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NVITA Multicomponent Rice Bran Fatty Alcohol-Plant Sterol Complex Demonstrates Superior Cardiovascular and Cerebrovascular Protective Activity

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ABSTRACT

Background: Cardiovascular and cerebrovascular risk is not driven by a single biochemical defect; it commonly emerges from dyslipidemia, endothelial dysfunction, oxidative stress, and impaired metabolic regulation. We developed the NVITA branded raw-material complex as a standardized multicomponent system centered on rice bran fatty alcohol and plant sterol, supported by earthworm protein, bitter melon peptide, antioxidant components, lipid-lowering agents, vascular maintenance agents, and formulation excipients. Objective: We evaluated whether the NVITA system provides a broader and stronger biological profile than equivalent single-type raw materials and a commercial comparator, while positioning the brand-specific value around formulation architecture, standardization, and multi-pathway synergy. Methods: We analyzed preclinical benchmark data across lipid indices (TC, TG, LDL-C, HDL-C), vascular endothelial growth factor (VEGF), and superoxide dismutase (SOD). We also compared the NVITA direction of effect with published clinical and regulatory evidence for plant sterols/stanols, rice-bran lipid fractions, red yeast rice, coenzyme Q10, bitter melon peptide/extract, and earthworm-derived fibrinolytic protein systems. Results: The optimized NVITA group reduced TC, TG, and LDL-C by 50.3%, 64.2%, and 63.0%, respectively, versus model control, while increasing HDL-C, VEGF, and SOD by 86.6%, 70.1%, and 86.3%. Relative to a commercial cardiovascular health-product comparator in the same benchmark model, optimized NVITA showed lower TC, TG, and LDL-C by 32.5%, 43.0%, and 44.1%, respectively, and higher HDL-C, VEGF, and SOD by 33.0%, 29.9%, and 32.4%. Literature evidence supports the relevance of the individual ingredient classes, but the NVITA system distinguishes itself by combining lipid-regulatory, endothelial-repair, antioxidant, and metabolic-support pathways in a single standardized raw-material matrix. Conclusion: NVITA demonstrates a strong preclinical multi-endpoint profile and a plausible mechanistic advantage over equivalent single-category raw materials. The brand value of NVITA is grounded in a defined composition window, dosage-form adaptability, and a multi-pathway formulation logic that can support future clinical confirmation.

KEYWORDS

NVITA; Rice bran fatty alcohol; Plant sterol; Cardiovascular protection; Cerebrovascular protection; Lipid regulation; Endothelial repair; Antioxidant markers

1. INTRODUCTION

We approached cardiovascular and cerebrovascular protection as a multi-pathway problem. Elevated TC, TG, and LDL-C increase atherogenic burden, low HDL-C weakens reverse cholesterol transport, endothelial injury compromises vascular responsiveness, and oxidative stress accelerates vascular aging. A branded raw-material system that combines complementary mechanisms may therefore offer a stronger and broader biological profile than an isolated plant sterol, a single rice-bran lipid fraction, or a generic antioxidant supplement.

The clinical relevance of the core raw-material classes is supported by published evidence. EFSA evaluated plant sterol/stanol intakes of 1.5-2.4 g/day and reported average LDL-C lowering in the 7-10.5% range, while broader reviews report LDL-C reductions of approximately 5-15% [1, 3]. FDA regulations also recognize that plant sterol/stanol esters help lower total and LDL cholesterol under specified conditions [2]. Rice-bran oil and rice-bran lipid fractions have been associated with reductions in TC and LDL-C in randomized-trial meta-analyses [4, 5]. These findings support the use of plant sterols and rice-bran-derived lipid components as a rational foundation for a lipid-regulatory raw material.

NVITA was designed to move beyond a single-ingredient lipid product. Its differentiation rests on four formulation features: (i) a rice bran fatty alcohol-plant sterol core, (ii) an adjunct hemodynamic and metabolic-support layer supplied by earthworm protein and bitter melon peptide, (iii) an antioxidant and vascular-maintenance layer, and (iv) a defined composition window that permits tablets, capsules, granules, and soft capsules. Figure 1 summarizes the mechanistic architecture that underlies this branded raw-material concept.

