Asian J Biol Life Sci., 2026; 15(2):258-265.
https://ajbls.com

Review Article

Literature Review of *Gymnema sylvestre, Cuminum cyminum* and *Allium sativum* in Mitigating Health Effects Associated with Cigarette Smoking

Sridevi Jayamani*, Manjari Venkatraman*

Department of Nanju Maruthuvam, National Institute of Siddha, Affiliated to the Tamil Nadu, Dr MGR Medical University, Chennai, Tamil Nadu, INDIA.

ABSTRACT

Evidence from existing literature suggests that herbal preparations may aid individuals in smoking cessation. However, a comprehensive understanding of the role of herbal drugs in mitigating the broader health effects associated with smoking remains limited and fragmented. A search was carried out using major scientific databases including Pubmed, Google scholar, and the Cochrane Library. Eligible studies were screened and evaluated for clinical and preclinical evidence regarding the therapeutic effects of *Gymnema sylvestre, Cuminum cyminum*, and *Allium sativum* in the context of smoking-related health consequences. The review highlights that these herbal agents demonstrate promising pharmacological properties, such as antidiabetic, antioxidant, anti-inflammatory, and detoxifying effects, which may contribute to the reduction of smoking-induced physiological damage like increased insulin resistance, increased reactive oxygen species and increased LDL. Clinical evidence remains preliminary but indicates potential supportive benefits in reducing oxidative stress, improving metabolic balance, and alleviating symptoms linked to chronic tobacco use. The findings provide initial evidence supporting the role of selected herbal drugs in reducing the adverse health outcomes of smoking with reference to classical Siddha text *Nanjumurivunool*. Further well-designed, large-scale clinical trials in combination with conventional therapies are warranted to validate these results and strengthen the evidence base.

Keywords: *Gymnema sylvestre*, *Cuminum cuminum*, *Allium sativum*, Smoking ill effects, Siddha.

Correspondence:
Dr. Manjari Venkatraman
B.S.M.S, M.D(S), PhD, Professor, Department of Nanju Maruthuvam, National Institute of Siddha (Affiliated to TN Dr. MGR Medical University), Tambaram Sanatorium, Chennai, Tamil Nadu, INDIA.
Email: drmanjarimd@gmail.com

Dr. Sridevi Jayamani
PhD Scholar, Department of Nanju Maruthuvam, National Institute of Siddha, Affiliated to the Tamil Nadu, Dr MGR Medical University, Chennai, Tamil Nadu, INDIA.
Email: sridevi.jayamani@gmail.com

Received: 03-04-2026;
Revised: 29-05-2026;
Accepted: 17-07-2026.

INTRODUCTION

Tobacco use is responsible for over 7 million deaths annually, of which approximately 1.6 million occur among non-smokers due to exposure to second-hand smoke. According to the Global Adult Tobacco Survey India, 2016-17 for about 29% of adults are users of tobacco (WHO, 2025). Reports of systematic review indicate that a clear dose-response relationship exists between smoking intensity and the associated health outcomes like Cancer, Diabetes, Chronic Obstructive Pulmonary Disease, Cardiovascular Disease (Dai, 2022). Apart from various Nicotine replacement therapy (Theodoulou, 2023), behavioural therapy (Hartmann-Boyce, 2019) and pharmacotherapy (Streck, 2024), Complete cessation of smoking is said to be the most effective approach for cancer and CVD prevention (Chang, 2021). Though smokers are motivated by nicotine replacement therapy they are obviously met with various adverse effects with reference to systematic review (Mills, 2010). Evidence from existing literature suggests that herbal preparations like *Vernonia cineria*, St. John's wort, black pepper (Di Fabio, 2013) may aid individuals in smoking cessation (Mitra, 2023). However, a comprehensive understanding of the role of herbal drugs in mitigating the broader health effects associated with smoking remains limited and fragmented. *Gymnema sylvestre, Cuminum cyminum* and *Allium sativum*, in the form polyherbal decoction is administered to reduce the toxicity of *Nicotiana tobacum* with reference to the classical text Nanjumurivunool (Mudhaliyaar, 2006).

Gymnema sylvestre a medicinal plant from central and peninsular India has reference to various activity like antimicrobial, antihypercholesterolemic, hepatoprotective and sweet suppressing activities (Kanetkar, 2007). *Cuminum cyminum* a small annual and herbaceous plant is most widely used for culinary and medicinal purposes (Mnif, 2015). *Allium sativum* is an aromatic herbaceous plant known for its various pharmacological activities like anticarcinogenic, antioxidant, antidiabetic, anti-atherosclerotic, antibacterial, antifungal, and antihypertensive activities in traditional medicines (El-Saber

DOI: 10.5530/ajbls.20260100

Batiha, 2020). This study aims to discuss the review of these herbal plants both clinically and preclinically in risk factors like increased Insulin resistance (US FDA, 2025), Increased LDL (Rao, 2013), increased reactive oxygen species (Valavanidis, 2009) of smoking which ultimately leads to health consequences like Diabetes (Bergman, 2012), Cardiovascular diseases (Bergman, 2012) and COPD respectively.

