



MOISTURE MAGNET AS HUMECTANT ON TOPICAL REGION: POLYGUTAMIC ACID & HYALURONIC ACID; BOTH ARE ACIDIC IN NATURE WHICH GIVES BODY PROTECTION SIGNATURE

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ABSTRACT

A humectant is a water-attracting (hygroscopic) substance used to draw and retain moisture in the skin, hair, or products. Hyaluronic Acid: A powerful molecule that holds large amounts of water to intensely plump and hydrate skin. Popular options include the Minimalist 2% Hyaluronic Acid + PGA Serum or Pilgrim 2% Hyaluronic Acid Hydration Super Serum.

- Glycerin: A classic, plant-derived hydrator suited for sensitive or dry skin, such as WishCare Pure Glycerine.
- Alpha Hydroxy Acids (AHAs): Acids like glycolic or lactic acid that hydrate while gently exfoliating dead skin cells.
- Natural Extracts: Aloe vera and honey.
- Others: Urea, propylene glycol, and sorbitol

How Humectants Work:

- Moisture Draw: They pull water vapour from the surrounding air (if the humidity is high enough) or from the deeper layers of your skin.
- Hydration: They bind water to the outer layer of skin (stratum corneum) or hair strands to plump and smooth the surface.
- The Need for Sealants: In very dry air, humectants can pull moisture out of deeper skin instead of the air. They work best when followed by an emollient to smooth and an occlusive (like a cream or oil) to lock the moisture in.

KEYWORDS: Skin, hyaluronic acid, polyglutamic acid, stratum corneum, epidermis, dermis, humectant, polymer, peptide.

Overview: Polyglutamic acid is a powerful, water-soluble peptide and humectant that draws moisture into the skin and holds up to 5,000 times its weight in water.

Polyglutamic acid and hyaluronic acid are both powerful hydrating humectants, but they work at different depths and can be used together for optimal results.

What It Does

- **Deep Hydration:** Acts as a super-humectant, pulling atmospheric moisture into the outer layers of the skin.
- **Locks in Moisture:** Forms a breathable, flexible film on the skin's surface to prevent water loss.
- **Protects Hyaluronic Acid:** Inhibits hyaluronidase, the enzyme that breaks down the skin's natural hyaluronic acid.
- **Smooths Fine Lines:** Plumps the skin to reduce the visual appearance of wrinkles and aging.

Key Differences

- **Hyaluronic Acid (HA):** [pH: 5.0 and 6.5; pKa: 3.0-4.0]. A sugar-based polymer (glycosaminoglycan) naturally found in the body. It pulls moisture into the deeper layers of the skin to plump from within. It holds up to 1,000 times its weight in water.^[1-4]

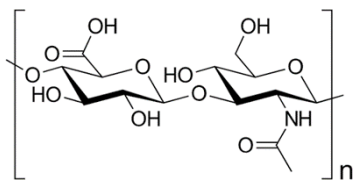


Figure 1: Hyaluronic acid.

• **Polyglutamic Acid (PGA):** [pH: 4.5 to 8.0; pKa: 4.3]. A large peptide made of repeating amino acid units produced via fermentation. It forms a breathable, protective film on the skin's surface to lock in moisture and prevent water loss. It can hold up to 4,000 to 5,000 times its weight in water.

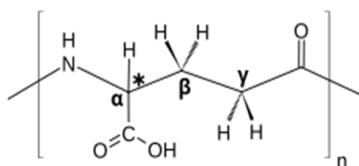


Figure-2: Polyglutamic acid.

• **Synergy:** PGA also inhibits the enzymes that break down natural hyaluronic acid in the skin, making them an ideal pair rather than competitors. Mixed opinions exist on Reddit regarding whether PGA dramatically outperforms HA for everyone, as individual skin responses vary.^[5-8]

Skincare Uses

- Found in facial serums, creams, and gels.
- Used in concentrations typically ranging from 0.3% to 3%.
- Layered under heavier moisturizers or occlusive creams to seal in hydration.
- Safe to use alongside active ingredients like Vitamin C and retinol.

Side Effects & Safety

- Generally well-tolerated by all skin types.
- Allergic reactions are rare, but can include redness, itching, or burning.
- A patch test is recommended before full application

if you have sensitive skin.

