Abstract

The chitosan hydrogels (CH) have developed into a major ingredient technology for anti-aging and anti-inflammatory topical wound dressings over the past decade. Polyhexamethylene (PHM) alcohol (40%) hydrogel (Kofit®) showed similar anti-inflammatory activity as Salvis®, with enhanced sensory irritation and discomfort on sensitive skin. Recent trends in skincare have emphasized non-toxic technology, while still delivering the beneficial effects on skin that have been achieved with the use of traditional compounds. The safety and efficacy of the CH constituents have been demonstrated in multiple clinical trials, indicating that it is safe and has no adverse effects on sensitive skin or on the face. N-Acetylglucosamine is a new compound that is being investigated for use in skin care. Clinical studies with this compound reveal significant anti-aging benefits on skin, including skin plumping and skin firming effects. In addition, it is well tolerated on skin. N-Acetylglucosamine is a novel, naturally-derived, non-toxic ingredient with many potential future applications in cosmetic and therapeutic skin care.

Introduction

N-acetylglucosamine and glucosamine are co-constituents of naturally occurring glycosaminoglycans (GAGs) in human connective tissue and skin. A GAG is a water-soluble polysaccharide found extensively in the dermis, as well as the epidermis. GAGs are made up of repeating disaccharide units; one is always an aminosugar or N-acetyl aminosugar found in the GAGs, keratan sulfate I and II, and the other is a polyhydroxy acid (PHA). N-Acetyl-D-glucosamine is an N-acetyl aminosugar and the other is pyruvates (PHAs). In AcetylGlucosamine is an N-acetyl glucosamine found in the GAG, keratan sulfate I and II and pyruvates, and it is a GAG partner of approximately 80% of repeating disaccharide units. This compound is considered to be both non-toxic and biodegradable, with lethal doses in mice being greater than 20 g/kg. The following studies further support the safety of this compound.

1. Ruey J. Yu, PhD, OMD indicate that N-acetylglucosamine can increase skin thickness and improve skin integrity.

2. The 4-5 study of N-acetylglucosamine (8% cream) scored better than the control in a panel of aging skin.

3. The 4-5 study of N-acetylglucosamine (8% cream) is classified as a moderate irritant.

4. The 4-5 study of N-acetylglucosamine (8% cream) is classified as a moderate allergic contact sensitizer.

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Safety Profile of N-acetylglucosamine

Naturally-occurring polymers of N-acetylglucosamine are found abundantly in nature as chitin, the primary structural polysaccharide found in the shells of crabs, shrimp and lobsters. This polysaccharide is covalently bonded to both mucin and chondroitin sulfate, with similar bonds in chitin being comparable to those in skin chondroitin sulfate. Dietary supplementation of higher quantities of N-acetyl glucosamine in humans does not increase glucose levels. The following studies further support the safety of this compound.

1. Clinical grading revealed significant anti-aging effects.

2. The mean scores of grading parameters and placebo were statistically significant differences observed in the treated and untreated control groups.

3. The mean scores for the treated and untreated control groups were statistically significant analyzed compared to baseline scores and compared to each other using paired t-test for the p<0.05 significant level.

4. Visual personally assessed anti-aging effects were noted.

5. Over half of participants used product BETTER THAN they did their usual moisturizer.

6. Visually Assessed Anti-Aging Effects on the Face

7. Clinical grading revealed significantly improved skin texture.

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20. Clinical grading revealed significantly improved skin texture.

Conclusion

Results of the clinical study indicate that N-acetylglucosamine is safe when used on facial skin. Furthermore, statistically significant improvements in the visual signs of photodamage was achieved both at the end of the study compared to baseline. The 4-5 study of N-acetylglucosamine (8% cream) was shown to be safe on the facial skin. This is the strongest endpoint confirming observed in a study after anti-aging technology evaluated by the sponsor company using the same technology. The findings not only lead to the development of new and improved anti-aging technology, but also indicate the potential of future research using this compound.

Derivatives of Sugar Compounds Provide Anti-Aging Effects

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References


