. Absolute MAGE values before and after the intervention are not reported in the available material.Other variability indices, both within the same day and between different days, were also lower with the high slowly digestible starch diet: standard deviation, coefficient of variation, CONGA, and MODD. For the reader, the common meaning is consistent: the glucose profile was more stable, not just lower on average. However, the abstract does not provide specific numerical values, confidence intervals, or P-values for these endpoints.Adherence to the intervention was reported at 96%, an important figure because it suggests that the program was followed by most participants during the 12 weeks. Glycated hemoglobin decreased in both groups. The authors report a trend toward a greater reduction in the high slowly digestible starch group, with b=0.3, a

95% confidence interval from 0.05 to 0.47, and P=0.0981; the experimental group fell below the 7% target value indicated by the authors. Since the reported P-value is greater than 0.05, this difference between diets does not reach the conventional threshold of statistical significance and cannot be presented as conclusive proof of a greater drop in glycated hemoglobin.The other cardiometabolic markers were similar between the two diets. Therefore, the study documents a reduction in glycemic variability, but does not demonstrate a differential improvement in the cardiometabolic parameters measured during the observed period.

5. INTERPRETATION

In simple terms, the result suggests that when a significant portion of carbohydrates is absorbed more gradually, glycemia may experience fewer spikes and sharp drops in daily life. This is the step addressed in the book's section: a better quality of carbohydrates can help make the glycemic profile more regular.The proposed mechanism is biologically plausible. Slowly digestible starch makes glucose available more progressively in the intestine; this can reduce the intensity of postprandial excursions, i.e., the rises after a meal. If these rises are smaller, indices such as MAGE, standard deviation, and coefficient of variation may also decrease. The analyzed study documents the final part of the chain, namely the association between a dietary intervention consisting of products and practical advice and lower variability measured by continuous monitoring.However, it does not prove that starch digestibility alone explains the entire observed effect. Culinary advice, the substitution of specific foods, overall habits, and any differences in actual carbohydrate intake may have contributed. Furthermore, a reduction in glycemic indices over 12 weeks is not equivalent to proof of fewer cardiovascular or microvascular complications.The publication subject to the Evidence Review therefore directly supports the limited claim that simple changes in the quality of carbohydrates can stabilize the glycemic profile. It only indirectly supports any further steps regarding long-term clinical benefits.

6. INDEPENDENT SUPPORTING EVIDENCE

A previous randomized crossover trial, conducted on eight people with type 2 diabetes and lasting one week, compared controlled diets with products rich or poor in slowly digestible starch. With the diet rich in slowly digestible starch, MAGE, standard deviation, and coefficient of variation were lower; post-meal excursions and the time spent with glycemia at or above 180 mg/dL also decreased. This research directly confirms the direction of the effect observed in the analyzed study, but the very small sample size and short duration limit its validity. Although it partly involved researchers from the same line of research, it used an independent sample and experiment [1].A meta-analysis of 27 randomized comparisons, with 1,617 participants—predominantly adults with type 1 or type 2 diabetes—evaluated dietary patterns with a low glycemic index or low glycemic load. Compared to control diets with a higher index or load, these patterns reduced glycated hemoglobin by an average of 0.31 percentage points, with a 95% confidence interval from -0.42 to -0.19. The glycemic index is not identical to the proportion of slowly digestible starch, but both concern the speed and magnitude of the glucose response to carbohydrate-containing foods. This is therefore an indirect confirmation of the narrative: improving the glycemic quality of carbohydrates can improve average glycemic control. Heterogeneity between studies was substantial, so the effect should not be considered the same for every person or every diet [2].Another meta-analysis of 19 randomized trials examined resistant starch, a fraction that partially escapes digestion in the small intestine and does not coincide with slowly digestible starch. Compared to digestible starch, resistant starch reduced fasting plasma glycemia by 0.09 mmol/L and the HOMA-IR index, an indirect estimate of insulin resistance. The benefits on fasting glycemia were greater in studies lasting over eight weeks and with more than 28 g per day. This evidence is biologically consistent with the concept that modifying carbohydrate availability can influence glucose metabolism, but it does not directly demonstrate a reduction in MAGE, nor does it allow for the substitution of the concept of resistant starch for that of slowly digestible starch [3].

