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Clove+ as a Multi-Botanical Herbaceutical for Gut and Skin Wellness: A Narrative Review of Ingredient-Level Evidence and Convergent Mechanisms

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Abstract: Clove+ is a multi-botanical capsule positioned for daily gut and skin wellness and formulated with coconut-derived medium-chain triglyceride (MCT), rosemary, garlic, Aloe vera, cinnamon, onion-derived quercetin, clove, thyme, grape seed extract and beetroot. The product is positioned for adult daily wellness use, with the supplied label specifying one capsule daily or as advised by a healthcare professional and stating that it is not intended to diagnose, treat, cure or prevent disease. This narrative review evaluates existing ingredient-level evidence relevant to the formulation's wellness positioning. Human studies support gastrointestinal or microbiome relevance for cinnamon, garlic and Aloe vera; skin hydration and elasticity outcomes for defined oral Aloe preparations; antioxidant biomarker effects for clove and grape-seed preparations; and photoprotective outcomes for a rosemary-containing oral polyphenol combination. Mechanistic evidence extends to defined cellular and subcellular targets. Quercetin regulates intestinal tight-junction proteins; garlic-derived allicin modifies cysteine thiols in human proteins and activates Nrf2/HO-1-associated epithelial antioxidant responses; grape-seed proanthocyanidins influence mitochondrial redox function and epithelial barrier integrity; clove/eugenol and rosemary carnosic acid regulate matrix metalloproteinases and redox-sensitive signalling in skin cells; and Aloe acemannan influences fibroblast proliferation, growth-factor expression and type-I collagen. Together, the evidence supports a coherent ingredient-level rationale for digestive comfort, a balanced gastrointestinal environment, mucosal homeostasis, antioxidant defence and selected aspects of skin wellness. The evidence does not establish disease treatment, genomic modification or finished-product clinical efficacy.

Keywords: Clove+; herbaceutical; Syzygium aromaticum; gut microbiota; intestinal barrier; cellular signalling; Nrf2; matrix metalloproteinases; Aloe vera; gut–skin axis; skin wellness

Abbreviations: AhR, aryl hydrocarbon receptor; AP-1, activator protein 1; ARE, antioxidant response element; CYP1A1, cytochrome P450 family 1 subfamily A member 1; GI, gastrointestinal; GSH, glutathione; HO-1, heme oxygenase-1; IL, interleukin; Keap1, Kelch-like ECH-associated protein 1; KGF-1, keratinocyte growth factor 1; MCT, medium-chain triglyceride; MMP, matrix metalloproteinase; NF-κB,

nuclear factor kappa B; Nrf2, nuclear factor erythroid 2-related factor 2; RCT, randomized controlled trial; ROS, reactive oxygen species; SCFA, short-chain fatty acid; SOD, superoxide dismutase; TEER, transepithelial electrical resistance; TGF, transforming growth factor; TNF-α, tumour necrosis factor alpha; VEGF, vascular endothelial growth factor; ZO, zonula occludens.

1. Introduction

Culinary spices and food-derived botanicals contain phenolics, terpenoids, organosulfur compounds and polysaccharides that can interact with the intestinal surface and gut microbiota. These interactions are bidirectional: plant phenolics may influence microbial ecology, while microorganisms transform poorly absorbed polyphenols into smaller metabolites with local or systemic activity[1][2]. This is directly relevant to digestive-wellness formulations because the gut is simultaneously the site of exposure, metabolism, epithelial-barrier regulation and immune-redox signalling.

Clove is especially prominent within this nutritional context. Analyses of dietary polyphenol density and total antioxidant content have placed clove among the richest food sources studied, with other culinary herbs and spices also ranking highly[3][4]. The principal clove phenylpropanoid, eugenol, has well-characterised antioxidant and membrane-active antimicrobial properties, while the whole bud also contains eugenyl acetate, β-caryophyllene, tannins and other polyphenols[5][6][7]. The scientific rationale for a clove-centred blend therefore extends beyond a single isolated molecule and includes redox activity, microbial interactions and gastrointestinal mucosal biology.

Clove+ combines this clove-based rationale with rosemary, garlic, Aloe vera, cinnamon, onion-derived quercetin, thyme, grape seed extract and beetroot in a coconut-derived MCT matrix. In this review, 'herbaceutical' is used descriptively for a multi-botanical wellness formulation and not as a separate statutory classification. Indian regulation separately defines Ayurvedic, Siddha and Unani drugs and patent/proprietary medicines under the Drugs and Cosmetics framework[8]. The evidence is therefore appraised in a wellness-support context without attributing diagnostic, disease-treatment, curative or preventive effects to the product.

The formulation is best evaluated through interconnected physiological domains: microbial ecology can influence epithelial-barrier function; oxidative stress can affect barrier and inflammatory signalling; and microbial metabolites and immune signals can connect gastrointestinal physiology with systemic and skin homeostasis[9][10][11][12]. This claim-centred approach is more informative than treating the formula as ten isolated botanical monographs.

This narrative review synthesises existing human, preclinical, mechanistic and compositional evidence for the declared ingredients across digestive comfort, gastrointestinal microbial balance, mucosal integrity, antioxidant/inflammatory homeostasis and skin wellness, including the gut–skin axis. Ingredient-level and standardised-preparation evidence is distinguished from evidence attributable to the finished formulation.

2. Review Scope and Evidence Approach

This article was developed as a narrative product review. Literature was selected from peer-reviewed human trials, systematic reviews and meta-analyses, mechanistic studies, pharmacokinetic studies and well-characterised preclinical investigations relevant to the declared ingredients and the intended wellness domains. Priority was given to PubMed-indexed studies and primary human evidence where available. Regulatory context was drawn from Indian government sources[8], while product description and composition were taken from the product label supplied for this review.

Evidence was interpreted in tiers. Human randomised evidence and meta-analyses were used to support statements about demonstrated human physiological effects of individual ingredients. Other human studies were used where randomised evidence was limited. Preclinical studies were used to describe mechanistic plausibility, including antimicrobial selectivity, epithelial barrier effects, gastroprotection, antioxidant signalling and microbiota interactions. Compositional studies were used to establish phytochemical characteristics and relative antioxidant or polyphenol density. Traditional and monograph-based use was treated as contextual support rather than as proof of a clinical outcome.

The scope was restricted to evidence relevant to the product's intended wellness positioning. For example, the substantial literature on garlic and blood pressure or beetroot and athletic performance is not a central focus because those outcomes are not Clove+ claims. Conversely, gastrointestinal microbiota, digestive physiology, mucosal integrity, redox balance and human skin parameters were prioritised. This approach keeps the scientific discussion product-centred while preserving the distinction between ingredient-level evidence and the finished blend.

The review also recognises that botanical evidence is preparation-dependent. Extract solvent, plant part, drug-to-extract ratio, marker-compound content and matrix can materially alter exposure. Garlic preparations may differ in allicin-generating potential or S-allylcysteine content; Aloe vera gel differs fundamentally from anthraquinone-rich latex; cinnamon species differ in coumarin content; and grape seed preparations vary in proanthocyanidin composition[13][14][15][16]. For this reason, human trial findings are discussed as evidence for the biological relevance of the corresponding ingredient class rather than as automatic dose-equivalent outcomes of Clove+.

3. Product Identity, Composition and Wellness Positioning

Clove+ is a botanical capsule formulated for gut and skin wellness. Product information supplied for this review describes the blend as containing rosemary, Allium-derived ingredients, Aloe vera, cinnamon, quercetin and clove, among other components, and positions it for healthy skin and gut wellness. The label gives a suggested intake of one capsule daily or as recommended by a healthcare professional and states that the product is not a substitute for a varied diet and is not intended to diagnose, treat, cure or prevent disease.

