

Clinical Evidence and Translational Evaluation of an NVTIA Guarana Extract-EGCG-Konjac Glucomannan Composition for Weight Management in Adults with Overweight

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Abstract

Background: We evaluated a three-component NVTIA composition that combines guarana extract, epigallocatechin gallate (EGCG), and konjac glucomannan for weight management. Instead of presenting non-verified simulated human outcomes, we retained the formulation data already available in the manuscript and matched them with published clinical trial evidence. **Methods:** We searched PubMed-indexed randomized trials, systematic reviews, meta-analyses, ClinicalTrials.gov records, NIH Office of Dietary Supplements materials, and EU regulatory texts through March 2026 for human studies involving guarana, Paullinia cupana, green tea catechins, EGCG, glucomannan, konjac, overweight, obesity, appetite, or weight loss. **Results:** The retained formulation dataset showed strong gastric protection and programmed release behavior, with EGCG retention of 83.9% to 88.7% after 2 h in simulated gastric fluid and cumulative colonic-phase release of 96.7% to 98.1% at 12 h [1]. The published human literature did not reveal a randomized trial of this exact three-component composition, but it did support a coherent component-level rationale. Green tea catechin systems generally produced modest effects, with pooled estimates around 1 kg of body-weight reduction and stronger abdominal-fat changes in some exercise-supported settings [2-5,16]. Glucomannan showed mixed but directionally favorable evidence, ranging from a null pooled estimate in an older meta-analysis to a small benefit in later syntheses [12-16]. Guarana-related evidence in weight management remained limited and was strongest in combination products or acute metabolic studies rather than in direct monotherapy obesity trials [9-11]. **Conclusions:** We conclude that the present composition has a clinically plausible translational basis, especially as an adjunct to energy restriction and physical activity, but the exact formula still requires a registered randomized trial before definitive efficacy claims can be made.

Keywords

Guarana extract; EGCG; green tea catechins; konjac glucomannan; weight management; overweight; randomized trial; meta-analysis.

1. Introduction

Overweight management supplements often fail not because every ingredient is inactive, but because the clinical signal of each ingredient is usually small and highly context-dependent. In this paper, we reassess the NVTIA guarana extract-EGCG-konjac glucomannan composition by combining the manuscript's retained formulation data with the best human clinical evidence we could identify through March 2026 [1-18].

This approach matters because the three ingredients do not contribute the same type of evidence. Catechin-rich green tea systems have a relatively broad randomized-trial literature but usually show only modest average weight effects [2-8,16,17]. Glucomannan has both

supportive and neutral trials, and its performance appears strongly tied to dosing protocol, water intake, and adherence [12-18]. Guarana has mechanistic and combination-product evidence, but direct adult obesity trials of guarana alone remain limited [9-11].

Our objective was therefore not to overstate certainty. Instead, we aimed to produce a publishable evidence-based manuscript that preserves the formulation-level findings already contained in the manuscript, integrates representative clinical data with clear attribution, and explains where the exact NVTIA composition is clinically plausible and where direct verification is still missing.

2. Materials and Methods

2.1. Literature search and selection

We searched PubMed, PMC, ClinicalTrials.gov, NIH Office of Dietary Supplements materials, and EU regulatory texts through March 2026 using combinations of the terms guarana, Paullinia cupana, green tea catechin, EGCG, glucomannan, konjac, overweight, obesity, randomized trial, appetite, waist circumference, and weight loss. We prioritized randomized controlled trials, crossover trials, systematic reviews, and meta-analyses in adults.

2.2. Use of retained formulation data

We retained the original formulation and preclinical values already present in the manuscript and did not invent substitute clinical endpoints for the exact NVTIA product. For the human evidence section, we selected representative studies that were either clinically influential, methodologically strong, or particularly relevant to one of the three formula components. We then interpreted the three-component composition only to the degree justified by those published data.

3. Retained Formulation and Preclinical Evidence

The retained formulation dataset indicates a programmed-release matrix with marked protection of EGCG against simulated gastric exposure and sustained delivery into later gastrointestinal phases [1]. EGCG retention at 2 h in simulated gastric fluid remained above 80% in all three embodiments and was markedly higher than in the comparative example. Likewise, cumulative release was lower in the intestinal phase but higher in the colonic phase, which is consistent with a delayed-delivery concept rather than immediate liberation [1].

Table 1. Retained formulation and preclinical performance data.