Polyglutamic acid is a powerful surface hydrator that draws moisture into the skin and locks it in place to keep the complexion plump and smooth. It is a polymer of the amino acid glutamic acid (GA). Depending on where the individual monomers connect, PGA can be gamma PGA (poly- γ -glutamic acid, γ -PGA), the form where the peptide bonds are between the amino group of GA and the carboxyl group at the end of the GA side chain, or alpha PGA, and the form where the alpha-carboxyl is used to form the peptide bond.^[9-12]

IUPAC: Poly[imino[1-carboxy-4-oxo-1,4-butanediyl]];
CAS: 25736-27-0

Hyaluronic acid is a clear, sugar-like substance naturally made by your body that acts like a sponge to lock in moisture for your skin, eyes, and joints.

IUPAC: (1 $\rightarrow$ 4)-(2-Acetamido-2-deoxy-D-gluco)-(1 $\rightarrow$ 3)-D-glucuronoglycan; CAS: 9004-61-9

How It Works

- **Moisture Magnet:** It is a humectant, which means it pulls water from the air and deeper layers of your skin to the surface.
- **Different Sizes:** Small molecules go deep into the skin to hydrate, while larger ones stay on top to protect your skin barrier.
- **Body Cushion:** In your joints and eyes, it acts as a fluid lubricant and shock absorber.

Main Benefits

- **Deep Hydration:** Keeps skin plump, soft, and bouncy.
- **Reduces Fine Lines:** Fills in dry areas so wrinkles look less noticeable.
- **Soothes Joints:** Eases stiffness and pain in people with osteoarthritis.
- **Safe for All:** Works well on oily, dry, and sensitive skin types without clogging pores.



Figure 3: Body hydration.

Key Benefits

Super-charged hydration: Acts as a humectant (an ingredient that pulls water in) and can hold up to four times more moisture than hyaluronic acid.

Locks in moisture: Forms a breathable, lightweight film on the skin's surface to stop water from evaporating.

Smooths fine lines: Plumps the outer layers of the skin, which temporarily reduces the look of wrinkles and fine lines.

Supports natural factors: Helps boost the skin's natural moisturizing factors and preserves its own stores of hyaluronic acid by slowing down its breakdown.^[13-16]

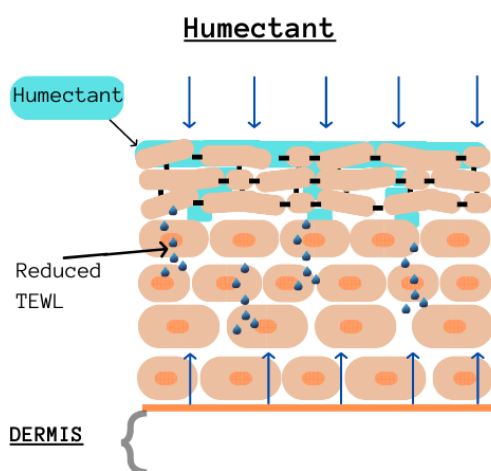


Figure 4: Skin layer anatomy.

Humectants are water-loving (hygroscopic) ingredients that function primarily within the outermost layer of the skin anatomy, known as the *stratum corneum*. They act like magnets, chemically drawing water molecules up from the moisture-rich dermis or pulling it from the outside air when environmental humidity is high (above 70%) to hydrate skin tissue directly. Human skin is organized into three primary layers, but humectants are

engineered to influence the structural dynamics of the top layer.

1. The Epidermis & Stratum Corneum (The Target)

The epidermis lacks its own blood vessels and relies on moisture from below. Its top layer, the stratum corneum, uses a "bricks and mortar" design:

- The Bricks: Corneocytes (flat, dead skin cells).
- The Mortar: Intercellular lipids (ceramides, cholesterol, and fatty acids).

Naturally, your skin produces its own humectants inside these cells, called Natural Moisturizing Factors (NMF). When you apply topical humectants (like glycerin or hyaluronic acid), they integrate into this layer, swelling the "bricks" with water to flatten, plump, and smooth out the skin surface.