METHODOLOGY

The review was done in database like Pubmed, Google scholar and Cochrane library with search terms like *Gymnema sylvestre* and insulin resistance, *Gymnema sylvestre* and hyperlipedimia, *Gymnema sylvestre* and reactive oxygen species, *Cuminum cyminum* and insulin resistance, *Cuminum cyminum* and hyperlipedimia, *Cuminum cyminum* and reactive oxygen species, *Allium sativum* and insulin resistance, *Allium sativum* and hyperlipedimia, *Allium sativum* and reactive oxygen species involving filters for both clinical trials and preclinical trials.

RESULTS

Mechanism of action Against Smoke-Induced Metabolic and Cardiovascular Risks

Exposure to nicotine and cigarette smoke triggers multiple harmful pathways in the body. It increases Reactive Oxygen Species (ROS), leading to oxidative stress and endothelial dysfunction, which contribute to conditions like COPD and cardiovascular disease. Smoke exposure also elevates LDL levels and promotes lipid peroxidation, resulting in dyslipidemia and atherosclerosis (Figure 1). Additionally, it induces insulin resistance through the mTOR pathway in skeletal muscle, causing hyperglycemia and increasing the risk of type 2 diabetes (Figure 2). Chronic low-grade inflammation is further promoted by elevated inflammatory cytokines such as TNF-α and IL-6. Several herbs have demonstrated protective effects against these mechanisms (Figure 3). *Gymnema sylvestre* helps lower blood glucose and HbA_{1C}, improves insulin sensitivity, reduces LDL and total cholesterol, and provides antioxidant activity to combat ROS (Figures 4 and 5). *Cuminum cyminum* enhances insulin function, improves lipid profiles by lowering total and LDL cholesterol while raising HDL, exerts antioxidant and anti-inflammatory

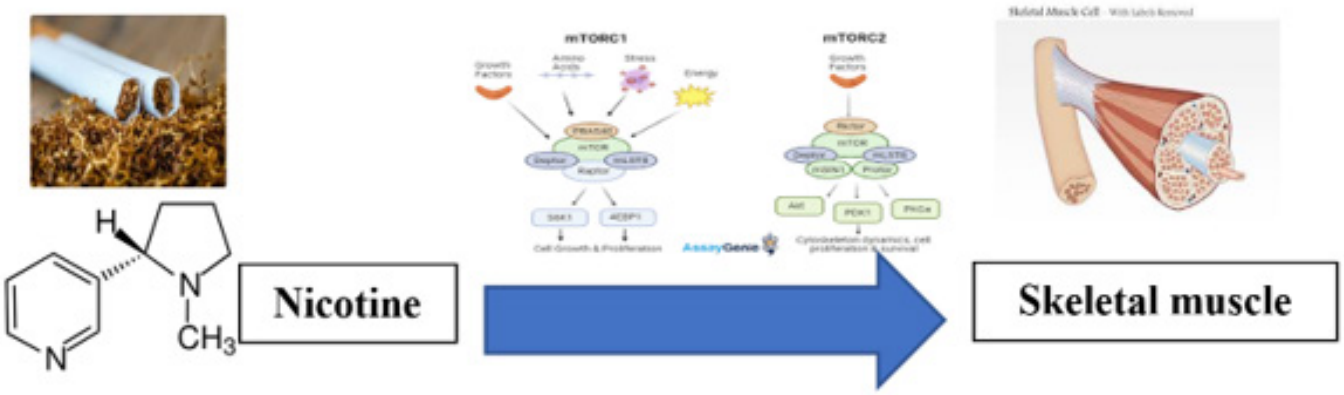

Figure 1: Nicotine induces insulin resistance in skeletal muscle by activating Mtor pathway (Bajaj M, 2012).