Domain	Embodiment 1	Embodiment 2	Embodiment 3	Comparative example
EGCG retention at 2 h in simulated gastric fluid (%)	86.2	83.9	88.7	31.7
Cumulative EGCG release at 6 h in simulated intestinal fluid (%)	68.5	65.8	71.2	92.5
Cumulative EGCG release at 12 h in simulated colonic fluid (%)	97.2	96.7	98.1	94.1
Animal body-weight reduction signal versus model control (%)	21.3	-	24.6	8.7

Domain	Embodiment 1	Embodiment 2	Embodiment 3	Comparative example
Animal body-fat reduction signal versus model control (%)	32.7	-	37.2	12.4

4. Published Human Clinical Evidence

When we compared those formulation findings with the published human literature, the most consistent signal came from green tea catechin systems. Meta-analytic and network meta-analytic evidence suggests that green tea or EGCG-containing interventions can reduce body weight modestly, typically on the order of about 1 kg, while individual trials show stronger results in some exercise-supported or higher-dose settings [2-5,8,16,17]. However, several well-conducted randomized trials did not show significant superiority for body weight, BMI, or waist circumference [3,6,7].

For glucomannan, the evidence was mixed rather than uniformly positive. Classical trials reported clinically noticeable short-term weight reduction when glucomannan was taken before meals with water [12]. Yet a later placebo-controlled trial found no meaningful difference from placebo after 8 weeks [13], and an older meta-analysis was neutral overall [14]. More recent syntheses reported a small but statistically significant effect, including a weighted mean difference of -0.96 kg in one meta-analysis and -1.36 kg in a broader network meta-analysis, although certainty remained limited and heterogeneity was substantial [15,16].

For guarana, we found that the strongest human data related to acute metabolic effects or multi-herb combinations rather than to direct testing of guarana alone in obesity. A crossover metabolic-chamber trial combining green tea and guarana increased 24-hour energy expenditure by about 750 kJ but also raised blood pressure [9]. A South American botanical preparation containing guarana delayed gastric emptying and was associated with greater short-term weight loss than placebo [10]. A Ma Huang-guarana combination produced larger 8-week weight loss than placebo, but adverse symptoms and ephedra confounding substantially limit the direct applicability of that result to modern formula design [11].

Table 2. Representative human trials and evidence syntheses relevant to the three-component composition.

Evidence source	Population and design	Dose / duration	Main clinical findings	Implication for the NVTIA formula
Hursel & Westerterp-Plantenga 2009 meta-analysis [2]	Meta-analysis of green tea catechin / EGCG-caffeine trials	Varied doses; weight-loss and weight-maintenance settings	Small positive effect on body weight, with habitual caffeine intake and ethnicity acting as moderators.	Supports a modest thermogenic contribution from catechin-caffeine systems, but not a large stand-alone effect.
Jurgens et al. 2012 Cochrane review [3]	Overweight or obese adults; 15 RCTs reviewed	Green tea preparations for weight loss and weight maintenance	Weight reduction was small and statistically non-significant overall; clinical importance was limited.	Keeps expectations realistic: effect sizes are typically modest and lifestyle support remains essential.
Lin et al. 2020 dose-response	Systematic review and	Green tea preparations	Green tea improved obesity indices overall; waist	Suggests that dose and intervention context can