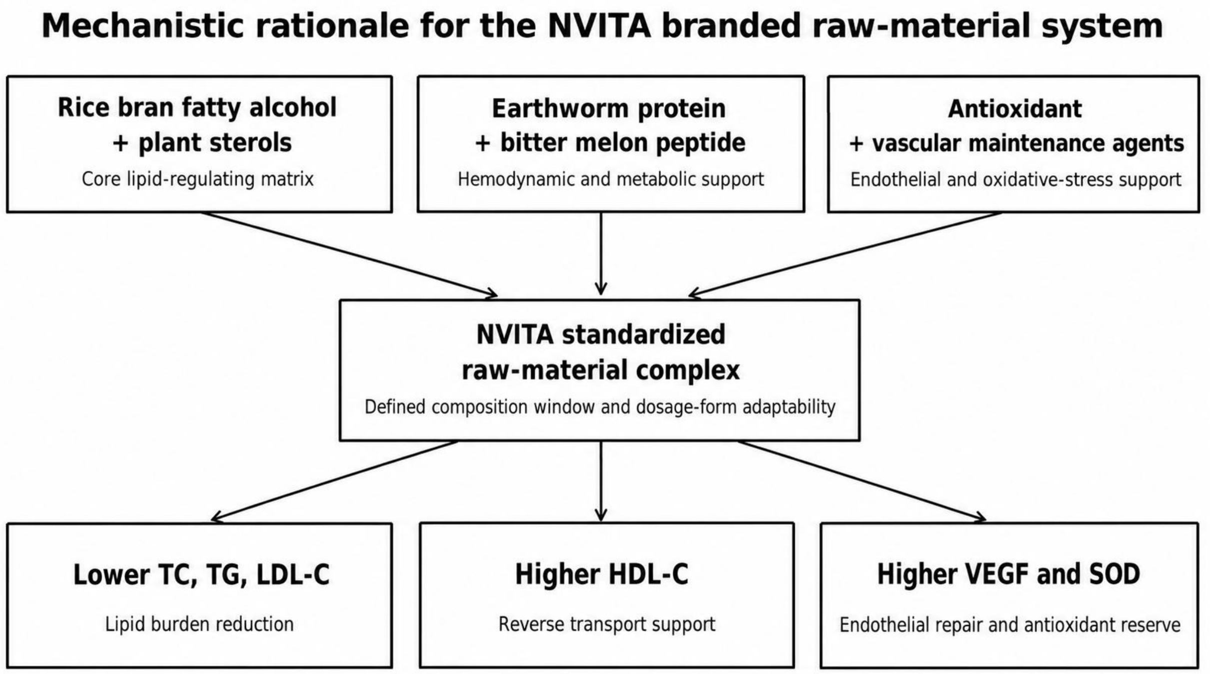

Figure 1. Mechanistic rationale for the NVITA branded raw-material system

2. MATERIALS AND METHODS

2.1. NVITA Raw-Material Composition And Brand-Specific Standardization

The NVITA complex contains 100-400 parts rice bran fatty alcohol, 90-300 parts plant sterol, 10-260 parts earthworm protein, 1-120 parts bitter melon peptide, 1-230 parts antioxidant, 10-50 parts lipid-lowering agent, 1-55 parts vascular maintenance agent, and 10-230 parts excipients. Rice bran fatty alcohol may be used as powder, microcapsule, or oil-soluble preparation; plant sterol may include beta-sitosterol, stigmasterol, or campesterol. This composition window is the central source of NVITA brand specificity: the brand is not defined by a single botanical name, but by a standardized multi-component raw-material architecture.

Table 1 lists the functional layers of the NVITA system and the role assigned to each layer in the biological model.