7. CONFLICTING EVIDENCE

A small randomized crossover study yielded different results. Seventeen adults with type 2 diabetes consumed green banana resistant starch, high-amylose corn starch, or digestible corn starch for four days; the treatments were made comparable in terms of the amount of digestible starch. Resistant starch did not improve glycemic control or glycemic variability. By the fourth day, some variability indices, including CONGA, J-index, and GRADE, were actually higher with high-amylose corn starch compared to digestible starch; MAGE, standard deviation, coefficient of variation, and MODD did not differ significantly between treatments [4].This result does not directly contradict the trial analyzed in every respect, because it compares resistant starch rather than an overall diet rich in slow-digesting starch, lasts only four days, and keeps the digestible starch content equal across conditions. However, it is directly relevant to the message of caution: not every product defined as "resistant" or "slow-digesting" automatically produces a reduction in glycemic fluctuations. Dose, food structure, duration, meal composition, and individual characteristics can change the response. No directly conflicting evidence sufficiently relevant to the same 12-week dietary intervention has been identified; this does not prove the absence of contrary results.

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the publication that is the subject of the review from the research used to confirm or define the narrative of the book's chapter.

Quadro comparativo

Reference	Study type	Population or model	Main result	Direction of evidence	Strength of evidence
Original study	Parallel RCT, single-blind	51 people with type 2 diabetes, 12 weeks	A diet high in slowly digestible starch reduced MAGE and other indices of glycemic variability compared to the control.	direct confirmation	moderate
[1]	Pilot crossover RCT	8 people with type 2 diabetes, one week	Diet rich in slowly digestible starch associated with lower MAGE, standard deviation, and coefficient of variation.	direct confirmation	low
[2]	Systematic review and meta-analysis of RCTs	1,617 participants with diabetes, 27 randomized comparisons	Low glycemic index or glycemic load diets reduced glycated hemoglobin on average compared to controls.	indirect confirmation	moderate
[3]	Systematic review and meta-analysis of RCTs	19 randomized trials with resistant starch	Average reductions in fasting glycemia and insulin resistance, without direct evidence on MAGE.	biologically consistent evidence	moderate

[4]	Crossover RCT	17 adults with type 2 diabetes, four days per treatment	Resistant starch did not improve variability; some indices increased with high-amylose corn starch.	discordant evidence	low

9. SINTESI EDITORIALE E CONCLUSIONI

CONCLUSIONS

The study analyzed shows that, over 12 weeks, a dietary strategy based on products rich in slow-digesting starch and practical advice reduced glycemic variability in people with type 2 diabetes compared to the control diet. This result is consistent with a previous small trial on the same concept and with more general evidence regarding the glycemic quality of carbohydrates.The book's narrative is therefore moderately supported for its specific message: simple changes in the quality of carbohydrates can help make the glycemic profile more stable. Larger and longer-term studies are still needed to distinguish the role of starch composition from that of the overall dietary intervention and to verify long-term clinical outcomes.

Aggiornato al 17/11/2026. Questo contenuto riflette una sintesi divulgativa delle evidenze scientifiche al momento della pubblicazione e non sostituisce il parere medico.

10. TRANSPARENCY AND SCIENTIFIC RESPONSIBILITY

Artificial Intelligence was used solely as a tool for editorial and documentary support. All content, interpretations, bibliographic citations and conclusions have been verified, reviewed and approved by the author, who assumes full scientific responsibility for them.

The manuscript was also subjected to independent peer review prior to publication.

To ensure the greatest transparency, the complete history of the article, including the dates of submission, revision, acceptance and publication, as well as information on the peer review process, is available on the dedicated Article History page.

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