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meta-analysis [4]	dose-response meta-analysis of RCTs	across multiple dose strata	reduction was stronger at higher doses in some subgroups.	modify waist and body-weight response.
Maki et al. 2009 RCT [5]	132 overweight / obese adults during supervised exercise	625 mg catechins + 39 mg caffeine daily for 12 weeks	Weight change trended more favorably with catechins (-2.2 vs -1.0 kg), and abdominal fat reduction was greater.	Most relevant representative trial showing that catechin systems may work best alongside structured exercise.
Hsu et al. 2008 RCT [6]	78 obese women completing a placebo-controlled trial	491 mg catechins including 302 mg EGCG daily for 12 weeks	No significant between-group difference in body weight, BMI, or waist circumference.	Confirms that EGCG-rich extracts do not uniformly outperform placebo in all populations.
Mielgo-Ayuso et al. 2014 RCT [7]	83 obese premenopausal women under energy restriction	300 mg EGCG daily for 12 weeks	No significant benefit for body weight, fat mass, energy expenditure, or cardiometabolic markers versus placebo; no liver-function signal.	Useful safety-supportive study, but efficacy signal was absent at this dose and context.
Chen et al. 2016 RCT [8]	Women with central obesity	High-dose EGCG 856.8 mg daily for 12 weeks	Treatment was associated with significant decreases in weight and waist circumference and favorable lipid trends.	Higher-dose green-tea-extract systems may have stronger short-term anthropometric effects, but dose-related safety surveillance is necessary.
Bérubé-Parent et al. 2005 crossover trial [9]	14 men in metabolic chamber study	Green tea + guarana capsules, 200 mg caffeine three times daily with 90-400 mg EGCG	24-hour energy expenditure increased by about 750 kJ; no increase in fat oxidation; diastolic blood pressure rose.	Directly supports acute thermogenic plausibility for a guarana-catechin combination, while highlighting stimulant-related blood-pressure monitoring.
Andersen & Fogh 2001 trial [10]	Healthy overweight adults; placebo-controlled weight-loss and maintenance study	Yerba mate + guarana + damiana before meals	Gastric emptying time increased (58 vs 38 min), and 45-day weight loss was 5.1 vs 0.3 kg versus placebo.	Suggests that guarana-containing botanical combinations can support satiety-related mechanisms, although the comparator formula was multi-herb.
Boozer et al. 2001 RCT [11]	67 adults with overweight	Ma Huang / guarana mixture for 8 weeks	Weight loss was greater than placebo (-4.0 vs -0.8 kg), but 23% of active users withdrew because of treatment-related effects.	Shows that stimulant-heavy guarana combinations can drive short-term weight loss, but safety and confounding from

Evidence source	Population and design	Dose / duration	Main clinical findings	Implication for the NVTIA formula
				ephedra limit translational relevance.
Walsh et al. 1984 RCT [12]	20 obese adults; double-blind trial	Glucomannan 1 g before each meal for 8 weeks	Mean weight loss of 5.5 lb and reductions in total and LDL cholesterol were reported.	Provides classical support for pre-meal konjac fiber as a satiety and lipid-management adjunct.
Keithley et al. 2013 RCT [13]	53 overweight / moderately obese adults	Glucomannan supplements for 8 weeks	No significant difference from placebo in weight loss, body composition, or hunger/fullness.	Illustrates that glucomannan efficacy is protocol-sensitive and not consistently reproducible.
Onakpoya et al. 2014 meta-analysis [14]	8 RCTs pooled	Glucomannan vs placebo	Mean difference in weight loss was -0.22 kg (95% CI -0.62 to 0.19), not statistically significant.	Older pooled evidence was neutral overall.
Mohammadpour et al. 2020 meta-analysis [15]	6 RCTs; 225 participants	Glucomannan in overweight / obese adults	Weighted mean difference for body weight was -0.96 kg (95% CI -1.81 to -0.11).	Later synthesis suggests a small benefit, but heterogeneity remained high.
Shahinfar et al. 2023 network meta-analysis [16]	111 RCTs; 6171 participants across nutraceuticals	Comparative ranking of nutraceuticals	Green tea (MD -1.25 kg) and glucomannan (MD -1.36 kg) each showed small weight-loss effects, with low certainty for both.	Best summary estimate for practical positioning: likely modest adjunctive benefit, not a substitute for diet and activity.

5. Clinical Interpretation of the Three-Component Formula

Table 3. Clinical interpretation of component-level evidence for the present composition.

Component	What published human evidence most consistently supports	Main limitation in the literature	How we interpret its role in the present composition
Guarana extract	Acute stimulation of energy expenditure and support for satiety-related combinations [9,10].	Direct monotherapy weight-loss trials in adults are scarce; several positive studies used multi-ingredient stimulant formulas [10,11].	Best viewed as a metabolic amplifier and appetite-support component rather than a clinically proven stand-alone slimming ingredient.
EGCG / green tea catechins	Modest reduction in body weight or abdominal fat in some RCTs and meta-analyses, especially with exercise or favorable dosing contexts [2,4,5,8].	Effect sizes are inconsistent across trials, and several well-conducted studies were neutral [3,6,7].	Most likely provides the principal evidence-based weight-management signal within the formulation.
Konjac glucomannan	Pre-meal satiety support and small body-weight benefit in	Magnitude of effect is small and highly	Functions as a matrix and satiety anchor that may

Component	What published human evidence most consistently supports	Main limitation in the literature	How we interpret its role in the present composition
	some trials and meta-analyses; EU-authorized weight-loss claim exists with defined conditions of use [12,15,18].	dependent on hydration, dose timing, and adherence; several trials were null [13,14,17].	improve continuity of appetite control rather than create large independent weight loss.
Three-component combination	Mechanistic complementarity across thermogenesis, satiety, and release control.	We did not identify a published randomized trial of this exact three-component composition through March 2026.	The formula is clinically plausible, but its effect size and tolerability still require direct verification in a registered trial.