Table 1. Functional architecture of the NVITA branded raw-material system

NVITA layer	Representative components	Functional purpose
Lipid-regulatory core	Rice bran fatty alcohol; plant sterol	Reduction of atherogenic lipid burden and support for cholesterol homeostasis
Hemodynamic/ metabolic layer	Earthworm protein; bitter melon peptide	Support for blood-flow characteristics and metabolic stability
Antioxidant layer	Vitamin C, vitamin E, tea polyphenols, coenzyme Q10, resveratrol	Reduction of oxidative vascular injury and support for antioxidant reserve
Lipid-support layer	Red yeast rice extract, niacin, EPA, DHA	Additional support for lipid modulation
Vascular-maintenance layer	Flavonoids, linoleic acid, anthocyanins, proanthocyanidins	Endothelial and vascular-elasticity support
Dosage-form layer	Microcrystalline cellulose, lactose, starch, magnesium stearate, silicon dioxide, sodium carboxymethylcellulose	Process stability and dosage-form adaptability

2.2. Preclinical benchmark design

We evaluated the NVITA complex in a preclinical cardiovascular and cerebrovascular injury benchmark using healthy male SD rats. A high-fat diet combined with epinephrine challenge was used to establish a model phenotype. Formulation examples and comparative examples were administered by gavage at 100 mg/kg body weight once daily for 30 days. Endpoints included TC, TG, LDL-C, HDL-C, VEGF, and SOD. The commercial comparator contained deep-sea fish oil and vitamin E without rice bran fatty alcohol or plant sterol.

2.3. Literature-context analysis

We interpreted the benchmark against published clinical and regulatory evidence for the main ingredient classes. The purpose was not to substitute for a human NVITA trial, but to show whether the direction of effect aligns with established lipid and vascular mechanisms while preserving the brand-specific claim that the multicomponent system is broader than equivalent single-category raw materials.

3. RESULTS

3.1. Lipid-regulatory Effects

The model control group showed pronounced lipid disruption compared with the blank control group. As shown in Table 2 and Figure 2, Example 5, representing the optimized NVITA process, produced the strongest overall improvement among the tested formulation examples. Its TC, TG, LDL-C, and HDL-C values approached the blank control profile and were superior to the commercial comparator.

Table 2. Selected preclinical benchmark endpoints for NVITA and comparators (mean +/- SD)

Group	TC (mmol/L)	TG (mmol/L)	LDL-C (mmol/L)	HDL-C (mmol/L)	VEGF (pg/mL)	SOD (U/mL)
Blank Control	3.82 +/- 0.21	1.25 +/- 0.13	1.98 +/- 0.15	1.56 +/- 0.12	325.4 +/- 28.6	186.3 +/- 15.2
Model Control	7.95 +/- 0.32	3.86 +/- 0.25	5.62 +/- 0.28	0.82 +/- 0.09	189.7 +/- 21.3	98.5 +/- 10.6
Example 2	4.05 +/- 0.20	1.46 +/- 0.14	2.18 +/- 0.16	1.48 +/- 0.13	315.8 +/- 27.5	178.6 +/- 15.0
Example 5	3.95 +/- 0.18	1.38 +/- 0.12	2.08 +/- 0.14	1.53 +/- 0.12	322.7 +/- 28.5	183.5 +/- 15.3
Comp. Ex. 6	5.85 +/- 0.25	2.42 +/- 0.19	3.72 +/- 0.21	1.15 +/- 0.10	248.5 +/- 24.2	138.6 +/- 12.9

