The significance of storage modulus to hyaluronic acid

Is bulk elastic modulus relevant in ha filler rheology?
The shear elastic modulus (G) is the ratio of shear stress (?) over the shear strain (?) and it reflects the elastic strength of a solid material. As G is higher,the material is stronger and less deformable. Finally,the bulk elastic modulus (K) is not relevantin HA filler rheology.

What are the rheological parameters of cmc4 hyaluronic acid?
In this context, a proposed gel, comprised of 4% carboxymethylcellulose (CMC4), 20 mg/ml of hyaluronic acid (HA), and 5 mg/ml of keratin (K), denoted as (CMC4+HA+K5), demonstrates outstanding rheological parameters: a storage modulus (G') of 463 Pa, a loss modulus (G'') of 290 Pa, and a complex viscosity of 117 Paos.

What are the structural properties of hyaluronic acid?
Structural Properties Hyaluronic acid is a linear heteropolysaccharide(glucosaminoglycan,mucopolysaccharide) with high molecular weight formed by regularly repeating residues of N-acetyl-D-glucosamine and D-glucuronic acid [1,29].

Why is the shear stress elastic modulus important?
In this regard,the shear stress elastic modulus (G') plays a pivotal role as rheological factor,signifying the gel's firmness under dynamic conditions. That factor is crucial considerations in the filler's life cycle,emphasizing its ability to effectively and naturally adapt to the dynamic nature of facial expressions .

Which hyaluronic acid solution should be used based on high molecular weight?
For this reason,it is preferable to use highly viscous hyaluronic acid solutionsbased on high molecular weight hyaluronic acid at concentrations equal to 10 mg/mL instead of solutions with low molecular weight,HA,and at higher concentrations . 2.8. Hydraulic Conductivity and Fluid Absorption Rate

Does hyaluronic acid have a higher cohesive level?
However, the zero shear viscosity is intrinsically unable to characterize the cohesive properties in the hyaluronic acid solution . Summarizing the above, it is obvious that hyaluronic acid with high molecular weight has a higher cohesive level than hyaluronic acid with low molecular weight.

The viscoelastic characteristics in HA fillers are described using five main rheological parameters: the elastic/storage modulus (G?), the viscous/loss modulus (G?), the complex modulus (G*), tangent delta (tan ? = G?/G?), ...

Hyaluronic acid (HA) is a non-sulphated glycosaminoglycan (GAG) and is found in extracellular tissue in many parts of the body. HA is a material of increasing significance to ...

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Introduction Hyaluronic acid (HA) is a naturally occurring polysaccharide frequently used as a functional ingredient in many topical and subcutaneous anti-ageing treatments such as dermal fillers, which exploit ...

Abstract Storage and loss moduli of hyaluronic acid solutions with different molecular weights were observed as a function of frequency in the presence of sugars and salts. The hyaluronic ...

ABSTRACT: Hyaluronic acid fillers are one of the most frequently used in cosmetic procedures. They are popular because of their ability to restore volume to the face, which surgery isn"t ...

The loss tangent, tan(?), is the ratio of the to the storage modulus (G?), providing insight into loss modulus (G??) to the storage modulus (G?), providing insight into the material"s ...

Using various tests, rheological properties of the hydrogels such as gelation time, storage and loss modulus, and self-healing behavior can be established, all of which contribute towards evaluating the given hydrogel ...

2. HYALURONIC ACID - INTRODUCTION Hyaluronic acid (also known as hyaluronan) was first isolated in 1934 from bovine vitreous humor by Karl Meyer and John ...

Background Combining calcium hydroxylapatite-carboxymethylcellulose (CaHA-CMC) with hyaluronic acid (HA) products using Cohesive Polydensified Matrix (CPM) ...

Elastic modulus (also known as storage modulus), or G?, measures the elastic properties of the gel, specifically the ability of the gel to regain its original shape after deforma- neral handling of ...

These studies resulted in reporting different values for mechanical properties of hydrogels. 14, 15 As an example, Xu et al. 16 reported a storage modulus of about 1 kPa for photocrosslinkable ...

The goal of this study was to identify hyaluronic acid (HA) hydrogels with peptide and stiffness combinations that will direct muscle-derived cells towards regenerating ...

A rheometer (TA Instruments, DHR-1, America) was used to measure the energy storage modulus (G ") of the sodium hyaluronate gel for injection in the sample group, namely ...

Download scientific diagram | Dynamic moduli (G 0 : storage modulus and G": loss modulus) plotted as a function of the frequency of (A) 1.0% HA eye drop, (B) HA hydrogel precursor ...

1. Preserve Hyaluronic Acid Products at Ideal Temperatures Hyaluronic acid products can be affected by temperature changes, which can lead to degradation or denaturation of the molecule. It is essential to ...

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We have obtained the dependences of storage elastic modulus and loss modulus on the load exposure frequency at constant stress. The obtained values of the complex shear ...

Characterization of hyaluronic acid-peptide hydrogel. (A) Formation of hyaluronic acid-peptide hydrogel. (B) Frequency scanning was used to study the rheological properties (G" is the modulus of ...

Elastic or storage modulus (G?) assesses the gel"s ability to store energy and return to its original shape, reflecting its elastic characteristics. Higher G? values indicate a more elastic, firmer material.

Hyaluronic acid (HA) as well as HA-based materials are widely applied in regenerative medicine due to their good biocompatibility, bioactivity and amenability to ...

Hyaluronic acid (HA) is the most widely used dermal filler to treat facial volume deficits and winkles specially for facial rejuvenation. Depending on various areas of the face, filler is exposed ...

In this work the elastic modulus of hyaluronic acid gels swollen to equilibrium in water and crosslinked using a zero length crosslinker is presented. The modulus is obtained ...

As a polymer in solution, hyaluronic acid shows non-Newtonian viscosity behaviour. Non-Newtonian liquids exhibit viscosity dependence upon the applied shear conditions, the most common type of non-Newtonian ...

In this context, a proposed gel, comprised of 4% carboxymethylcellulose (CMC4), 20 mg/ml of hyaluronic acid (HA), and 5 mg/ml of keratin (K), denoted as (CMC4+HA+K5), ...

Eleven commercially available hyaluronic acid gels are evaluated using this method, alongside uniaxial tension and drop weight methods to establish correlations between ...

Based on storage modulus, loss modulus, and complex viscosity results, CMC4-HA-K5 (4% CMC + AH (20 mg/ml) + K (5 mg/ml)) emerged as the optimal gel for use as a ...

Introduction Hyaluronic acid (HA) is widely used for facial rejuvenation and soft tissue volumization, with lip augmentation being one of its primary applications. The rheological ...

The storage modulus, measured at 1 Hz frequency in the linear viscoelastic range (<5%), varied in a controllable way between 1.5 and 4 kPa depending on the collagen ...

In this regard, the dynamic parameters G" (elastic modulus in shear stress) and E" (elastic modulus in compression), representative of the gel firmness in dynamic conditions, ...

Here, we developed a pentenoate-functionalized hyaluronic acid hydrogel (PHA) into a printable bioink and

used three recommended, quantitative rheological assessments to ...