The product label supplied for this review declares ten components: Narikela powder (MCT) 278 mg, rosemary leaf powder 100 mg, garlic bulb extract 30 mg, Aloe vera 20 mg, cinnamon bark extract 20 mg, onion extract/quercetin 20 mg, clove 10 mg, thyme 10 mg, grape seed extract 10 mg and beetroot root extract 5 mg. Their summed declared mass is approximately 503 mg per capsule, broadly corresponding to the 500 mg front-of-pack presentation. The formulation is therefore not a clove monopreparation; it is a multi-botanical blend in which MCT provides the largest mass contribution, and rosemary is the largest botanical component.

Fig 1: Biotex Clove+ product image. The product image and formulation details are based on the product material supplied for this review.

Table 1: Declared Clove+ composition per capsule and principal evidence-relevant role. Composition is based on the product label supplied for this review.

Declared ingredient	Botanical/source identity	Amount per capsule	Principal relevance in this review
Narikela powder (MCT)	Cocos nucifera-derived MCT	278 mg	Lipid matrix; digestive absorption physiology
Rosemary leaf powder	Rosmarinus officinalis / Salvia rosmarinus	100 mg	Rosmarinic acid, carnosic acid/carnosol; antioxidant and skin-relevant polyphenols
Garlic bulb extract	Allium sativum	30 mg	Organosulfur compounds; gut microbiota and redox biology
Aloe vera	Aloe vera / Aloe barbadensis	20 mg	Polysaccharide/sterol fractions; GI mucosal and human skin evidence
Cinnamon bark extract	Cinnamomum spp.	20 mg	Cinnamaldehyde/polyphenols; digestive physiology and microbiota evidence
Onion extract/quercetin	Allium cepa / quercetin	20 mg	Flavonol biology; tight-junction and microbial-metabolism relevance
Clove	Syzygium aromaticum flower bud	10 mg	Eugenol and polyphenols; antioxidant and microbial mechanisms
Thyme	Thymus vulgaris	10 mg	Thymol/carvacrol; microbial, antioxidant and mucosal mechanisms
Grape seed extract	Vitis vinifera seed	10 mg	Proanthocyanidins; colonic metabolism and antioxidant evidence
Beetroot root extract	Beta vulgaris root	5 mg	Betalains; radical-scavenging and Nrf2-related biology
Total declared mass		≈503 mg	Multi-botanical blend

The product image and declared composition are shown in Figure 1 and Table 1. The formula brings together several phytochemical classes: eugenol and related phenylpropanoids from clove; rosmarinic acid, carnosic acid and carnosol from rosemary; organosulfur compounds from garlic; polysaccharides and sterol fractions associated with Aloe vera preparations; cinnamaldehyde and polyphenols from cinnamon; quercetin and fructans from onion; thymol and carvacrol from thyme; oligomeric and polymeric proanthocyanidins from grape seed; and betalains from beetroot[5][17][18][14][19][20][21][16][22].

Within this review, Clove+ is treated as a multi-botanical wellness formulation rather than as a conventional medication. The supplied product information limits its intended role to wellness support and states that it is not intended to diagnose, treat, cure or prevent disease. Accordingly, the scientific appraisal is confined to structure/function-oriented domains such as digestive comfort, the gastrointestinal environment, antioxidant defence, mucosal homeostasis and maintenance of healthy skin.

4. Phytochemical Architecture and Convergent Biological Rationale

The scientific rationale of Clove+ is best understood as convergence across several ingredient classes rather than dependence on one isolated active. Figure 2 summarises the major evidence-supported

pathways. The formulation combines membrane-active aromatic compounds, polyphenols, organosulfur molecules, polysaccharides and a lipid matrix. These components reach the gut in different physicochemical forms and can interact with microbial populations, the mucus layer, epithelial cells and host redox systems.

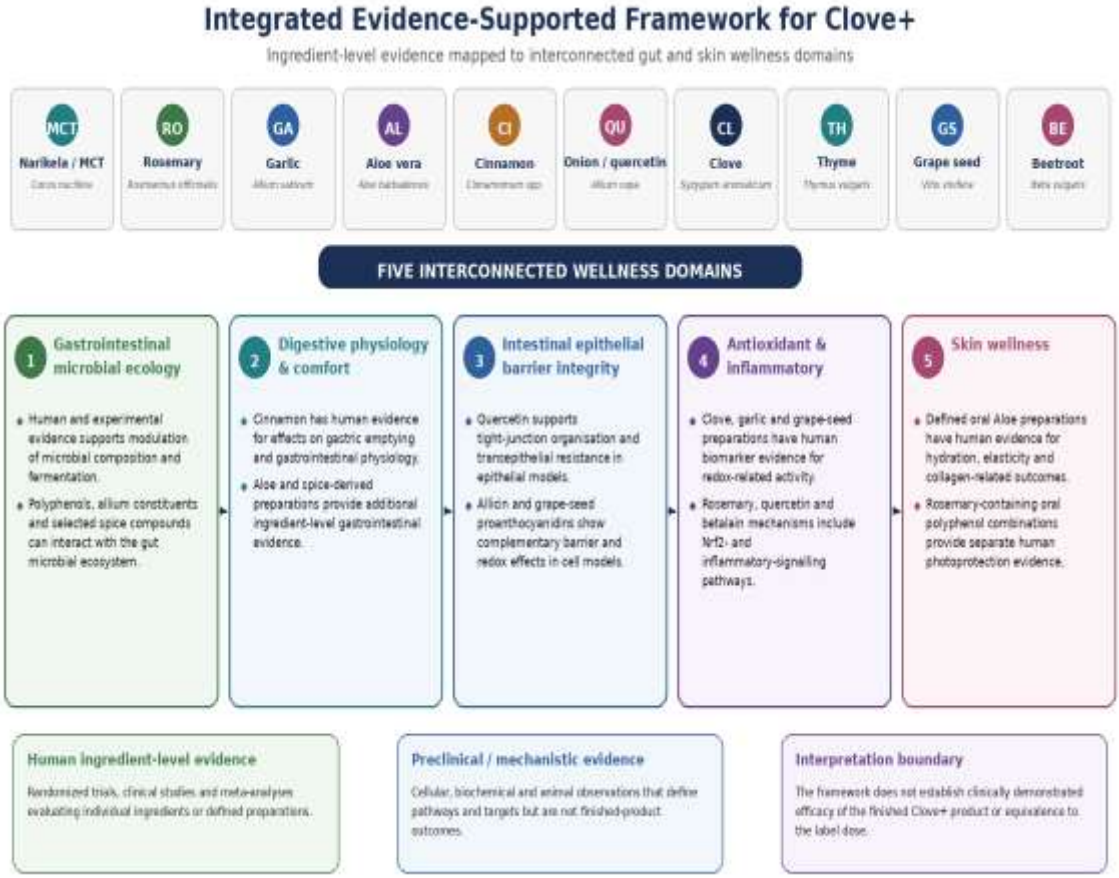

Fig 2: Integrated evidence-supported framework for Clove+. The ten declared ingredients map onto five interconnected wellness domains: gastrointestinal microbial ecology, digestive physiology, intestinal epithelial barrier integrity, antioxidant/inflammatory homeostasis and skin wellness. Human ingredient-level evidence, preclinical evidence and mechanistic evidence represent distinct evidence tiers; the framework does not represent finished-product clinical efficacy[1][7][28][51][11].

Table 2: Major phytochemical classes and their evidence-supported relevance to the intended Clove+ wellness domains.

