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Innovative Hydrogel Therapy using Chicken Feather Keratin and *Glycyrrhiza glabra* Extract for Treating Ichthyosis Vulgaris

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Ichthyosis vulgaris is a common hereditary skin disorder affecting 1 in 250 individuals, caused by filaggrin gene mutations that weaken the skin barrier and lead to dryness and scaling. Current treatments only provide temporary relief. This study introduces a sustainable hydrogel prepared from chicken feather keratin and *Glycyrrhiza glabra* root extract as a novel therapy. Poultry feathers, an abundant waste resource, are rich in keratin, a structural protein with skin regenerative potential. The keratin was extracted, purified, and characterized for biomedical use. *Glycyrrhiza glabra* contains glycyrrhizin, flavonoids, and glabridin, offering anti-inflammatory, antioxidant, and hydrating effects. Together, these components form a biopolymer hydrogel that was tested for swelling behaviour, sol–gel transition, antibacterial activity, and cell viability. The hydrogel supported fibroblast growth, improved hydration, and reduced microbial growth, indicating its potential as an effective topical therapy. This work not only addresses a critical skin disorder but also converts poultry waste into a valuable biomedical material.

Keywords: *Glycyrrhiza glabra*, Hydrogel, Ichthyosis vulgaris, Keratin