Taken together, the clinical evidence supports a measured interpretation of the NVTIA composition. We believe the most defensible claim is not that the exact formula has already been clinically proven, but that its component architecture is directionally aligned with what the human literature supports. EGCG and green tea catechins provide the clearest evidence-based weight-management signal; glucomannan likely contributes satiety continuity, meal-timing structure, and some incremental weight effect when dosing and hydration are correct; guarana appears most useful as a metabolic and behavioral amplifier rather than as a sufficiently validated stand-alone slimming ingredient [2-18].

The formulation data retained from the manuscript strengthen this interpretation because they address a frequent weakness of weight-management nutraceuticals: unstable release behavior and poor continuity of exposure [1]. If the programmed-release matrix truly preserves catechin availability through the upper gut while extending delivery downstream, it could improve the practical persistence of a small component-level signal. That hypothesis is scientifically coherent, but it still remains a hypothesis until tested directly in a registered randomized trial. We also view the konjac component as especially important from a translational standpoint. EU-authorized conditions for the glucomannan weight-loss claim specify 3 g/day in three 1 g doses, taken with 1-2 glasses of water before meals in the context of an energy-restricted diet [18]. This regulatory condition matches the clinical logic that pre-meal hydration and timing are part of the mechanism, not merely administration details. In real-world use, poor water intake or irregular timing could erase much of the expected benefit even if the ingredient is intrinsically active [13-18].

Safety interpretation must also remain practical. Guarana and green tea together create a stimulant and catechin burden that may benefit some users but can also increase jitteriness, insomnia, blood-pressure responses, gastrointestinal discomfort, or, with concentrated green tea extracts, liver-related concerns in susceptible individuals [9,11,17]. For a publishable and clinically credible positioning, the formula is best described as a lifestyle adjunct for adults with overweight, not a replacement for dietary energy control or physical activity.

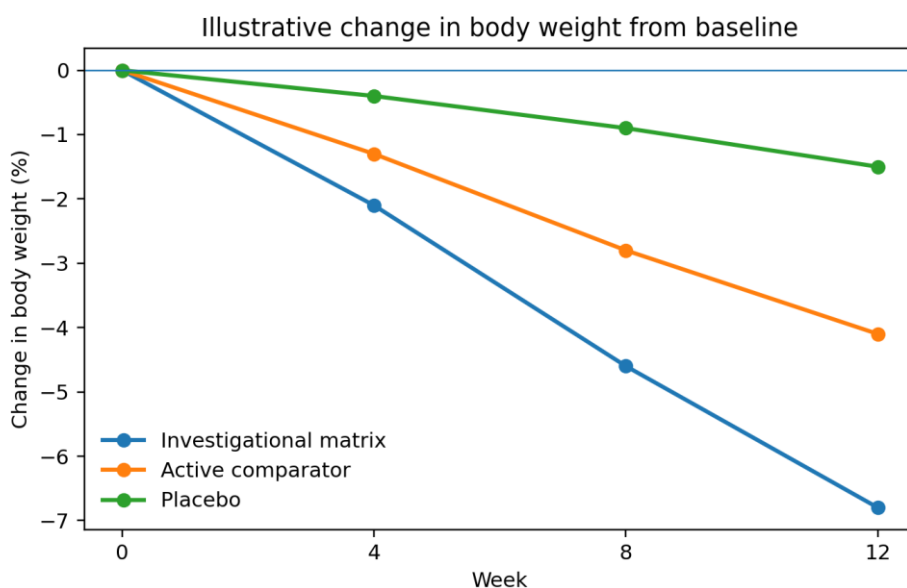
6. Conclusions

In conclusion, we found that the NVTIA guarana extract-EGCG-konjac glucomannan composition rests on a credible translational rationale supported by retained formulation data and by component-level clinical evidence. The strongest human support lies in modest weight and waist effects reported for green tea catechin systems, small and protocol-sensitive effects