2. The Dermis (The Water Reservoir)

The dermis houses a deep network of blood capillaries and structural proteins. It is naturally rich in its own endogenous humectant, hyaluronic acid, which keeps the skin's structural scaffold elastic. When external humidity is low, topical humectants pull water upward from this dermal reservoir to replenish the surface.

3. Cellular Shedding (Desquamation)

In healthy skin anatomy, old cells shed continuously. The enzymes responsible for breaking down the cellular bonds to let dead skin drop off smoothly require a highly hydrated environment. By binding water to the stratum corneum, humectants ensure these enzymes can work properly, preventing the buildup of rough, flaky skin.

The Synergy: Humectants, Emollients, and Occlusive

Humectants excel at gathering water, but they cannot keep it there on their own. If the air is very dry, water drawn up by a humectant will simply evaporate into the atmosphere—a process called Transepidermal Water Loss (TEWL). To build a perfect skincare routine, humectants must be paired with other structural agents:

Table 1: Function of humectant.

Ingredient Type	Role in Skin Anatomy	Common Examples
Humectants	Attracts water into the dead cell layers to plump and hydrate	Hyaluronic Acid, Polyglutamic acid, Glycerin, Urea, Panthenol
Emollients	Fills in the microscopic gaps between skin cells to soften and smooth the surface texture	Ceramides, Squalane, Jojoba Oil
Occlusives	Coats the skin surface with a hydrophobic barrier to lock moisture in and stop TEWL [trans epidermal water loss]	Petrolatum, Dimethicone, Beeswax

How to Use It

Layering: Works best in serums or moisturizers applied after cleansing and toning.

Pairing: Combines safely and effectively with other

favourites like hyaluronic acid, polyglutamic acid, vitamin C, niacinamide, and retinol.

Skin types: Gentle and generally safe for all skin types, including sensitive skin.

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How Humectants Work

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Hyaluronic acid in a moisturizing cream typically ranges from 0.5% to 2%, while polyglutamic acid is usually used at lower concentrations between 0.01% and 0.3% because it is a much larger molecule and holds significantly more moisture.^[17-20]

Typical Percentages in Creams

- **Hyaluronic Acid (HA)**
- Standard level: 1% to 2% in high-strength formulas or serums.
- Creams: Often closer to 0.5% to 1% when combined with other emollients and butters.
- Function: A humectant (water-attracting molecule) that draws moisture into the skin layers.
- **Polyglutamic Acid (PGA)**
- Standard level: 0.01% to 0.3% in finished creams.
- Function: Forms a protective seal on the skin surface to lock in the hydration provided by hyaluronic acid.
- Deep Hydration: Hyaluronic acid pulls water deep into the skin's outer layers.
- Moisture Lock: Polyglutamic acid holds up to 4 times more moisture than hyaluronic acid and stops water from evaporating.
- Combined Synergy: Using both ingredients creates a multi-level moisture effect that plumps fine lines and supports your skin barrier.

CONCLUSION

A humectant moisturizer pulls water into the outer layer of your skin like a sponge, using ingredients such as hyaluronic acid or glycerin or polyglutamic acid to boost hydration.

How Humectants Work

- Attracts moisture: Pulls water from the air and deeper layers of the skin to the surface.
- Common ingredients: Includes hyaluronic acid, glycerin, urea, and alpha-hydroxy acids (AHAs).
- Needs sealing: Can pull moisture out of the skin in dry environments if not locked in by an emollient or occlusive (like ceramides or heavy creams).

Hyaluronic acid and polyglutamic acid are both hydrating humectants that work at different depths of the skin to maximize moisture retention.

How They Work Together

- Hyaluronic Acid (HA): Features smaller molecules that penetrate into the deeper layers of the skin to draw and bind water.
 - Polyglutamic Acid (PGA): Features larger molecules that sit on the skin's surface, forming a breathable film that prevents moisture from evaporating.
 - Combined Benefit: Using both creates a multi-level hydration system—HA pulls water in, while PGA locks it at the surface.
1. Cleanse: Wash your face with a gentle cleanser.
 2. Hyaluronic Acid: Apply to slightly damp skin so it has immediate water to draw into the deeper layers.
 3. Polyglutamic Acid: Layer the thicker PGA serum or booster right on top of the HA layer.
 4. Moisturizer: Finish with a standard cream or lotion to seal everything in place.

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