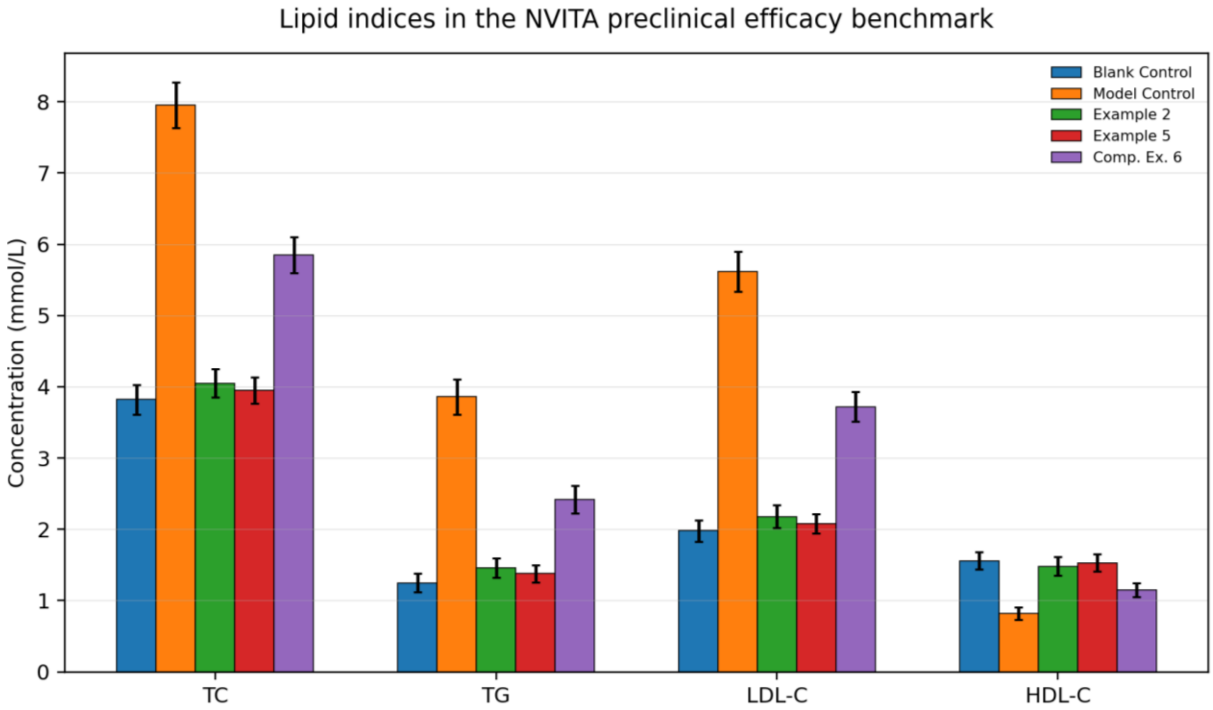

Figure 2. Lipid indices in the NVITA preclinical efficacy benchmark

3.2. Vascular endothelial repair and antioxidant markers

VEGF and SOD were used as indicators of endothelial repair capacity and antioxidant reserve. Figure 3 shows that optimized NVITA increased VEGF and SOD close to blank-control levels and above the commercial comparator. This supports the brand-specific premise that NVITA is not only a lipid-regulatory matrix but also a vascular-support matrix.