Ingredient group	Representative constituents	Evidence-supported biological domains
Clove	Eugenol, eugenyl acetate, β-caryophyllene, tannins	Antioxidant activity; membrane-active microbial effects; gastroprotective mechanisms[7][25][77]
Rosemary	Rosmarinic acid, carnosic acid, carnosol	Nrf2-linked antioxidant response; inflammatory signalling; oral skin photoprotection in combination studies[28][29][87]
Garlic/onion	Alliin, allicin, S-allylcysteine; quercetin; fructans	Human gut-microbiota modulation; microbial selectivity; prebiotic substrate; barrier-related flavonol effects[33][71][34][51]
Aloe vera	Acemannan-related polysaccharides; sterol fractions	Human GI activity; microbiota/metabolite changes; human skin hydration, elasticity and collagen-related outcomes[39][41][44][45]
Cinnamon/thyme	Cinnamaldehyde; thymol/carvacrol	Human digestive and gut-environment effects for cinnamon; antimicrobial and gastroprotective

		mechanisms[48][54][78]
Grape seed/beetroot	Proanthocyanidins; betanin/betalains	Colonic microbial metabolism; antioxidant biomarkers; Nrf2-related and radical-scavenging mechanisms[56][81][59][60]
MCT	Medium-chain fatty acids	Lipid matrix and established digestive absorption physiology[63][64]

4.1 Clove phenolics and eugenol

Clove buds are chemically characterised by a high essential-oil fraction rich in eugenol, together with eugenyl acetate, β-caryophyllene and polyphenolic tannins[5][23][24]. Eugenol can disrupt microbial membranes and alter permeability, explaining broad in-vitro antibacterial and antifungal activity[7]. At the same time, standardised clove polyphenol extracts demonstrate substantial antioxidant capacity, and a randomised crossover human study reported changes in inflammatory and oxidative-stress biomarkers after a standardised clove-bud polyphenol preparation[25][26]. These findings support clove as the conceptual antioxidant and spice-phenolic anchor of the formula.

4.2 Rosemary polyphenols and diterpenes

Rosemary contains rosmarinic acid as well as the diterpenes carnosic acid and carnosol[17][27]. Carnosic acid is a well-described activator of the Keap1/Nrf2 antioxidant-response pathway, and rosemary diterpenes have been linked mechanistically to modulation of NF-κB-related inflammatory signalling[28][29]. Rosemary extracts also interact with intestinal microbiota in preclinical models, while human work has demonstrated microbial catabolism of Lamiaceae phenols into smaller metabolites[30][31].

4.3 Garlic organosulfur compounds and allium fructans

Garlic's characteristic chemistry arises from alliin, allicin and downstream sulfur-containing compounds, with preparation-specific differences between fresh garlic, powders and aged garlic extracts[18][32][13]. The ingredient has direct relevance to gastrointestinal ecology because human randomised evidence with aged garlic extract has demonstrated changes in microbial richness and selected taxa[33]. Garlic and onion are also dietary sources of fructans, providing a substrate-level connection to the prebiotic literature[34][35].

4.4 Aloe vera polysaccharides and sterol fractions

Aloe vera inner-leaf gel contains polysaccharides, including acemannan-related fractions, together with sterols and other constituents whose abundance depends on processing[14][36][37]. The inner gel has been studied in human gastrointestinal conditions and in direct experiments on human colorectal mucosa, while Aloe sterol-containing preparations have a notable human literature on skin hydration, elasticity, collagen-related measures and wrinkles[38][39][40][41][42][43][44][45]. This dual gastrointestinal and skin literature makes Aloe particularly relevant to the product's paired gut-and-skin positioning.

4.5 Cinnamon, quercetin and thyme

Cinnamon bark contains cinnamaldehyde and polyphenolic constituents with digestive, microbial and antioxidant relevance[19][46][47]. A randomised controlled trial of cinnamon water extract in people with diarrhoea reported improvement in symptoms accompanied by changes in the gut environment and microbial groups[48]. Quercetin, abundant in onion as glycosides, is absorbed and extensively metabolised, while cell studies consistently show effects on epithelial tight-junction organisation and TEER[20][49][50][51][52]. Thyme contributes thymol and related monoterpene phenols with antimicrobial, antioxidant and anti-inflammatory pharmacology[21][53]. Importantly, work using human-colon-derived bacteria has shown that essential-oil components can differ in activity against pathogenic and commensal organisms, supporting the concept of microbial-ecology modulation rather than indiscriminate sterilisation [54].

4.6 Grape-seed proanthocyanidins and beetroot betalains

Grape seed extract is rich in oligomeric and polymeric proanthocyanidins[16][55]. Because larger proanthocyanidins have limited small-intestinal absorption, substantial fractions can reach the colon, where

microbial metabolism generates smaller phenolic metabolites[56][57][58]. This is particularly relevant to a gut-focused formulation because limited systemic absorption does not imply biological inactivity at the colonic level. Beetroot adds betalains, including betanin, which demonstrate direct radical-scavenging activity and can activate Nrf2-linked antioxidant enzymes in cell systems[59][60][61]. Human pilot evidence also indicates that beetroot juice can alter aspects of gut microbiota and inflammatory profiles, although the preparation and exposure differ substantially from a low-dose extract[62].

4.7 MCT as a formulation matrix

Medium-chain triglycerides are rapidly hydrolysed and absorbed compared with long-chain triglycerides, with established nutritional physiology[63][64]. At the Clove+ amount, MCT is most appropriately interpreted as a formulation matrix and lipid substrate rather than the primary source of the product's claimed effects. Reviews have discussed possible interactions between MCT-rich diets and gut microbial or metabolic physiology at substantially larger intakes[65]. In the present formula, its main scientific relevance is that it provides a lipid environment alongside several lipophilic aromatic and phenolic constituents.

Taken together, the formulation contains complementary aromatic phenolics, allium compounds, Aloe fractions, proanthocyanidins, quercetin and betalains that converge on microbial, epithelial and redox biology. This ingredient-level convergence supports the wellness rationale without implying that each pathway has been demonstrated with the finished capsule.

5. Evidence Supporting Digestive Wellness and Gastrointestinal Microbial Ecology

Digestive wellness is a broad physiological concept that includes comfort, motility, luminal ecology, mucosal function and the handling of dietary substrates. Several Clove+ ingredients have direct human or mechanistic evidence in these domains.

5.1 Human evidence for gastrointestinal physiology and symptoms

Cinnamon provides one of the clearest direct human links to gastrointestinal physiology in the formulation. In healthy subjects, a culinary dose of cinnamon altered gastric emptying and postprandial responses, demonstrating that cinnamon ingestion can measurably influence upper-GI physiology[66]. More directly, a randomised controlled trial of Cinnamomum cassia water extract in people with diarrhoea reported improvement in diarrhoeal symptoms, increased colonic transit time and changes in microbial diversity and specific bacterial groups[48]. The preparation and amount used in that trial are not equivalent to the Clove+ cinnamon component, but the study establishes that a cinnamon-derived oral preparation can affect both digestive symptoms and the gut environment in humans.

Aloe vera has a separate human gastrointestinal evidence base. Controlled trials and a systematic review have evaluated oral Aloe preparations in irritable bowel syndrome, while a randomised trial of Aloe barbadensis extract assessed symptoms together with faecal microbiota and metabolite profiles[40][67][41]. A double-blind placebo-controlled study of oral Aloe gel in active ulcerative colitis also demonstrated biological activity at the human intestinal mucosa, although disease-treatment outcomes from that study are not extrapolated to Clove+[39]. For a wellness review, the relevance of these data lies in demonstrating that orally administered Aloe preparations can interact with gastrointestinal symptoms, mucosal biology and microbial-metabolite profiles.

Garlic has direct human evidence relevant to microbial ecology. In the 12-week GarGIC randomised placebo-controlled trial, aged garlic extract was associated with greater microbial richness and diversity and with shifts that included Lactobacillus and Clostridia taxa[33]. A separate double-blind randomised trial in women with obesity used 800 mg/day of garlic extract; Bifidobacterium increased within the garlic group, and Faecalibacterium showed an increasing trend, although between-group differences in measured bacterial levels were not significant[105]. These interventions used substantially greater garlic exposures than the 30 mg extract declared in Clove+, so they support ingredient-level microbiome relevance rather than dose-equivalent efficacy of the finished formulation.

