

Natural carb blockers: Emerging nutritional strategy, or overhyped nutraceuticals?

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Global obesity rates are witnessing a significant surge, with estimates indicating an approximate 115% increase from the year 2010, and a rise in the number of obese individuals by over 1.13 billion by the year 2035. Obesity prevalence among the children aged 5–19 has been projected to increase from 8.7% in 2025 to an alarming 11.9% by 2040 (World Obesity Atlas, 2026). The trend constitutes a major public health crisis, as obesity is a primary factor in the causation of various noncommunicable diseases (NCDs) and chronic health conditions, such as type 2 diabetes mellitus (T2DM), cardiovascular diseases (CVDs), neurological disorders, and chronic respiratory disease (CRDs). The death toll manifesting from these adverse health outcomes was estimated at 3.7 million deaths worldwide in 2021. The economic cost attributed to this globesity pandemic is set to soar to USD 3 trillion by 2030, and a whopping USD 18 trillion by the year 2060 (World Health Organization., 2026).

The rising prevalence of dysglycemia-induced obesity and the bid to reduce dependence on pharmaceutical formulations for management of blood glucose levels has forced a rethink on part of the scientific community. The renewed focus is increasingly geared towards the neutralization of calories before being subject to metabolism. The latest contenders in this regard are what are being termed as *natural carb blockers*, plant-derived compounds with the potential to inhibit carbohydrate digestion, reduce caloric absorption, and therefore, reduce postprandial glycemic spikes (and frequency of hyperglycemic episodes) (Peddio et al., 2022). Positioned at the crossroads of metabolic physiology and nutraceutical potential, these compounds hold promise through a very attractive proposition: consume carbohydrates while circumventing the adverse metabolic outcomes associated with their downstream processing. However, whether this proposition represents a viable long-term nutritional strategy, or another “healthwashing” conundrum, remains open to debate and expansive scientific inquiry.

It is pertinent to note that the use of medicinal plants with ethnopharmacological attributes and as a natural therapeutic source is not a new phenomenon and has been in practice for centuries (Chaachouay and Zidane, 2024). Plant-derived

carb blockers are known to act as adjunctive modulators of glucose homeostasis, a key pathway in the modulation of carbohydrate digestion and intestinal glucose entry. These plant metabolites have the potential to inhibit the activity of different carbohydrate digesting enzymes such as pancreatic α -amylase, and intestinal α -glucosidase, modulate glucose transport via small intestine, improve insulin sensitivity, and β cell functioning (a mechanism mirroring that of the established antidiabetic drug, Acarbose) (Husak et al., 2026). For instance, white kidney bean (*Phaseolus vulgaris*) extract (WKBE) is emerging as a potential nutraceutical with a role in the management of overweight/obesity through glycemic control mechanisms (Nolan et al., 2020). The bioactive moieties in WKBE (phaseolamin) can facilitate weight reduction by inhibiting carbohydrate digestion enzymes, improve satiety, alter gut microbiota composition, and lipid oxidation etc. Glucose modulating effect, postprandial blood glucose reduction and fat loss were observed when the supplement was taken with modified diets in a short-term randomized trial (Muzaffar et al., 2025). Meta-analyses studies, however, have exhibited inconsistent impact on weight and metabolic parameters, highlighting that the effect is contingent to variability in sample size, type of diet and physiological conditions of the individuals (Onakpoya et al., 2011; Udani et al., 2018). Similarly, more recent trials by Houghton et al.

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(2023) and Jäger et al. (2024) exhibit measurable physiological effects of WKBE in the context of carbohydrate and calorie restriction, however, these effects remain context-dependent and clinically modest.

In the modern context, the nutraceutical industry represents more of a “gray area” between food and pharmaceuticals, but the market is growing at a rapid pace with significant consumer interest and adoption potential (Santini and Novellino, 2018). Plant-derived carb blockers have emerged as popular nutraceutical approach for the management of overweight and obesity and related NCDs, albeit, these compounds lack scientific evidence for the general population, as the effect depends on various factors, such as composition, dosage, and the physiological state of the individuals. Similarly, the claims tied to commercial formulations of these nutraceuticals border on marketing gimmicks. This represents a major disconnect between mechanistic plausibility and real-world impact. Moreover, long-term safety studies and efficacy across diverse populations are limited. Rigorous quality control, standardization, transparent labeling, and large-scale clinical trials are critical when considering long-term and consistent supplementation (Husak et al., 2026; Muzaffar et al., 2025).

In conclusion, natural carb blockers such as WKBE represent the exciting intersection of nutritional biochemistry and nutraceutical innovation. From a scientific perspective, carbohydrate-blocking supplements may hold adjunctive potential for improving glycemic control when combined (in a supplementary role) with established dietary strategies (such as integration into functional foods, but they should not be regarded as a replacement/substitution of fundamental dietary modification or lifestyle interventions. Therefore, until stronger, standardized clinical evidence emerges, their role in metabolic health should be viewed as exploratory and complementary, rather than transformative to dietary practice.

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