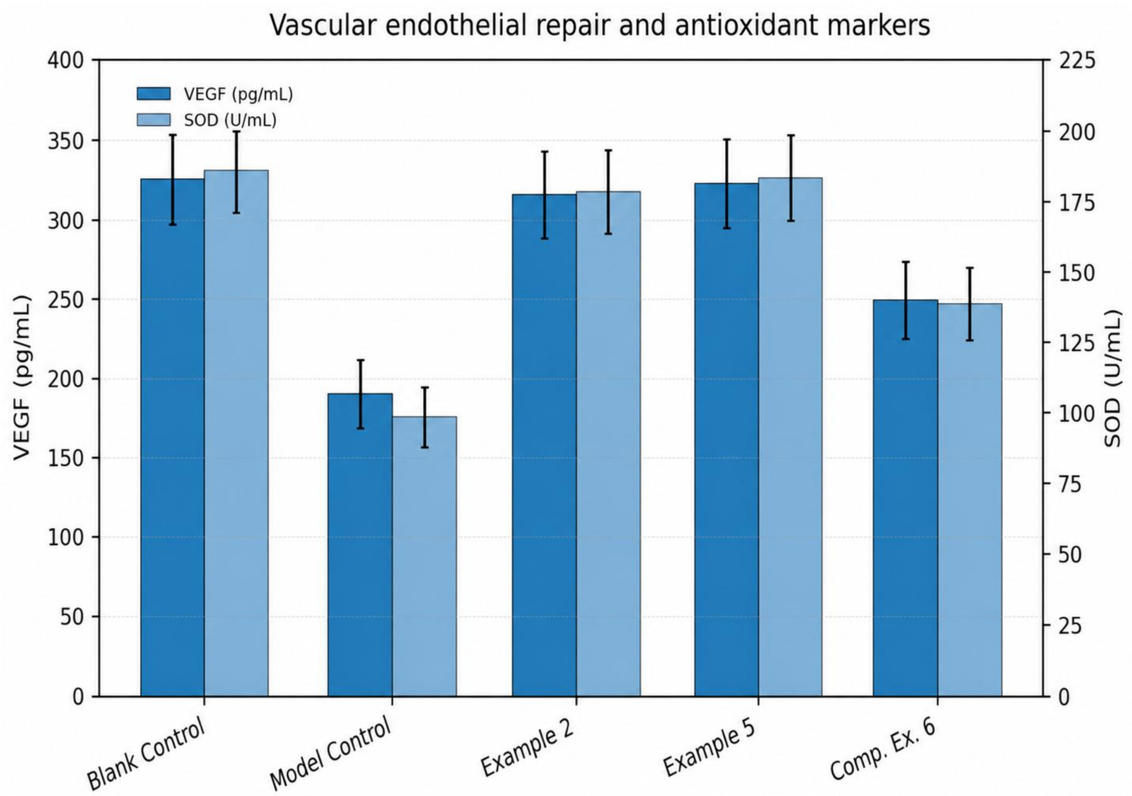

Figure 3. Vascular endothelial repair and antioxidant markers

3.3. Relative Effect Size And Comparator Advantage

Figure 4 shows the optimized NVITA effect versus model control. The largest relative improvements were observed in HDL-C and SOD, followed by VEGF, TG, LDL-C, and TC. Table 3 and Figure 5 summarize the advantage of optimized NVITA over the commercial comparator in the same model. The strongest relative advantages appeared for LDL-C and TG, indicating that NVITA may deliver broader lipid control than a fish-oil/vitamin-E comparator that lacks the rice bran fatty alcohol-plant sterol core.