Mixed-spice human and in-vitro studies provide additional context for the combination concept: culinary-spice exposure can alter microbial profiles, and spice extracts can differentially affect commensal

and potentially pathogenic organisms[68][69][54]. These data support ecological plausibility but are not evidence for the finished Clove+ formulation.

5.2 Antimicrobial selectivity and microbial balance

The phrase "microbial balance" is scientifically preferable to a simple "antimicrobial" narrative. The gut is an ecological system in which indiscriminate suppression would not be a wellness objective. Essential-oil constituents in clove and thyme are strongly membrane-active, and cinnamaldehyde and allicin have distinct antimicrobial mechanisms[70][7][32][21]. Studies using human-colon-derived organisms have shown differential susceptibility of pathogenic and commensal bacteria to essential-oil components[54]. Garlic powder also demonstrated differential effects on gastrointestinal commensals in experimental work[71].

The significance of these observations is not that Clove+ functions as an antibiotic; rather, the ingredient literature shows that spice-derived compounds can influence microbial growth and community structure. Clove essential oil has additionally been shown to alter intestinal flora in a mouse model of Candida infection, providing a recent in vivo demonstration of gut-ecology effects, although this remains preclinical evidence[72].

5.3 Prebiotic substrate and microbial metabolism

Garlic and onion contribute another dimension through fructans and fructooligosaccharides. Quantitative food analyses identify both alliums as meaningful dietary sources of fructans[34][73]. Human administration of short-chain fructooligosaccharides has demonstrated dose-dependent increases in faecal bifidobacteria, establishing the general prebiotic principle relevant to allium-derived carbohydrate fractions[35].

Polyphenol metabolism adds a second substrate pathway. Many larger polyphenols are incompletely absorbed in the upper gastrointestinal tract. Grape-seed proanthocyanidins are a clear example: polymeric fractions reach the colon and are converted by human colonic microbiota into lower-molecular-weight phenolic acids[56][57]. Similar bidirectional relationships between polyphenols and microbiota are extensively described for flavonoids, including quercetin[74][75][76]. Thus, the gut effects of a polyphenol-rich blend may involve both direct contact with the intestinal epithelium and microbial transformation into secondary metabolites.

5.4 Digestive comfort as a convergent formulation domain

The available evidence supports digestive wellness through several non-identical mechanisms. Cinnamon has direct human evidence for gastrointestinal physiology and gut-environment changes; Aloe has human evidence spanning gastrointestinal symptoms, mucosal activity and microbiota/metabolite outcomes; and garlic has human microbiome data[48][41][33]. Clove and thyme contribute aromatic compounds with membrane-active or gastroprotective experimental evidence[77][78]. Onion provides both quercetin, which has epithelial-junction evidence, and fructan-type carbohydrate substrate documented in Allium foods[51][34][73], while grape-seed proanthocyanidins provide polyphenols that undergo colonic microbial catabolism[56]. Table 3 summarises the most directly relevant human evidence.

This evidence supports a structure/function interpretation of Clove+ as a botanical blend designed to support normal digestion, gastrointestinal comfort and a balanced gut environment. The literature does not justify describing the capsule as a treatment for diarrhoea, inflammatory bowel disease, infection or any other gastrointestinal disease, because those are different clinical claims from the wellness context evaluated here.

Table 3: Selected human evidence most directly relevant to digestive, microbiome and antioxidant support. Studies concern individual ingredients or related preparations, not the finished Clove+ formulation.

Ingredient/preparation	Study type and population	Principal relevant finding	Interpretation for Clove+

Ingredient/preparation	Study type and population	Principal relevant finding	Interpretation for Clove+
Cinnamon water extract[48]	Randomised controlled trial; participants with diarrhoea	Improved diarrhoeal symptoms with changes in colonic transit, microbial diversity and selected bacterial groups	Direct human support for cinnamon's ability to influence the GI environment; not dose-equivalent to the finished product
Aged garlic extract[33]	Double-blind randomised placebo-controlled trial; adults with uncontrolled hypertension	Higher microbial richness/diversity and shifts in Lactobacillus/Clostridia species	Human evidence that an oral garlic preparation can alter gut microbial profiles
Aloe barbadensis extract[41]	Randomised clinical trial; IBS	Assessed symptoms together with faecal microbiota and metabolite profiles	Links oral Aloe exposure to GI symptoms and microbiota/metabolite biology
Mixed culinary spices[68]	Pilot human intervention	The spice intervention altered community composition and increased specific Bifidobacterium and Lactobacillus taxa relative to control[68]	Supports the broader multi-spice microbiome concept
Clove-bud polyphenols[26]	Randomised double-blind placebo-controlled crossover	Modulation of oxidative stress and inflammatory biomarkers after alcohol challenge	Human evidence for oral bioactivity of standardised clove polyphenols
Garlic supplementation[80]	Systematic review/meta-analysis of RCTs	Improvement in several oxidative-stress markers	Supports garlic contribution to systemic antioxidant context
Grape seed extract[81][82]	Meta-analysis and randomised controlled trial	Effects on oxidative stress and inflammatory biomarkers	Human antioxidant/inflammatory evidence for proanthocyanidin-rich preparations

6. Mucosal Integrity, Antioxidant Defence and Inflammatory Homeostasis

The intestinal mucosa is exposed continuously to dietary oxidants, microbial products, bile acids and metabolic by-products. Barrier integrity depends on coordinated epithelial junctions, mucus, cellular redox control and regulated immune signalling. Oxidative stress is a recognised contributor to gastrointestinal mucosal injury and can amplify inflammatory pathways[9]. The Clove+ ingredient profile is relevant to this biology through both direct antioxidant chemistry and signalling-based cytoprotection.

6.1 Antioxidant density and human biomarker evidence

Clove has unusually high compositional antioxidant credentials. In the Phenol-Explorer ranking of polyphenol-rich dietary sources, clove was among the most concentrated sources identified, and a large international food survey likewise placed spices and herbs—particularly clove—at the top of total antioxidant-content measurements[3][4]. These are compositional measurements, not clinical outcomes, but they establish why clove is a rational eponymous ingredient in an antioxidant-oriented botanical formula.

Human evidence strengthens that compositional rationale. In a randomised, double-blind, placebo-controlled crossover study, a standardised clove-bud polyphenol preparation modified oxidative-stress and inflammatory markers after an alcohol challenge, including changes in glutathione, SOD and lipid-peroxidation-related measures[26]. A separate open-label pilot with a water-soluble polyphenol-rich clove extract demonstrated systemic biological activity after oral administration[79]. These studies used standardised clove extracts at doses distinct from the Clove+ bud amount, so they support the ingredient's human bioactivity rather than direct product equivalence.

Human evidence also supports redox-related activity for several constituents. Across randomised trials, garlic supplementation has been associated with favourable shifts in oxidative-stress biomarkers[80]. Controlled-trial evidence for grape-seed extract likewise includes changes in oxidative and inflammatory markers, including a randomised study in people with type 2 diabetes[81][82]. Pooled human data for quercetin indicate modulation of systemic inflammatory markers at supplemental doses[83]. These findings establish ingredient-level biological activity but do not imply that the smaller amounts in Clove+ reproduce the effect sizes of isolated-ingredient interventions.

6.2 Nrf2 and endogenous antioxidant-response pathways

Direct radical scavenging is only one component of antioxidant physiology. Nrf2 coordinates transcription of a broad cytoprotective programme involving antioxidant and detoxification enzymes. Carnosic acid from rosemary can activate this pathway through covalent modification of reactive Keap1 cysteine residues[28]. In human liver-derived cell lines, betanin also activated Nrf2-associated transcription and increased expression of detoxification/antioxidant enzymes[59]. These findings support the presence of multiple redox-responsive phytochemicals in the formulation without implying that their cellular concentrations after Clove+ ingestion are known.