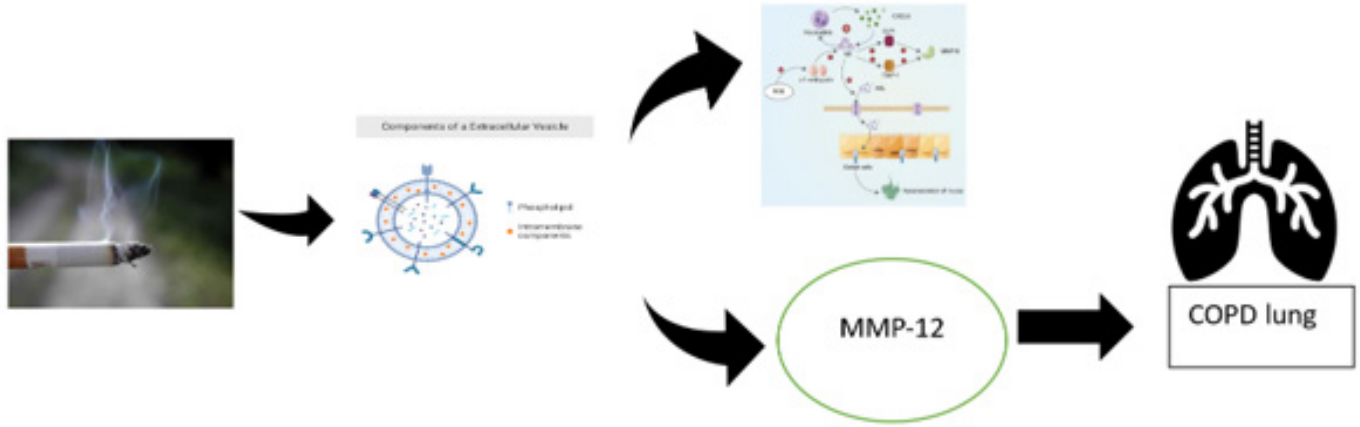

Figure 2: Exposure to Cigarette smoke result in the formation of distinct Extracellular vesicle that has Metalloproteinase (MMP-12) and neutrophil elastase which leads to COPD (Annareddy, 2024).

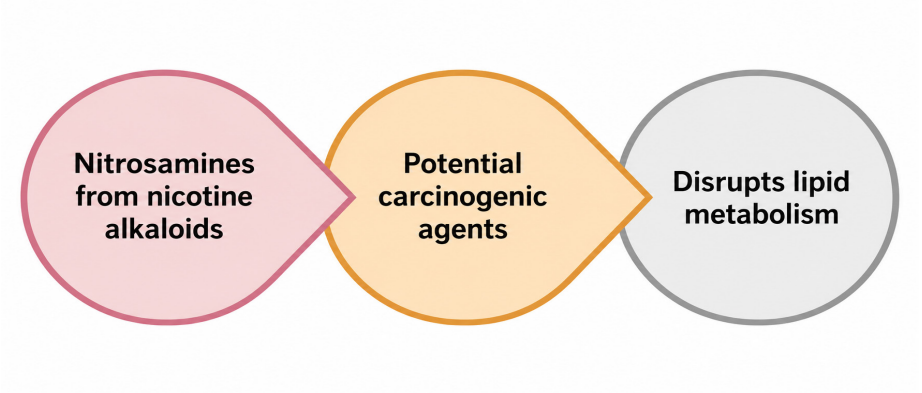

Figure 3: Nicotine in relation to Lipid Metabolism (Aslam, 2025).

effects, and supports weight and BMI regulation. *Allium sativum* (garlic) exhibits potent antioxidant and anti-atherosclerotic properties, increases adiponectin to improve metabolic function, reduces insulin resistance and improves glycemic control, lowers inflammatory markers such as CRP and cytokines, and enhances vascular and microvascular function. Together, these herbs may offer a complementary approach to counteract the metabolic and cardiovascular risks associated with nicotine and smoke exposure.

DISCUSSION

This review brings together clinical and preclinical evidence on the potential benefits of *Gymnema sylvestre, Cuminum cyminum*, and *Allium sativum* in countering the health effects of cigarette smoking. Smoking triggers a range of harmful pathways, including oxidative stress, dyslipidemia, systemic inflammation, and insulin resistance, all of which raise the risk for diabetes, cardiovascular disease, and Chronic Obstructive Pulmonary Disease (COPD). While conventional treatments like pharmacotherapy and nicotine replacement remain central to quitting smoking, their side effects and challenges with long-term adherence highlight the need for safer, supportive interventions.

Among the herbs studied (Table 1), *Gymnema sylvestre* consistently shows hypoglycemic, hypolipidemic, and insulin-sensitizing effects. Clinical research has reported reductions in fasting glucose, glycated hemoglobin, and LDL cholesterol, along with improvements in adipokine regulation. These properties suggest it could help counteract nicotine-induced insulin resistance and lipid imbalances in smokers.

Cuminum cyminum, commonly used both as a spice and a medicinal herb, demonstrates antioxidant, anti-inflammatory, and lipid-modulating effects. Trials in prediabetic and overweight individuals have shown improvements in insulin sensitivity, favorable changes in lipid profiles, and reductions in oxidative stress markers, suggesting it may help buffer some of the metabolic disturbances associated with smoking.