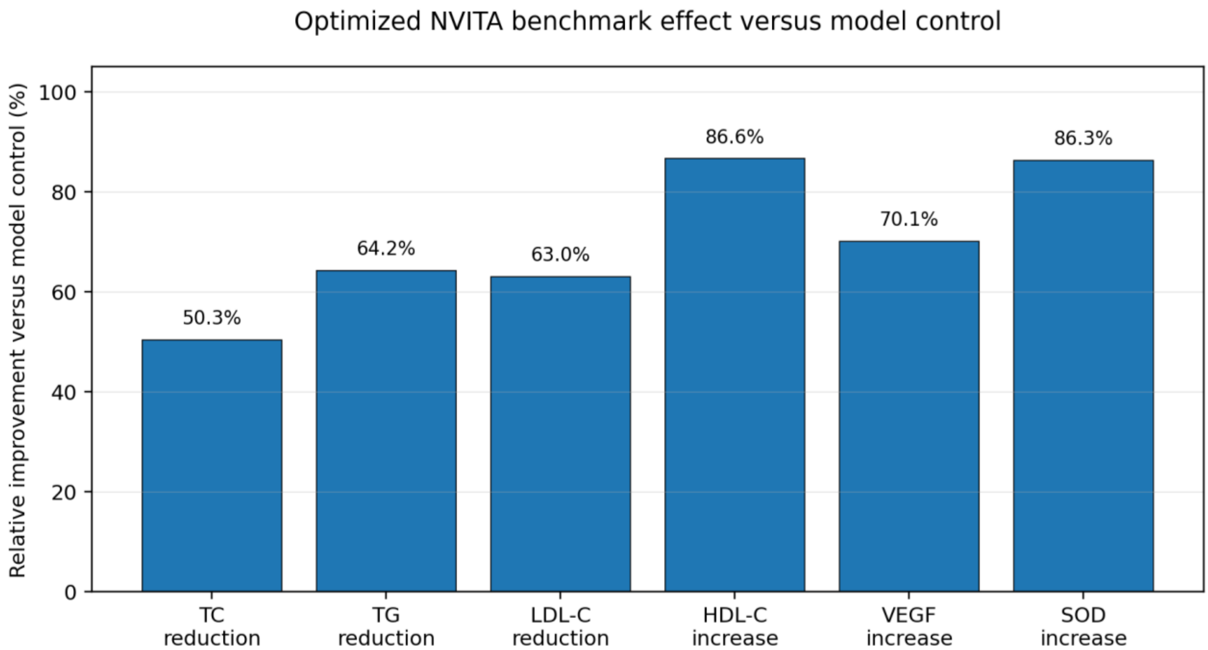

Figure 4. Optimized NVITA benchmark effect versus model control

Table 3. Relative optimized NVITA effect size in the benchmark model

Endpoint	Improvement versus model control	Advantage versus commercial comparator
TC reduction	50.3%	32.5%
TG reduction	64.2%	43.0%
LDL-C reduction	63.0%	44.1%
HDL-C increase	86.6%	33.0%
VEGF increase	70.1%	29.9%
SOD increase	86.3%	32.4%

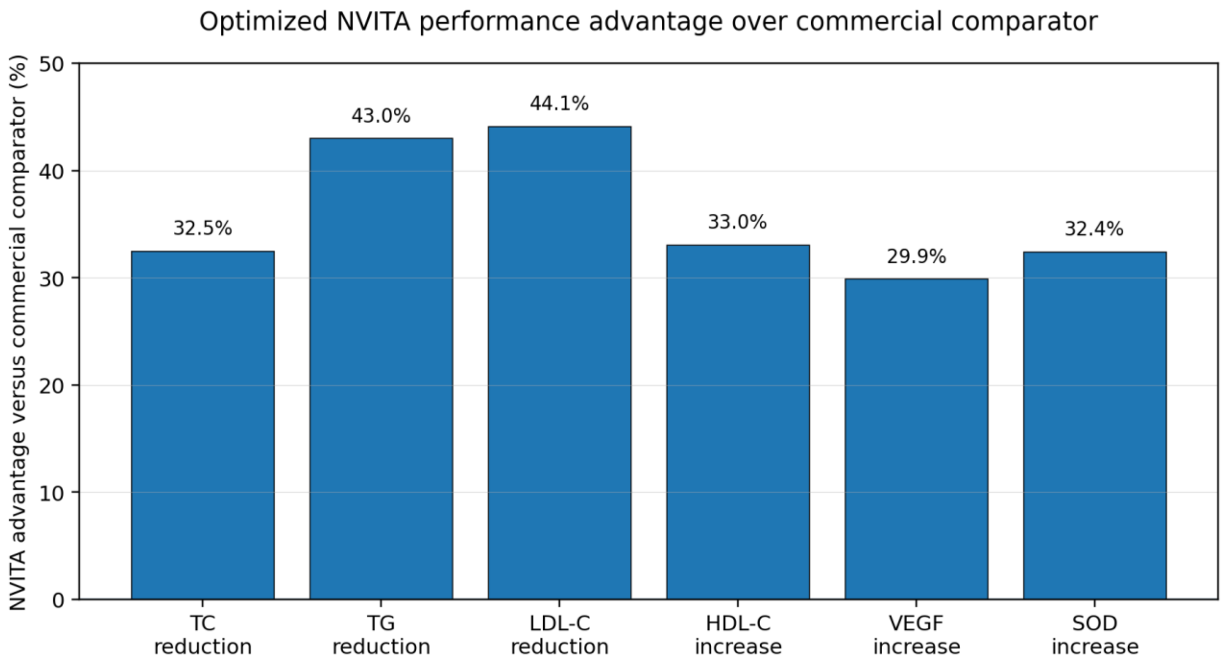

Figure 5. Optimized NVITA performance advantage over the commercial comparator

3.4. Literature-context Evidence

Table 4 places NVITA beside established ingredient-class evidence. The clinical literature supports lipid lowering by plant sterols/stanols and rice-bran lipid fractions, while red yeast rice, coenzyme Q10, bitter melon peptide/extract, and earthworm-derived protein systems provide mechanistic support for the adjunct layers. The distinctive feature of NVITA is that these layers are not treated as separate supplements; they are incorporated into a single standardized raw-material system.