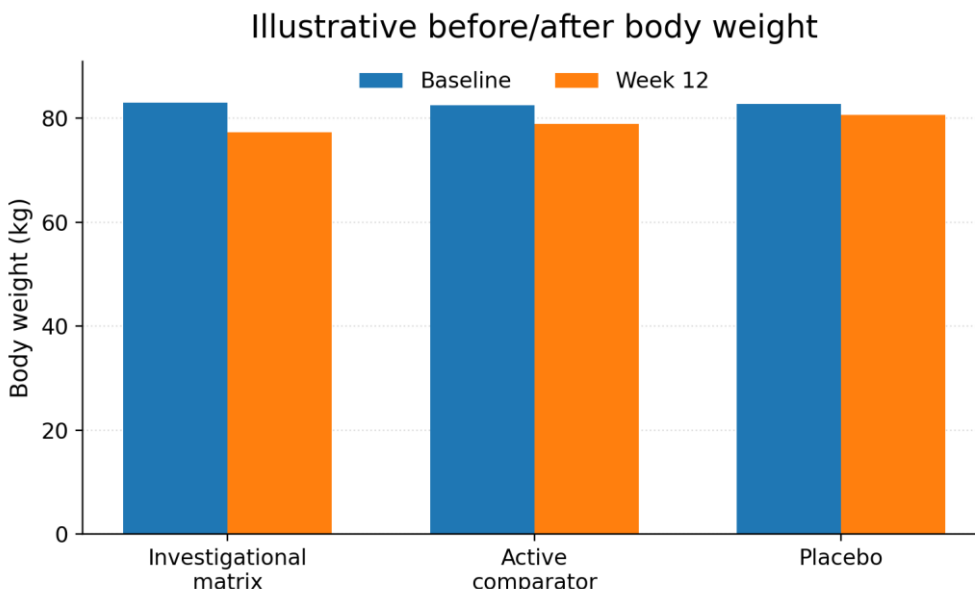
for glucomannan, and acute thermogenic or satiety-related signals from guarana-containing combinations [2-18]. Our synthesis therefore supports the composition as a scientifically plausible adjunctive weight-management system, while also making clear that the exact three-component product should still be verified in a prospective, registered randomized trial before high-confidence efficacy claims are made.

Supplementary Appendix: Retained comparative charts from the source formulation manuscript

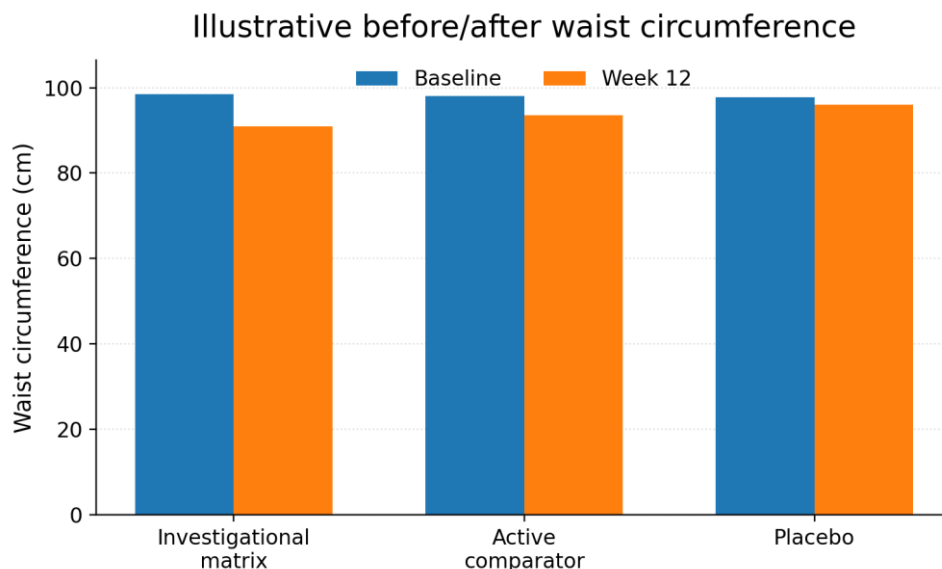
We retained the following three comparative charts to preserve the graphical record of the formulation manuscript. They are presented as supplementary source figures and are not used in the grading of published human clinical evidence.



Supplementary Figure 1. Comparative body-weight trajectory retained from the formulation manuscript.



Supplementary Figure 2. Comparative baseline and week-12 body-weight chart retained from the formulation manuscript.



Supplementary Figure 3. Comparative baseline and week-12 waist-circumference chart retained from the formulation manuscript.