Allium sativum (garlic) has perhaps the most substantial evidence base. Multiple randomized controlled trials highlight its benefits

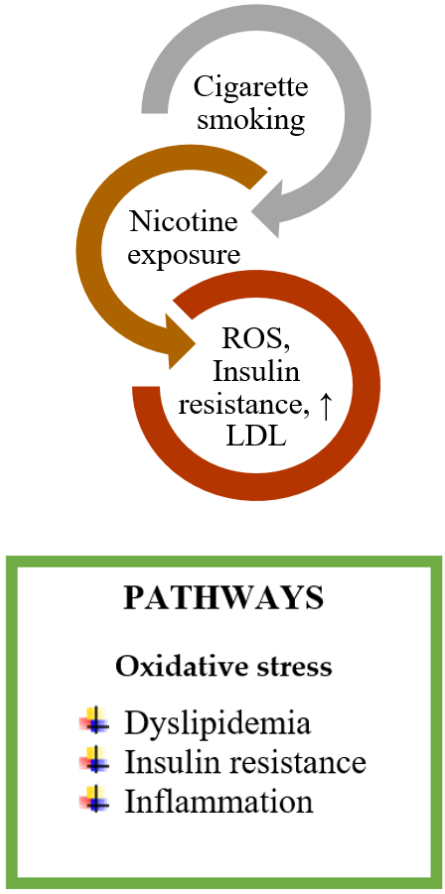

Figure 4: Mechanism of Action.

on metabolic syndrome parameters, microvascular function, oxidative stress, and adiponectin levels. Notably, Aged Garlic Extract (AGE) has been shown to increase plasma adiponectin in patients with metabolic syndrome, revealing a novel mechanism for lowering cardiometabolic risk in smokers. Its wide-ranging effects-including antidiabetic, anti-atherosclerotic, and antioxidant properties-make garlic a strong candidate for supportive therapy against tobacco-related health issues.

Interestingly, all three herbs are referenced in classical Siddha texts, such as *Nanjumurivunool*, which recommend polyherbal decoctions to counter the toxic effects of tobacco. This alignment

Table 1: Clinical study of *Gymnema sylvestre* in alleviating increased Insulin resistance, hyperlipidemia and increased reactive oxygen species.

Sl. No.	Study design	Age group and disease	Intervention	Outcome	Sample size	Conclusion
1.	Double blind RCT	30-60 years	Participants received either *G. sylvestre* or placebo, 300 mg capsules taken twice daily before breakfast and dinner, totaling 600 mg per day for 12 weeks.	Levels of lipids and glucose, along with blood pressure and body weight.	24	*Gymnema sylvestre* shows strong efficacy in both preventing and managing metabolic syndrome (Zuñiga, 2017).
2.	RCT	IDDM	GS4, a water-soluble extract of the leaves of *Gymnema sylvestre* (400 mg/day).	Insulin requirements came down together with fasting blood glucose and glycosylated Haemoglobin (HbA_{1C}) and glycosylated plasma protein levels.	27	GS4 therapy appears to enhance endogenous insulin, possibly by regeneration/revitalisation of the residual beta cells in insulin-dependent diabetes mellitus (Shanmugasundaram, 1990).
3.	RCT	30-60 years age	Capsules of each, *Gymnema sylvestre, Artemisia absinthium* and *Citrullus colocynthis* were given to patients twice a day for 30 days in 1 g per day dosage.	*Gymnema sylvestre* reduced glucose levels by 37%, triglyceride levels by 5%, cholesterol levels by 13%, and Low-Density Lipoprotein (LDL) levels by 19% in diabetic individuals.	32	Powdered *G. sylvestre, C. colocynthis*, and *A. absinthium* show antidiabetic effects but no significant impact on lipid profiles (Li, 2015).
4.	Randomized, double-blind, placebo-controlled clinical trial	Patients with impaired glucose tolerance	*G. sylvestre* in doses of 300 mg b.i.d.	At the end of the intervention, 46.7% of the patients obtained normal values in A1C.	30	In IGT patients, *G. sylvestre* lowered 2-hour OGTT and A1C, improved insulin sensitivity, and enhanced anthropometric and lipid profiles (Gaytán Martínez, 2021).
5.	Quasi-experimental study	Patient with Type 2 DM	500 mg of the herb per day for a period of 3 months.	*G. sylvestre* supplementation lowered glucose, HbA_{1C}, polyphagia, fatigue, and improved lipid and biochemical profiles.		These findings suggest a beneficial effect of GS in the management of diabetes mellitus (Kumar, 2010).
6.	Experimental study	(40-60) years	6 g of *Gymnema sylvestre* leaf powder was used to intervene the subjects in three divided doses.	Concluded that *Gymnema sylvestre* powder is effective in lowering the fasting as well as postprandial blood glucose levels.	20 (newly diagnosed)	*Gymnema sylvestre* powder effectively reduces both fasting and postprandial blood glucose levels (Paliwal, 2025).

