

## PSP-04

### Herbal-Infused Sodium Alginate Nasal Strips with Customized Formulations

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Herbal-infused sodium alginate-based nasal strips can be introduced as a natural and sustainable alternative for relieving sinusitis and allergic rhinitis, conditions that are increasingly prevalent and often managed with synthetic decongestants associated with side effects and dependency. Sodium alginate, a biodegradable and biocompatible polysaccharide derived from brown seaweed, can be employed as the base matrix owing to its film-forming ability, flexibility, and compatibility with herbal actives. To enhance functionality, glycerol is added as a plasticizer and optional reinforcement with polyvinyl alcohol was explored. Herbal essential oils such as eucalyptus, peppermint, camphor, tulasi, turmeric, lavender, and ajwain were incorporated, contributing not only therapeutic aromatic effects but also antimicrobial properties that help maintain skin health during application. Upon placement on the bridge of the nose, the strips will provide dual benefits: mechanical dilation of the nostrils to enhance airflow and controlled release of volatile herbal compounds activated by body heat, which help alleviate congestion, reduce inflammation, and promote respiratory comfort. Customizable formulations were designed to meet specific needs, such as eucalyptus–camphor–tulasi for sinus relief, lavender–tulasi for relaxation, and peppermint–ginger–lemon for revitalization. The biodegradable nature of sodium alginate further positions the strips as an environmentally responsible alternative to synthetic nasal dilators. This innovation bridges traditional herbal medicine and modern biomaterial technology, offering a versatile, eco-friendly, and consumer-friendly platform for respiratory wellness with potential applications in both healthcare and lifestyle markets.

**Keywords:** Sodium alginate nasal strips, Herbal essential oils, Antimicrobial properties, Sinusitis relief, Sustainable biomaterials

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