Clove polyphenols have human biomarker evidence for modulation of oxidative stress and inflammatory measures in an alcohol-challenge protocol[26]. Other constituents, including thymol, cinnamaldehyde and proanthocyanidins, have antioxidant and/or anti-inflammatory activity in experimental systems[47][53][16], while human quercetin data support effects on systemic inflammatory markers at supplemental doses[83]. Rosemary diterpenes additionally influence inflammatory signalling that intersects with oxidative stress, including NF-κB-associated pathways[29]. This redox–inflammation cross-talk is relevant to mucosal physiology because the two processes can amplify one another at epithelial surfaces.

6.3 Tight junctions and epithelial barrier function

Quercetin provides the clearest direct mechanistic link to epithelial barrier integrity among the Clove+ constituents. In Caco-2 intestinal epithelial models, quercetin increased TEER and promoted assembly or expression of junctional proteins including claudins, occludin and zonula occludens proteins[51][52]. These studies are in-vitro models, but they establish a specific cellular mechanism consistent with "supporting normal digestive lining integrity" as a wellness concept.

Aloe vera provides a complementary mucosal pathway. Aloe gel has demonstrated anti-inflammatory effects directly in human colorectal mucosa in vitro, and human trials show that orally administered Aloe preparations can interact with intestinal symptoms and mucosal disease activity[38][39]. Again, the disease setting is not transferred as a product claim; its relevance is evidence that Aloe constituents are active at the human gastrointestinal mucosa.

Several other ingredients have preclinical evidence relevant to mucosal resilience. In animal models, clove essential oil/eugenol reduced experimentally induced gastric injury, and a chemically characterised clove-bud polyphenol extract produced anti-ulcerogenic and mucin-associated effects[77][84]. Thymol reduced gastric injury in rodent ulcer models through mechanisms involving prostaglandins, ATP-sensitive potassium channels and mucus secretion[78]. Grape-seed proanthocyanidins have likewise shown protection in an NSAID-associated gastric-injury model[85]. These data are mechanistic and preclinical; they support mucosal plausibility rather than a disease claim for Clove+.

6.4 Integrated interpretation

The antioxidant and mucosal evidence is best interpreted as complementary ingredient activity: clove and grape seed supply polyphenols; rosemary and beetroot contain Nrf2-active compounds; garlic and quercetin have human or cellular redox evidence; quercetin directly regulates epithelial tight-junction models; Aloe has human mucosal evidence; and clove, thyme and grape-seed compounds have gastroprotective preclinical data[26][81][28][59][80][51][39][77][78][85]. This supports structure/function language around antioxidant support and normal mucosal integrity, not treatment of gastrointestinal disease.

This supports the product language of antioxidant support and maintenance of normal internal tissue or mucosal integrity when those phrases are used as structure/function descriptions. The evidence does not convert the formula into a treatment for ulcers, inflammatory bowel disease or oxidative-stress-related disease.

7. Cellular and Subcellular Basis of Gut and Skin Support

Ingredient-level evidence for several Clove+ constituents extends below whole-tissue physiology to defined cellular and subcellular targets. The strongest studies do not support a nonspecific statement that the ingredients simply 'react with cells'; rather, they identify interactions with protein thiols, redox sensors, nuclear transcription pathways, epithelial junctional complexes, mitochondria, fibroblast matrix pathways and enzyme expression. These mechanisms remain preparation- and concentration-specific, but they provide a molecular bridge between the formulation's phytochemical composition and the gut-barrier, antioxidant and skin-homeostasis domains already described.

7.1 Protein and amino-acid-residue interactions

Garlic provides the clearest amino-acid-residue-level evidence. Proteomic work in human Jurkat T cells showed that allicin covalently modified protein cysteine thiols through S-thioallylation, with 332 proteins mapped as targets[97]. This is a post-translational modification of amino-acid side chains, not a change in primary protein sequence. A second defined example comes from rosemary: carnosic acid can S-alkylate reactive cysteine residues on Keap1, thereby relieving Keap1-mediated restraint of Nrf2 signalling[28]. These mechanisms should not be interpreted as evidence that Clove+ 'repairs' amino-acid structures.

7.2 Intestinal epithelial cells, junctional proteins and mitochondria

The intestinal epithelial barrier is one of the best-supported cellular targets. In human Caco-2 monolayers, quercetin increased the junction-associated presence of ZO-2, occludin and claudin-1 and increased claudin-4 expression; protein kinase Cδ was implicated in this response[51]. A separate Caco-2 study linked quercetin exposure with higher ZO-1 and claudin-1 expression, AhR nuclear translocation and CYP1A1 induction[104]. These observations provide specific protein- and transcription-level support for an epithelial-barrier mechanism. Garlic-derived allicin has complementary evidence in porcine IPEC-J2 intestinal epithelial monolayers. Under lipopolysaccharide challenge, a non-cytotoxic allicin concentration increased TEER, reduced paracellular permeability, preserved ZO-1 distribution and reduced intracellular oxidative stress; pharmacological inhibition of Nrf2 attenuated the Nrf2/HO-1-associated barrier response[98]. These findings support epithelial redox and junctional mechanisms, but they do not establish mitochondrial rescue as a product-level effect. Grape-seed proanthocyanidins provide clearer organelle-level evidence. In LPS-stressed Caco-2 cells, a proanthocyanidin-rich grape-seed extract attenuated cellular oxidative and inflammatory stress, preserved mitochondrial membrane-potential indices and improved barrier-associated junctional function[99]. Thyme-related monoterpenes show a different cellular profile: thymol and carvacrol increased epithelial monolayer resistance, reduced Salmonella translocation and downregulated several bacterial virulence genes in a Caco-2 infection model[103]. Together, these studies support barrier, redox and microbial-interface mechanisms without demonstrating that Clove+ achieves the experimental concentrations used in vitro.

7.3 Nuclear signalling and DNA-related interpretation

At the nuclear level, the evidence concerns transcriptional regulation and stress-response signalling rather than beneficial alteration of genomic DNA sequence. Carnosic acid modification of Keap1 can activate Nrf2/ARE-dependent transcription[28]. In skin models, clove extract/eugenol modulated AP-1 and Nrf2/ARE signalling[100], whereas rosemary carnosic acid reduced UV-associated ROS generation and

ERK/AP-1 activation[101]. In intestinal epithelial cells, quercetin promoted AhR nuclear translocation with CYP1A1 expression while supporting junctional proteins[104]. These findings support regulation of redox-sensitive gene expression, not gene editing, genomic rejuvenation or DNA-sequence modification.

7.4 Skin fibroblasts, keratinocytes and extracellular-matrix proteins

Skin-related cellular evidence is particularly relevant for clove, rosemary and Aloe. In UVB-exposed normal human dermal fibroblasts, clove extract and eugenol reduced MMP-1/MMP-3 secretion and AP-1 phosphorylation while increasing Nrf2/ARE activity and reducing NF-κB/IL-6-associated signalling[100]. In the companion hairless-mouse model, clove extract increased type-I procollagen and elastin measures through TGF/Smad-associated signalling and increased filaggrin, a key epidermal-barrier protein[100]. These findings connect the eponymous ingredient with matrix-remodelling enzymes and barrier biology, but the evidence is preclinical and does not represent an oral human Clove+ outcome. Rosemary carnosic acid has been studied directly in human dermal fibroblasts and epidermal keratinocytes. It reduced UVA/UVB-induced expression of MMP-1, MMP-3 and MMP-9, decreased UVB-associated ROS generation and suppressed ERK/AP-1 activation; EGFR activation itself was not reduced[101]. The same work also reported a lower UVB-induced GADD45 response, supporting an oxidative DNA-damage-response interpretation rather than DNA repair or sequence modification[101]. Aloe contributes a constructive matrix pathway: acemannan increased gingival-fibroblast proliferation and KGF-1, VEGF and type-I collagen expression[102]. Separate human dermal-fibroblast work with Aloe sterols demonstrated increased collagen and hyaluronic-acid production and changes in synthesis-related gene expression[43]. Because the cell types and preparations differ, these data support a shared fibroblast/matrix rationale rather than equivalence among Aloe materials.

