

Effect of a Herbo-Mineral Ayurvedic Formulation on Pro-Inflammatory Factors and Antibody Levels



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Introduction

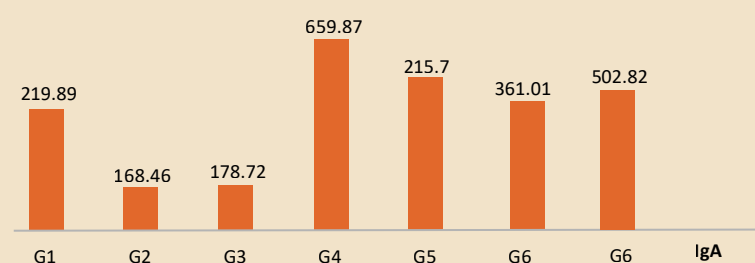
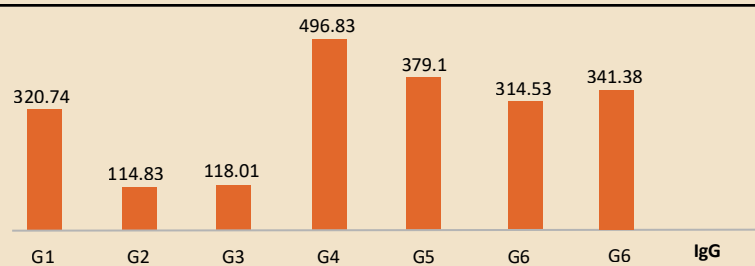
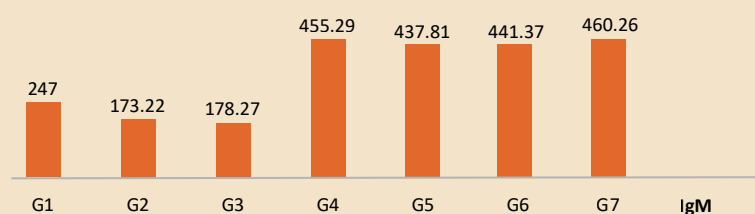
Immunosuppression, whether due to agents like cyclophosphamide (CPH) or disease-related factors, weakens the body's ability to generate pro-inflammatory cytokines and antibodies. Cytokines such as TNF- α , IFN- γ , and IL-1 β are vital for immune responses, while immunoglobulins (IgM, IgG, IgA) play a crucial role in humoral immunity.

IMMBO, a modified and standardized form of the classical Ayurvedic formulation Punaravadi Mandoor, has been evaluated for its immunomodulatory potential. This study examines the effects of IMMBO on pro-inflammatory cytokines and antibody levels in a CPH-induced immunosuppression model, comparing its efficacy with Levamisole, a well-known immunostimulant.

Materials and Methods

Experimental Design	Assessments
<ul style="list-style-type: none"> Animal Model: Healthy Wistar albino rats (6–8 weeks old) Immunosuppression induced using CPH (100 mg/kg, Day 0), followed by Sheep Red Blood Cell (SRBC) challenge Experimental Groups: <ul style="list-style-type: none"> G1: Normal saline G2: CPH Alone (cyclophosphamide only) G3: CPH + Levamisole 50 mg G4–G7: CPH + IMMBO (different dose groups: 100, 200, 400, 800 mg) 	<ul style="list-style-type: none"> Antibody Levels (IgM, IgG, IgA) measured using ELISA Pro-inflammatory Cytokines (TNF-α, IFN-γ, IL-1β, NF-κB, IL-6, IL-10, CRP) quantified using ELISA Statistical Analysis: <ul style="list-style-type: none"> One-way ANOVA with Dunnett's test; $p \leq 0.05$ considered significant Data presented as Mean \pm SD

Fig: Effect of IMMBO on IgM, IgG, and IgA levels in sera in response to SRBC in Cyclophosphamide-induced Wister rat



Acknowledgement

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Result

-Effect on Antibody Levels

Cyclophosphamide (G2) caused a marked decline in IgM, IgG, and IgA levels. Levamisole (G4) restored antibody levels, exceeding those of the untreated control. IMMBO showed a dose-dependent effect:

- 200 mg/kg Moderate increase in IgM & IgG, minimal recovery of IgA -400 mg/kg > Significant IgM & IgG improvement, IgA response remained suboptimal
- 800 mg/kg > Restored IgM & significantly elevated IgG & IgA, comparable to Levamisole

Conclusion: IMMBO counteracts CPH-induced immunosuppression by enhancing humoral immunity.

-Effect on Pro-Inflammatory Cytokines

CPH significantly reduced TNF- α , IFN- γ , and IL-1 β levels in spleen tissue:

- TNF- α 2.6-fold
- IFN- γ + 3.4-fold
- IL-1 β 2.1-fold

IMMBO reversed these effects effectively at all doses, normalizing NF- κ B expression and reducing IL-6, IL-10, and CRP, mimicking the effects of Levamisole.

Conclusion: IMMBO restores immune balance by modulating key cytokines.

Discussion & Conclusion

IMMBO, derived from classical Ayurvedic principles, demonstrates significant immunomodulatory effects, making it a promising candidate for post-chemotherapy immune recovery and immune-compromised conditions.

- Enhances Humoral Immunity > Boosts IgM, IgG, and IgA production
- Restores Cytokine Balance > Normalizes TNF- α , IFN- γ , IL-1 β , and NF- κ B
- Comparable to Levamisole > Suggests strong therapeutic potential

Future studies should explore its precise molecular mechanisms and potential clinical applications.

References

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