Sl. No.	Study design	Age group and disease	Intervention	Outcome	Sample size	Conclusion
7.	A small cohort of patients with T2DM	Pts with T2DM	Oral administration of OSA(R) (1 g/day, 60 days).	Marked rises in insulin and C-peptide were linked to lowered fasting and postprandial glucose.	Small cohort	The novel high-molecular-weight GS extract, OSA, offer a potential alternative treatment for T2DM-related hyperglycemia (Al-Romaiyan, 2010).
8.	Comparative study	Obesity	GS or BBR for 3 months.	GS decreased fasting glucose and Res gene expression ($p<0.05$).	50	In obesity, BBR improves body composition and BP, while GS mainly lowers fasting glucose and insulin-resistance markers (Bandala, 2024).
9.	Pilot study	Obese dysmetabolic patients	Daily dosage of two sachets, each one containing 1950 mg myo-inositol, 50 mg d-chiro-inositol, 50 mg α-lactalbumin, and 250 mg*Gymnema sylvestre*.	HOMA index, triglycerides, BMI, body weight, and waist circumference.	37	These findings support the supplementation with myo-inositol and d-chiro-inositol in the 40:1 ratio, α-lactalbumin, and *Gymnema sylvestre* as a therapeutical strategy to potentiate the beneficial effects induced via dietary programs in dysmetabolic patients (Basciani, 2023).
10.	Double blind clinical trial	30-75 years type DM	The first group received cumin essential oil in capsule form. The second group received Vitamin E, and the third group was used as a control receiving oral gelatin capsules as placebo for three months period.	Leptin, glycosylated Hemoglobin (HbA_{1C}) and also on lipid profile.	95	Cumin in comparison with vitamin E has broader impact and it is more beneficial in terms of ability to reduce the diabetic index (Samani Keihan, 2016).
11.	Double-blind randomized controlled trial	Pre-diabetic patients aged 19 years or more	One cumin soft gel (containing 75 mg of cumin essential oil) per day for 10 weeks.	FPG, lipid profile, and HbA_{1C} were assessed using standard enzymatic and colorimetric methods; serum insulin, leptin, and related indices (HOMA-IR, HOMA-B, QUICKI) were also evaluated.	32 patients in each group.	10-week cumin essential oil supplementation (75 mg/day) improved insulin function, lipid profile, and anthropometrics in prediabetics, but FPG, HbA_{1C}, and leptin remained unchanged (Jafari, 2018).

Sl. No.	Study design	Age group and disease	Intervention	Outcome	Sample size	Conclusion
12.	Randomized double-blind placebo-controlled clinical trial	18-60 years old. overweight subjects	Participants were randomly assigned into three groups to receive: (1) *cumin cyminum* L. capsule (*n*=26); (2) orlistat 120 capsule (*n*=26) and (3) placebo (*n*=26) three times a day for 8 weeks.	Anthropometric measures and fasting blood samples.	78	8 supplementation with *Cuminum cyminum* in overweight individuals matched orlistat 120 in reducing weight and BMI and also improved insulin metabolism (Taghizadeh, 2015).
13.	Randomized, triple-blind, placebo-controlled clinical trial	Aged 18-60 years	75 mg CuEO or placebo soft gel thrice daily for 8 weeks.	Anthropometric indices, glycemic control, blood pressure, lipid profile, and insulin resistance.	56	CuEO had no impact on MetS components except for reducing DBP in MetS patients. (Fu, 2015).
14.	RCT	18 years and eligible for the clinical diagnosis of MetS	1,600 mg/d garlic powder or placebo for 3 months.	Insulin resistance, Fatty Liver Index (FLI), and appetite.	90	Garlic improves MetS component, insulin resistance, FLI, and appetite (Morovati, 2019).
15.	A randomized controlled trial	Sge equal to or greater than 18 years.	Intake of 1,600 mg/d garlic powder) or control group (placebo) for 3 months.	Intestinal transit time, LAP, Cardiometabolic Index (CMI), Atherogenic Index of Plasma (AIP), Castelli Risk Index I (CRI-I) and Castelli Risk Index II (CRI-II).	90	Garlic supplementation can improve intestinal transit time, LAP, and cardiometabolic indices (Sangouni, 2023).
16.	A Randomized Placebo-Controlled Study	18 and 65 years	Encapsulated purple garlic oil or placebo capsules for five weeks.	Hs-CRP levels.	52	Regular intake of encapsulated purple garlic oil improved microvascular function, inflammation, and overall MetS profile in individuals with cardiometabolic issues (Bara-Ledesma, 2024).
17.	RCT		100 mg/kg body weight raw crushed garlic 2 times a day with standard diet for 4 weeks.	Anthropometric and serum biochemical variables.	40	Raw crushed garlic positively affects MetS components and may serve as an adjunct for its prevention and management (Choudhary, 2017).
18.	RCT	Over 18 years old	1.2 g/day of AGE (Kyolic), for 24 weeks of treatment (12 weeks of AGE and 12 weeks of placebo).	Adinopectin	46	The study showed that a 12-week administration of AGE led to an increase in plasma adiponectin levels in patients with metabolic syndrome (Gómez-Arbeláez, 2013).