7.5 Enzymes and protein release at gut and skin levels

The enzyme evidence is strongest for regulatory and matrix-remodelling enzymes rather than digestive-enzyme secretion. In skin models, clove/eugenol suppressed MMP-1 and MMP-3 secretion, whereas rosemary carnosic acid suppressed UV-induced MMP-1, MMP-3 and MMP-9 expression[100][101]. In intestinal epithelial cells, allicin increased HO-1 expression within the Nrf2 antioxidant system[98]; quercetin-associated barrier responses involved protein kinase Cδ and, in a separate model, AhR-linked CYP1A1 expression[51][104]. Claim-relevant evidence does not establish stimulation of pancreatic amylase, lipase or protease release by Clove+. The cellular evidence therefore centres on epithelial barrier proteins, antioxidant enzymes, transcriptional regulators and extracellular-matrix enzymes.

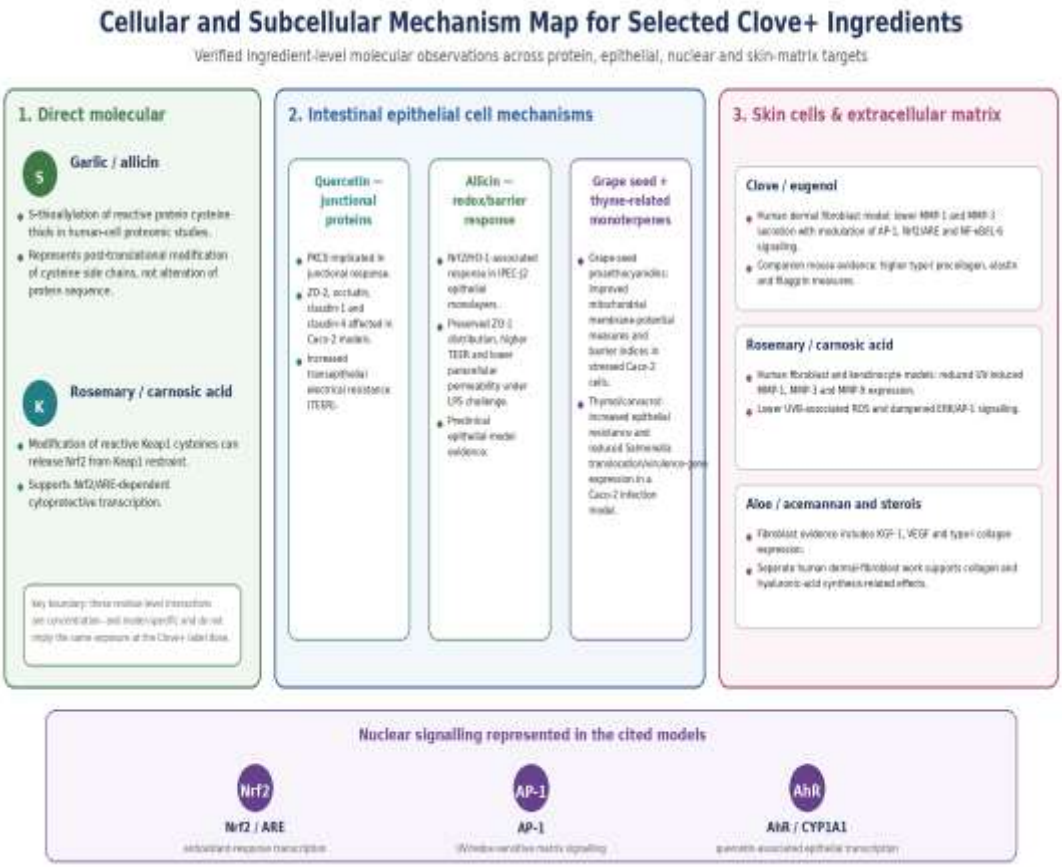

Fig 3: Cellular and subcellular mechanism map for selected Clove+ ingredients. Verified molecular observations include allicin-mediated S-thioallylation of protein cysteine residues and carnosic-acid modification of Keap1 cysteines; intestinal epithelial findings include ZO proteins, occludin, claudins, TEER, Nrf2/HO-1 signalling and grape-seed-associated mitochondrial membrane-potential effects; nuclear pathways include Nrf2/ARE, AP-1 and AhR/CYP1A1; and skin/matrix targets include MMP-1, MMP-3, MMP-9, type-I procollagen, elastin, filaggrin, KGF-1, VEGF and type-I collagen[28][51][97][98][99][100][101][102][104]. These observations derive from distinct experimental models and do not establish that the same molecular exposures occur at the Clove+ label dose.

8. Evidence Supporting Skin Wellness and the Gut–Skin Axis

Skin wellness is a distinct component of the Clove+ positioning and is supported most directly by Aloe vera and rosemary-containing oral preparations, with additional mechanistic support from the formulation's polyphenol and antioxidant profile.

8.1 Oral Aloe vera and human skin outcomes

Aloe vera has one of the more substantive oral botanical literatures relevant to skin physiology. In an early supplementation study, both Aloe-supplemented groups showed reductions in facial-wrinkle indices after the intervention; statistically significant improvement in elasticity was confined to the lower-intake group, and skin biopsies showed stronger type-I procollagen staining together with changes in collagen-related gene expression[42]. In a later randomised placebo-controlled study, an Aloe vera gel powder containing defined Aloe sterols reduced wrinkle depth in a prespecified older subgroup, while the sterols increased collagen and hyaluronic-acid production in cultured human dermal fibroblasts[43].

Additional randomised controlled evidence examined defined Aloe sterol preparations. In healthy women, 12 weeks of supplementation produced between-group differences in skin moisture, transepidermal water loss, elasticity and ultrasound-derived collagen score[44]. In Japanese men whose forearms were exposed to sunlight, overall between-group elasticity differences were not significant, but a prespecified age-stratified analysis showed greater R5 and R7 changes at 8 weeks among participants

younger than 46 years[86]. A later 12-week low-dose trial evaluated transepidermal water loss, hydration, collagen score and participant-reported or objective skin measures, with results supporting effects on moisture/barrier- and collagen-related outcomes[45]. Because these studies used characterised Aloe sterol preparations rather than generic Aloe powder, they establish ingredient-level oral skin activity rather than equivalence to the 20 mg Aloe declaration in Clove+.

This human evidence is directly relevant to the presence of Aloe vera in a product positioned for skin wellness. It does not establish that the 20 mg Clove+ Aloe component reproduces the outcomes of a standardised Aloe sterol intervention, because the label does not specify sterol content. It does, however, provide a credible ingredient-level human basis for including Aloe within a skin-support formulation.

8.2 Rosemary polyphenols and oral photoprotection

Rosemary contributes a second human evidence stream, although the clinical preparations also contained grapefruit polyphenols. In a randomised oral study, the combination increased resistance to experimentally induced UV erythema and produced favourable changes in wrinkle-depth and elasticity measurements[87]. A 2025 investigation of the same botanical pairing combined in-vitro models with a human supplementation component and reported additional photoprotective and skin-ageing-related outcomes[88]. These studies therefore support rosemary-containing nutricosmetic combinations but cannot isolate the effect of rosemary alone.

The mechanistic basis is consistent with rosemary chemistry. Rosmarinic acid, carnosic acid and carnosol have antioxidant and inflammatory-signalling effects, including Nrf2-related pathways that are relevant to cellular responses to environmental oxidative stress[27][28][29]. This provides a plausible bridge between the rosemary component and the product's broader antioxidant and skin-wellness themes.