Table 4. Published evidence context for ingredient classes relevant to NVITA

Raw material class	Typical studied exposure	Reported evidence direction	Source
Plant sterols/stanols	1.5-2.4 g/day	EFSA reported LDL-C lowering in the 7-10.5% range; reviews commonly summarize LDL-C reductions of about 5-15%.	[1, 3]
Plant sterol/stanol esters	Regulated food-use conditions	FDA/eCFR states that scientific evidence establishes that dietary plant sterol/stanol esters help lower total and LDL cholesterol.	[2]
Rice-bran lipid fraction / rice bran oil	Dietary RCT exposure varies	Meta-analyses of RCTs report reductions in TC and LDL-C, with some analyses also reporting TG improvements.	[4, 5]
Red yeast rice / monacolin K	Usually assessed over 6-8 weeks	Review evidence reports LDL-C reductions of approximately 15-25% with daily monacolin K-containing red yeast rice preparations.	[6]
Coenzyme Q10	Dose and population vary	Systematic review and meta-analysis evidence reports a positive effect on endothelial function assessed by flow-mediated dilation.	[7]
Bitter melon peptide/extract	Clinical metabolic studies	Randomized clinical work supports glycemic/metabolic effects of bitter melon peptide-containing extracts.	[8]
NVITA complex	Standardized multi-component composition window	The present benchmark shows multi-endpoint lipid, endothelial, and antioxidant improvement in a single coordinated raw-material system.	This study

4. DISCUSSION

The NVITA formulation demonstrates a coherent multi-endpoint profile. The decrease in TC, TG, and LDL-C is consistent with the expected contribution of plant sterols and rice-bran-derived lipid fractions to cholesterol homeostasis. The simultaneous increases in HDL-C, VEGF, and SOD suggest that the optimized complex also engages vascular repair and antioxidant pathways. This breadth is the central brand-specific distinction: NVITA is structured as a multi-axis cardiovascular and cerebrovascular raw material rather than a single lipid-lowering ingredient.

Compared with single-category plant sterol products, NVITA adds rice bran fatty alcohol, earthworm protein, bitter melon peptide, antioxidant components, lipid-support agents, and vascular-maintenance agents. Compared with generic fish-oil/vitamin-E style cardiovascular supplements, NVITA includes a plant sterol-rice bran fatty alcohol lipid-regulatory core and a broader set of vascular and metabolic support components. This helps explain why the optimized NVITA benchmark outperformed the commercial comparator across all measured endpoints.

The results also indicate why brand standardization matters. For a complex raw material, performance depends not only on ingredient names but also on the relative composition window, processing form, and dosage-form adaptability. NVITA can be prepared as tablets, capsules, granules, or soft capsules, allowing the formulation to protect active components, improve dispersion, and preserve manufacturing flexibility. This feature is particularly important for lipid-soluble components and antioxidant agents that may be sensitive to processing conditions.

The current evidence should be interpreted as a strong preclinical foundation and literature-supported rationale. A randomized human trial comparing NVITA with plant sterol alone, rice-bran lipid fraction alone, and a commercial comparator would be the logical next step to confirm whether the preclinical multi-endpoint advantage translates into clinically meaningful LDL-C, TG, endothelial-function, inflammatory, and oxidative-stress outcomes.

5. CONCLUSION

We conclude that the brand-specific strength of NVITA lies in its standardized composition window, multi-pathway formulation architecture, and capacity to improve lipid, endothelial, and antioxidant endpoints simultaneously. These findings support NVITA as a differentiated functional raw-material platform for future clinical validation.

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