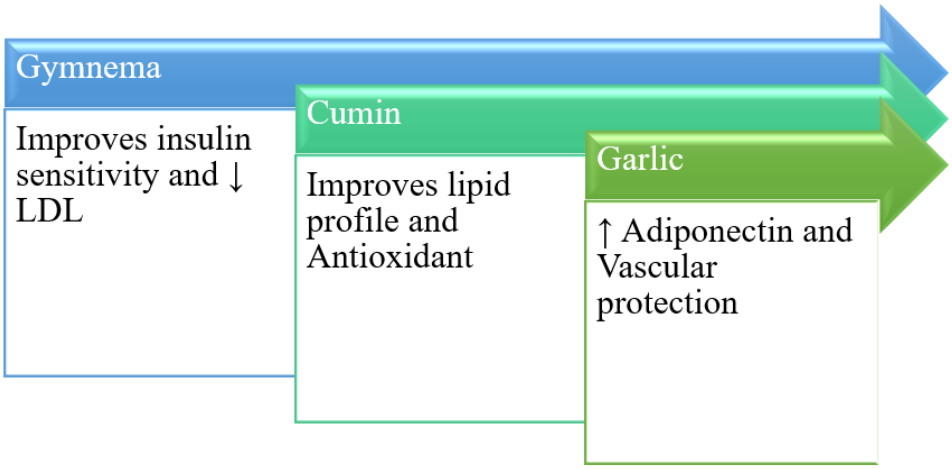

Figure 5: Counteracting Effects of Herbs.

between traditional knowledge and modern clinical evidence is encouraging.

Nevertheless, several limitations persist. Most clinical studies had small sample sizes, brief intervention periods, and diverse participant populations. Only a few trials directly assessed smokers or smoking-related outcomes, limiting the applicability of the findings. Additionally, differences in herbal formulations such as powders, extracts, and essential oils-pose challenges for standardization and reproducibility. Therefore, larger, longer-term studies focused specifically on smokers are needed to confirm efficacy, determine optimal dosing, and ensure safety.

CONCLUSION

This review supports the therapeutic potential of *Gymnema sylvestre, Cuminum cyminum*, and *Allium sativum* in reducing the health effects associated with smoking. Together, these herbs exhibit antioxidant, insulin-sensitizing, lipid-lowering, and anti-inflammatory properties that may counteract mechanisms of tobacco-related damage, such as increased insulin resistance, elevated LDL, and oxidative stress. Garlic, especially in its aged extract form, provides the strongest clinical evidence, including new findings of adiponectin enhancement in patients with metabolic syndrome.

Although initial results are promising, the current evidence is still fragmented. Larger, well-designed clinical trials especially targeting smokers are necessary to confirm clear therapeutic roles. Combining these herbs with conventional treatments and behavioral strategies could offer a safe, cost-effective, and culturally appropriate way to reduce the burden of smoking-related morbidity.

ACKNOWLEDGEMENT

The authors acknowledge the support and facilities provided by the National Institute of Siddha, Tambaram Sanatorium.

ABBREVIATIONS

AGE: Aged Garlic Extract; **COPD:** Chronic Obstructive Pulmonary Disease; **CVD:** Cardiovascular Disease; **HbA_{1C}:** Glycosylated Haemoglobin; **LDL:** Low-density Lipoprotein; **MetS:** Metabolic Syndrome; **ROS:** Reactive Oxygen Species; **T2DM:** Type 2 Diabetes Mellitus.

FUNDING

The author(s) received no financial support for the research, authorship, and/or publication of this article

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTION

Conceptualization, Data collection and compilation, Manuscript Writing: JS; Proofreading and editing: JS, VM.

REFERENCES

Al-Romaiyan, A., Liu, B., Asare-Anane, H., Maity, C. R., Chatterjee, S. K., Koley, N., *et al.* (2010). A novel *Gymnema sylvestre* extract stimulates insulin secretion. Phytotherapy Research, 24(9), 1370-1376. https://doi.org/10.1002/ptr.3145

Annareddy, S., Ghewade, B., Jadhav, U., Wagh, P., and Sarkar, S. (2024). Unveiling the long-term lung consequences of smoking and tobacco consumption: A narrative review. Cureus, 16(8), e66415. https://doi.org/10.7759/cureus.66415

Aslam, M. A., Iqbal, H., Ilyas, K., Rehman, K., Hussain, A., Akash, M. S. H., Shahid, M., and Chen, S. (2025). Metabolomic insights into smoking-induced metabolic dysfunctions. Metabolites, 15(2), 96. https://doi.org/10.3390/metabo15020096

Bajaj, M. (2012). Nicotine and insulin resistance: When the smoke clears. Diabetes, 61(12), 3078-3080. https://doi.org/10.2337/db12-1100

Bandala, C., Carro-Rodríguez, J., Cárdenas-Rodríguez, N., Peña-Montero, I., Gómez-López, M., and Hernández-Roldán, A. P., *et al.* (2024). Comparative effects of *Gymnema sylvestre* and berberine in obese patients. Nutrients, 16(14), 2284. https://doi.org/10.3390/nu16142284