8.3 Polyphenols, oxidative stress and skin homeostasis

Oxidative stress, inflammatory signalling and extracellular-matrix degradation are central to skin ageing biology. Clove polyphenols, quercetin, grape-seed proanthocyanidins and beetroot betalains possess established antioxidant chemistry, with selected human biomarker evidence outside dermatology[25][83][81][61]. Their contribution to skin wellness is therefore supportive and mechanistic rather than proof of a cutaneous effect for every ingredient.

Grape-seed proanthocyanidins undergo extensive colonic microbial metabolism to smaller phenolic metabolites, while onion-derived quercetin is absorbed largely as conjugated metabolites with substantial interindividual variation[56][58][49][50][89]. These pharmacokinetic features provide a plausible route by which gut processing influences systemic exposure to plant-derived metabolites.

8.4 Gut–skin biological communication

The gut–skin axis encompasses interactions among intestinal microbiota, epithelial barrier function, microbial metabolites, immune mediators and cutaneous homeostasis[11][12]. In a wellness context, this supports biological connectivity between gut and skin physiology without implying that gut modulation automatically produces skin rejuvenation.

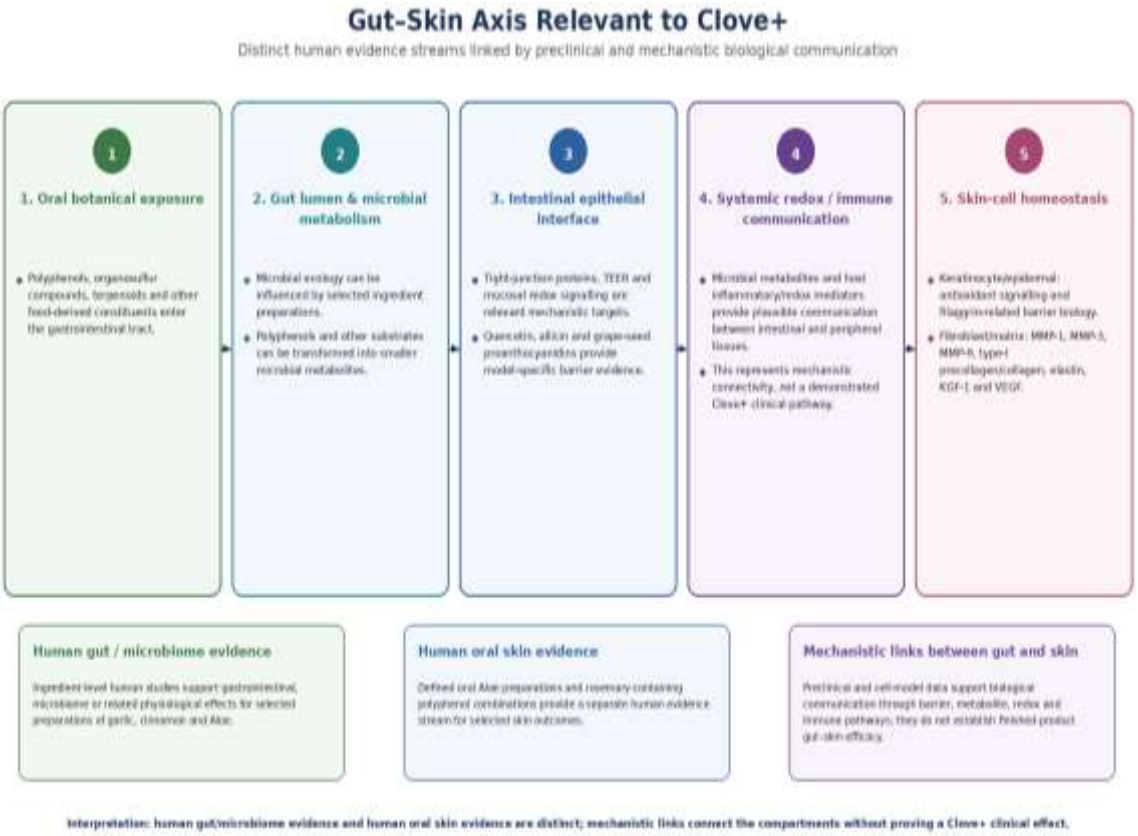

Fig 4: Gut–skin axis relevant to Clove+. Oral botanical exposure and microbial metabolism interface with the intestinal epithelium, barrier signalling and systemic redox/immune communication, with downstream relevance to keratinocyte and fibroblast homeostasis. Human gut/microbiome evidence and human oral skin evidence are distinct from mechanistic links between the two compartments[11][12][33][48][44][87].

Clove+ combines human ingredient-level evidence for gut or microbiome outcomes—particularly garlic, cinnamon and Aloe—with separate human evidence for skin parameters from Aloe and rosemary-containing oral preparations[33][48][41][44][45][87]. Figure 4 integrates these distinct evidence streams without treating them as a finished-product outcome.

8.5 Overall interpretation of the skin claim

The strongest direct skin-support evidence comes from orally administered Aloe preparations, including randomised trials of hydration, elasticity and collagen-related parameters[44][86][45]. Rosemary contributes combination-trial evidence for oral photoprotection and skin-ageing-related endpoints[87][88], while other polyphenol-rich ingredients add antioxidant context. This supports wellness language such as ‘supports healthy skin’; claims of reversing skin ageing, treating dermatological disease or clinically demonstrated rejuvenation exceed the evidence.

Table 4: Human evidence relevant to skin wellness among Clove+ ingredients. Aloe evidence is preparation-specific; rosemary trials used a co-formulated grapefruit extract.

Ingredient/preparation	Human evidence	Skin-related outcome	Evidence relevance
Aloe vera gel supplementation[42]	Human oral supplementation study	Reduced wrinkle indices in both groups; significant elasticity improvement only at the lower intake; collagen-related biopsy findings[42]	Direct oral skin evidence for Aloe-derived material
Aloe sterol-containing preparation[43]	Human study with fibroblast	Improved facial wrinkle-related parameters;	Supports Aloe sterol contribution to skin

	mechanistic component	collagen/hyaluronic-acid-related biology	matrix physiology
Aloe sterol[44]	12-week double-blind randomised controlled trial; healthy women	Between-group differences in moisture, TEWL, elasticity and ultrasound-derived collagen score[44]	Strong ingredient-level human evidence for skin wellness
Low-dose Aloe sterol[45]	12-week double-blind randomised controlled trial	Moisture/barrier and collagen-score outcomes assessed after low-dose oral Aloe sterol[45]	Reinforces oral Aloe skin-support evidence
Rosemary + grapefruit polyphenols[87]	Human oral intervention	Higher UV erythema threshold with favourable wrinkle-depth and elasticity changes[87]	Supports rosemary-containing oral polyphenol combinations; cannot isolate rosemary effect
Rosemary + grapefruit extracts[88]	Human study with in-vitro mechanistic work	Human and in-vitro photoprotection/skin-ageing-related outcomes for the combined extracts[88]	Contemporary supportive evidence for oral rosemary-containing nutricosmetic formulations

9. Ingredient-Level Integration and Dose Context

A multi-botanical product cannot be interpreted simply by comparing each ingredient's milligram amount with the dose used in an isolated single-ingredient trial. Such comparisons are still informative, but botanical preparations differ in extract ratio, solvent, active-marker content and matrix, and multi-ingredient formulations distribute biological inputs across several pathways.

The product label supplied for this review provides mass per capsule but does not quantify eugenol, rosmarinic acid, carnosic acid, allicin-generating potential, S-allylcysteine, Aloe sterols, cinnamaldehyde, quercetin content beyond the onion/quercetin declaration, thymol, grape-seed proanthocyanidins or betalains. Many human studies cited in this review used chemically defined or branded preparations. The clove studies used a characterised polyphenol-rich extract; the garlic microbiome trial used aged garlic extract; the Aloe skin trials used Aloe sterol-containing preparations; and a representative grape-seed RCT used a defined extract intervention[25][33][44][82]. These trials therefore establish ingredient and pathway relevance rather than exact dose equivalence to Clove+.