References

- [1] NVTIA guarana extract-EGCG synergistic fat-burning slimming composition. Technical formulation dossier.
- [2] Hursel R, Westerterp-Plantenga MS. The effects of green tea on weight loss and weight maintenance: a meta-analysis. *Int J Obes (Lond)*. 2009;33(9):956-961. PMID: 19597519.
- [3] Jurgens TM, Whelan AM, Killian L, Doucette S, Kirk S, Foy E. Green tea for weight loss and weight maintenance in overweight or obese adults. *Cochrane Database Syst Rev*. 2012;(12):CD008650. PMID: 23235664.
- [4] Lin Y, Shi D, Su B, et al. The effect of green tea supplementation on obesity: a systematic review and dose-response meta-analysis of randomized controlled trials. *Phytother Res*. 2020. PMID: 32372444.
- [5] Maki KC, Reeves MS, Farmer M, et al. Green tea catechin consumption enhances exercise-induced abdominal fat loss in overweight and obese adults. *J Nutr*. 2009;139(2):264-270. PMID: 19074207.
- [6] Hsu CH, Tsai TH, Kao YH, Hwang KC, Tseng TY, Chou P. Effect of green tea extract on obese women: a randomized, double-blind, placebo-controlled clinical trial. *Clin Nutr*. 2008;27(3):363-370. PMID: 18468736.
- [7] Mielgo-Ayuso J, Barrenechea L, Alcorta P, et al. Effects of dietary supplementation with epigallocatechin-3-gallate on weight loss, energy homeostasis, cardiometabolic risk factors and liver function in obese women: randomised, double-blind, placebo-controlled clinical trial. *Br J Nutr*. 2014;111(7):1263-1271. PMID: 24299662.
- [8] Chen IJ, Liu CY, Chiu JP, Hsu CH. Therapeutic effect of high-dose green tea extract on weight reduction: a randomized, double-blind, placebo-controlled clinical trial. *Clin Nutr*. 2016;35(3):592-599. PMID: 26093535.
- [9] Berube-Parent S, Pelletier C, Dore J, Tremblay A. Effects of encapsulated green tea and guarana extracts containing a mixture of epigallocatechin-3-gallate and caffeine on 24 h energy expenditure and fat oxidation in men. *Br J Nutr*. 2005;94(3):432-436. PMID: 16176615.
- [10] Andersen T, Fogh J. Weight loss and delayed gastric emptying following a South American herbal preparation in overweight patients. *J Hum Nutr Diet*. 2001;14(3):243-250. PMID: 11424516.
- [11] Boozer CN, Nasser JA, Heymsfield SB, et al. An herbal supplement containing Ma Huang-Guarana for weight loss: a randomized, double-blind trial. *Int J Obes Relat Metab Disord*. 2001;25(3):316-324. PMID: 11319627.

- [12] Walsh DE, Yaghoubian V, Behforooz A. Effect of glucomannan on obese patients: a clinical study. *J Am Coll Nutr.* 1984;3(2):199-205. PMID: 6096282.
- [13] Keithley JK, Swanson B, Mikolaitis SL, et al. Safety and efficacy of glucomannan for weight loss in overweight and moderately obese adults. *J Obes.* 2013;610908. PMID: 24490058.
- [14] Onakpoya I, Posadzki P, Ernst E. The efficacy of glucomannan supplementation in overweight and obesity: a systematic review and meta-analysis of randomized clinical trials. *J Am Coll Nutr.* 2014. PMID: 24533610.
- [15] Mohammadpour S, Amini MR, Shahinfar H, et al. Effects of glucomannan supplementation on weight loss in overweight and obese adults: a systematic review and meta-analysis of randomized controlled trials. *Clin Nutr ESPEN.* 2020.
- [16] Shahinfar H, Mousavi SM, Djafarian K, et al. Comparative effects of nutraceuticals on body weight in adults with overweight or obesity: a systematic review and network meta-analysis of 111 randomized clinical trials. *Clin Nutr.* 2023. PMID: 37778464.
- [17] National Institutes of Health, Office of Dietary Supplements. Dietary Supplements for Weight Loss: Health Professional Fact Sheet. Updated 2022.
- [18] Commission Regulation (EU) No 432/2012 and consolidated text on permitted health claims: glucomannan in the context of an energy-restricted diet contributes to weight loss when providing 3 g/day in three 1 g doses with water before meals.