Bara-Ledesma, N., Jimenez-Esteban, J., Fabregate, M., Fabregate-Fuente, R., Cymberknop, L. J., Castillo-Martinez, P., *et al.* (2024). Effect of encapsulated purple garlic oil. Nutrients, 16(11), 1755. https://doi.org/10.3390/nu16111755

Basciani, S., Nordio, M., Dinicola, S., Unfer, V., and Gnessi, L. (2023). Diet plus inositols, α-lactalbumin and *Gymnema sylvestre*. Nutrients, 15(14), 3142. https://doi.org/10.3390/nu15143142

Bergman, B. C., Perreault, L., Hunerdosse, D., Kerege, A., Playdon, M., and Samek, A. M., *et al.* (2012). Novel and reversible mechanisms of smoking-induced insulin resistance in humans. Diabetes, 61(12), 3156-3166. https://doi.org/10.2337/db12-0418

Chang, J. T., Anic, G. M., Rostron, B. L., Tanwar, M., and Chang, C. M. (2021). Cigarette smoking reduction and health risks: A systematic review and meta-analysis. Nicotine and Tobacco Research, 23(4), 635-642. https://doi.org/10.1093/ntr/ntaa210

Choudhary, P. R., Jani, R. D., and Sharma, M. S. (2018). Effect of raw crushed garlic on metabolic syndrome. Journal of Dietary Supplements, 15(4), 499-506. https://doi.org/10.1080/19390211.2017.1353567

Dai, X., Gil, G. F., Reitsma, M. B., Ahmad, N. S., Anderson, J. A., Bisignano, C., *et al.* (2022). Health effects associated with smoking: A burden of proof study. Nature Medicine, 28(10), 2045-2055. https://doi.org/10.1038/s41591-022-01958-1

Di Fabio, G., Romanucci, V., Zarrelli, M., Giordano, M., and Zarrelli, A. (2013). C-4 gem-dimethylated oleanes of *Gymnema sylvestre* and their pharmacological activities. Molecules, 18(12), 14892-14919. https://doi.org/10.3390/molecules181214892

El-Saber Batiha, G., Magdy Beshbishy, A., Wasef, L. G., Elewa, Y. H. A., Al-Sagan, A. A., and Abd El-Hack, M. E., *et al.* (2020). Chemical constituents and pharmacological activities of garlic (*Allium sativum* L.): A review. Nutrients, 12(3), 872. https://doi.org/10.3390/nu12030872

Fu, Z., Lv, J., Gao, X., Zheng, H., Shi, S., Xu, X., *et al.* (2023). Effects of garlic supplementation on metabolic syndrome. BMC Complementary Medicine and Therapies, 23, 260. https://doi.org/10.1186/s12906-023-04089-9

Gaytán Martínez, L. A., Sánchez-Ruiz, L. A., Zuñiga, L. Y., González-Ortiz, M., and Martínez-Abundis, E. (2021). Effect of *Gymnema sylvestre* on glycemic control in impaired glucose tolerance. Journal of Medicinal Food, 24(1), 28-32. https://doi.org/10.1089/jmf.2020.0073

Gómez-Arbeláez, D., Lahera, V., Oubiña, P., *et al.* (2013). Aged garlic extract improves adiponectin levels. Mediators of Inflammation, 2013, 285795. https://doi.org/10.1155/2013/285795

Hartmann-Boyce, J., Hong, B., Livingstone-Banks, J., Wheat, H., and Fanshawe, T. R. (2019). Additional behavioural support as an adjunct to pharmacotherapy for smoking cessation. Cochrane Database of Systematic Reviews, 2019(6), CD009670. https://doi.org/10.1002/14651858.CD009670.pub4

Jafari, T., Mahmoodnia, L., Tahmasebi, P., Memarzadeh, M. R., Sedehi, M., Beigi, M., *et al.* (2018). Effect of cumin essential oil on metabolic profile. Journal of Functional Foods, 47, 416-422. https://doi.org/10.1016/j.jff.2018.06.003

Kanetkar, P., Singhal, R., and Kamat, M. (2007). *Gymnema sylvestre*: A memoir. Journal of Clinical Biochemistry and Nutrition, 41(2), 77-81. https://doi.org/10.3164/jcbn.2007010

Kumar, S. N., Mani, U. V., and Mani, I. (2010). An open-label study on *Gymnema sylvestre* supplementation in type 2 diabetes. Journal of Dietary Supplements, 7(3), 273-282. https://doi.org/10.3109/19390211.2010.503692

Li, Y., Zheng, M., Zhai, X., Huang, Y., Khalid, A., Malik, A., *et al.* (2015). Effect of *Gymnema sylvestre*, *Citrullus colocynthis* and *Artemisia absinthium* on blood glucose and lipid profile. Acta Poloniae Pharmaceutica, 72(5), 981-985.