The formulation nevertheless contains several ingredients whose mechanisms are complementary at the intestinal level. Eugenol, thymol, cinnamaldehyde and garlic sulfur compounds have membrane-active or antimicrobial activity; quercetin affects tight-junction models; proanthocyanidins and other polyphenols reach the colon and undergo microbial metabolism; Aloe has direct human gastrointestinal and skin evidence; and rosemary and beetroot contribute redox-signalling compounds[7][54][32][51][56][41][44][28][59]. This pattern is consistent with a "breadth of support" formulation concept rather than a high-dose monotherapy concept.

The product is therefore most defensibly described as a multi-botanical herbaceutical whose declared ingredients have existing evidence across the targeted wellness domains. The human literature is strongest for specific ingredient preparations and does not permit attribution of those exact magnitudes of effect to Clove+. Equally, the presence of lower amounts in a blend does not negate the established chemical and physiological relevance of the included botanical classes; it defines the level at which the evidence can be stated.

10. Safety, Tolerability and Responsible Use

The Clove+ ingredients are food-derived or widely used botanical materials, but concentrated extracts can have safety considerations that differ from culinary use. The product information limits use to adults,

advises professional consultation in pregnancy, nursing, medication use or medical conditions, and states that the recommended daily amount should not be exceeded.

Table 5: Selected constituent-level safety considerations relevant to responsible daily use.

Constituent	Existing safety consideration	Context within the Clove+ wellness use
Clove/eugenol	A standardised clove-bud polyphenol extract has acute/subchronic toxicology and mutagenicity safety data[90]	The evidence applies to the characterised extract studied; Clove+ declares 10 mg of clove bud, not concentrated clove oil.
Garlic	Adverse effects and drug interactions, including platelet-related considerations, are described for supplemental garlic[91]	Relevant to users taking anticoagulant/antiplatelet therapy
Cinnamon	Coumarin exposure varies markedly by Cinnamomum species[15][93]	Species and preparation influence safety interpretation
Aloe vera	Safety differs between inner-leaf gel and anthraquinone-rich latex/whole-leaf preparations[94]	Preparation type is central to interpretation.
Quercetin	Supplement safety has been reviewed, with greater relevance at high supplemental exposures[95]	Clove+ amount is far below gram-scale quercetin intakes.
Grape seed extract	In-vitro antiplatelet activity has been reported[92]	Supports conservative medication-awareness
MCT	Generally well tolerated; GI intolerance is mainly associated with larger gram-scale intakes[96]	Clove+ contains a sub-gram amount.

For clove, the most directly relevant cited safety evidence concerns a standardised polyphenolic clove-bud extract: acute/subchronic toxicology and mutagenicity assays reported a wide experimental safety margin for that preparation[90]. Those data should not be generalised to concentrated clove oil, and they are not equivalent to the 10 mg clove-bud declaration in Clove+. Garlic has documented adverse-effect and drug-interaction considerations at supplemental intakes, including platelet-related effects[91]. Grape-seed extracts have also shown in-vitro antiplatelet activity, supporting conservative awareness in users taking anticoagulant or antiplatelet therapy[92].

Cinnamon safety depends partly on species because cassia can contain substantially more coumarin than Ceylon cinnamon; coumarin exposure is therefore a recognised consideration in concentrated cinnamon products[15][93]. Aloe safety depends strongly on preparation. Inner-leaf gel is chemically distinct from anthraquinone-rich latex or non-decolourised whole-leaf preparations; reviews of Aloe toxicology emphasise this distinction[94]. Quercetin has been extensively reviewed as a dietary-supplement ingredient, with safety considerations becoming more relevant at high supplemental doses than at ordinary food exposures[95]. MCT is generally well tolerated, with gastrointestinal effects becoming more prominent at gram-scale intakes rather than the sub-gram amount used in Clove+[96].

These considerations are compatible with the product's daily-wellness positioning and professional-advice statement. They also reinforce the importance of interpreting the formulation as a supplement for general wellness rather than as a substitute for medical evaluation or prescribed therapy.

11. Evidence Boundaries and Limitations

The evidence synthesised in this article spans standardised extracts, whole-food preparations, isolated phytochemicals, human trials and cellular or preclinical models. Direct human ingredient-level evidence is available for gastrointestinal or microbiome outcomes with cinnamon, garlic and Aloe; antioxidant biomarkers with clove, garlic and grape seed; and skin parameters with Aloe and a rosemary-containing

oral combination[48][33][41][26][80][81][44][87]. Cellular evidence adds mechanistic resolution for protein cysteine modification, tight-junction regulation, mitochondrial redox function, MMP signalling and fibroblast matrix biology[28][51][97][98][99][100][101][102]. These molecular findings support plausibility but are not equivalent to human outcomes at the Clove+ label dose.

The finished Clove+ formulation was not treated as clinically equivalent to any single-ingredient intervention. Differences in dose, extraction and standardisation limit quantitative transfer of effect sizes. The gut–skin axis is also a systems-level biological framework rather than proof that a change in one compartment necessarily produces a measurable clinical change in the other[11][12].

These boundaries define the appropriate interpretation of the formulation. Existing evidence supports an ingredient-level scientific rationale extending from molecular targets to tissue-level wellness domains, while disease-treatment claims, genomic-modification claims and claims of direct pancreatic digestive-enzyme stimulation remain outside the evidence base.

12. Conclusion

Clove+ combines ten food- and herb-derived components in a wellness-oriented formulation for gut and skin support. Human ingredient-level evidence supports gastrointestinal or microbiome relevance for cinnamon, garlic and Aloe; defined oral Aloe preparations support hydration, elasticity and collagen-related skin outcomes; a rosemary-containing oral polyphenol combination supports photoprotective skin outcomes; and other constituents contribute complementary antioxidant, microbial, barrier and inflammatory-homeostasis mechanisms[48][33][41][44][45][87][26][81][51][53][59]. Cellular studies further identify protein-thiol chemistry, epithelial junctional proteins, Nrf2-linked antioxidant responses, mitochondrial redox function, fibroblast growth-factor/collagen pathways and MMP regulation[28][51][97][98][99][100][101][102].

The evidence is most appropriately expressed in structure/function language: support for normal digestion and gastrointestinal comfort, a balanced gut environment, antioxidant defence, mucosal homeostasis and healthy skin. Cellular findings strengthen the mechanistic basis of these domains but do not establish DNA-sequence alteration, gene editing, disease treatment, cure or prevention. Clove+ is therefore discussed within a wellness-support framework consistent with the product's stated wellness positioning.

Declarations

Author contributions. All authors contributed equally to the conception and scope of the review, literature searching and selection, evidence appraisal, manuscript preparation, critical revision, and approval of the final manuscript. All authors accept equal responsibility for the integrity and accuracy of the work.

Conflict of interest. All authors are employees of Biotex Life Solutions Pvt. Ltd., the company associated with Clove+. This institutional relationship is disclosed as a potential conflict of interest. The manuscript is an evidence-based narrative review of published ingredient-level literature and does not present Clove+ as a treatment, cure, or preventive intervention for disease.

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Data availability. No new datasets were generated or analysed for this narrative review. The scientific evidence discussed is available in the cited publications, and product composition and suggested use were derived from the product label supplied for this review.

Ethics approval. Not applicable. This narrative review did not involve new research with human participants or animals.

Use of AI-assisted tools. AI-assisted tools were used for grammar and language refinement. Scientific interpretation, reference verification, evaluation of claim relevance, and the conclusions were reviewed and determined by the authors.

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