Mills, E. J., Wu, P., Lockhart, I., Wilson, K., and Ebbert, J. O. (2010). Adverse events associated with nicotine replacement therapy for smoking cessation: A systematic review and meta-analysis. Tobacco Induced Diseases, 8(1), 8. https://doi.org/10.1186/1617-9625-8-8

Mitra, R., Rai, A., Kumar, A., and Mitra, J. K. (2023). Role of herbal medication in tobacco cessation treatment: A systematic review and meta-analysis. Addiction and Health, 15(1), 63-70.

Mnif, S., and Aifa, S. (2015). Cumin (*Cuminum cyminum* L.) from traditional uses to potential biomedical applications. Chemistry and Biodiversity, 12(5), 733-742. https://doi.org/10.1002/cbdv.201400305

Morovati, A., Pourghassem Gargari, B., and Sarbakhsh, P. (2019). Effects of cumin essential oil on metabolic syndrome. Phytotherapy Research, 33(12), 3261-3269. https://doi.org/10.1002/ptr.6503

Murugesa Mudhaliyaar, K. S. (2006). Nanju murivu nool (pp. 23-24). Indian Medicine and Homeopathy Department. http://archive.org/details/dli.jZY9lup2kZl6TuXGlZQdjZU9k0My

Paliwal, R., Kathori, S., and Upadhyay, B. (2025). Effect of *Gymnema sylvestre* powder intervention on blood glucose levels among diabetics. ResearchGate. https://www.researchgate.net/publication/237321683

Rao, C. S., and Subash, Y. E. (2013). The effect of chronic tobacco smoking and chewing on the lipid profile. Journal of Clinical and Diagnostic Research, 7(1), 31-34.

Samani Keihan, G., Gharib, M. H., Momeni, A., Hemati, Z., and Sedighin, R. (2016). Comparison of *Cuminum cyminum* and vitamin E in diabetic patients. International Journal of Molecular and Cellular Medicine, 5(4), 229-235.

Sangouni, A. A., Alizadeh, M., Jamalzehi, A., Hosseinzadeh, M., and Parastouei, K. (2023). Garlic supplementation improves cardiometabolic indices. Phytotherapy Research, 37(6), 2305-2314. https://doi.org/10.1002/ptr.7736

Shanmugasundaram, E. R., Rajeswari, G., Baskaran, K., Rajesh Kumar, B. R., Radha Shanmugasundaram, K., and Kizar Ahmath, B. (1990). Use of *Gymnema sylvestre* leaf extract in insulin-dependent diabetes mellitus. Journal of Ethnopharmacology, 30(3), 281-294. https://doi.org/10.1016/0378-8741(90)90070-7

Streck, J. M., Rigotti, N. A., Livingstone-Banks, J., Tindle, H. A., Clair, C., and Munafò, M. R. (2024). Interventions for smoking cessation in hospitalised patients. Cochrane Database of Systematic Reviews, 2024(5), CD001837. https://doi.org/10.1002/14651858.CD001837.pub5

Taghizadeh, M., Memarzadeh, M. R., Asemi, Z., and Esmaillzadeh, A. (2015). Effect of *Cuminum cyminum* intake on weight loss. Annals of Nutrition and Metabolism, 66(2-3), 117-124. https://doi.org/10.1159/000371502

Theodoulou, A., Chepkin, S. C., Ye, W., Fanshawe, T. R., Bullen, C., and Hartmann-Boyce, J. (2023). Different doses, durations and modes of delivery of nicotine replacement therapy for smoking cessation. Cochrane Database of Systematic Reviews, 2023(6), CD013308. https://doi.org/10.1002/14651858.CD013308.pub2

U.S. Food and Drug Administration. (2025). How smoking can increase risk for and affect diabetes. https://www.fda.gov/tobacco-products/health-effects-tobacco-use/how-smoking-can-increase-risk-and-affect-diabetes

Valavanidis, A., Vlachogianni, T., and Fiotakis, K. (2009). Tobacco smoke: Involvement of reactive oxygen species and stable free radicals in mechanisms of oxidative damage and carcinogenesis. International Journal of Environmental Research and Public Health, 6(2), 445-462. https://doi.org/10.3390/ijerph6020445

World Health Organization. (n.d.). Tobacco - India. https://www.who.int/india/health-topics/tobacco

Zuñiga, L. Y., González-Ortiz, M., and Martínez-Abundis, E. (2017). Effect of *Gymnema sylvestre* administration on metabolic syndrome and insulin sensitivity. Journal of Medicinal Food, 20(8), 750-754. https://doi.org/10.1089/jmf.2016.0165

Cite this article: Jayamani S, Venkatraman M. Literature Review of *Gymnema sylvestre*, *Cuminum cyminum* and *Allium sativum* in Mitigating Health Effects Associated with Cigarette Smoking. Asian J Biol Life Sci. 2026;15(2):258-65.