



GLYBase™

SODIUM GLYCOLATE

THE BETTER BASE

The Science of a Beautiful Base

From Drift to Precision: Replacing
NaOH for Reliable Buffering in
Personal Care Formulations



CROSSCHEM
PURE CHEMISTRY



The Effects of pH on Acid Behavior

Sodium hydroxide (NaOH), also known as caustic soda, is a commonly used strong base with a variety of applications, including pH regulation in skin and hair care formulations [4, 6]. At room temperature, NaOH is a crystalline odorless solid that absorbs moisture from the air [1]. However, as evidenced by its common name, NaOH is a caustic material, meaning it “burns or destroys organic

tissue by chemical action” [2]. NaOH is extremely corrosive, and because it is hygroscopic, it can cause severe eye, skin, digestive, and respiratory tract burns if it comes into contact with the human body or becomes airborne [3]. This inherent causticity presents a significant irritation risk for consumer products.



The Problem

Beyond safety concerns, the chemical properties of NaOH make it highly susceptible to pH drift, a phenomenon where the pH value moves away from the true, expected pH value of a solution [5].

Because NaOH completely breaks apart into sodium (Na^+) and hydroxide (OH^-) ions in aqueous solutions [4], its hygroscopic nature draws in atmospheric moisture, setting up a reaction with carbon dioxide (CO_2). Carbon dioxide and water react to make carbonic acid, which then reacts with hydroxide ions to form sodium bicarbonate and water [7].

As these hydroxide ions are continually consumed, the pH of the NaOH solution gradually decreases [6].

This continuous sequence alters the chemical composition and causes the formulation to drift away from its desired characteristics [8, 9], leading to unstable shelf life and increasing the risk of skin and scalp irritation for consumers.

GLYBase™ is a high purity sodium glycolate derived from the GlyAcid® platform.

GLYBase™ SPECIFICATIONS

PROPERTY	LIMITS
Purity %	99 Min.
Moisture %	0.05 Max.
Appearance: White, free-flowing crystalline powder.	

GLYBase™ PHYSICAL PROPERTIES

PROPERTY	VALUE
Formula	$C_2H_3NaO_3$
Molecular Weight	98.03
Melting Point	201 – 218

Package: 25 Kg Drum

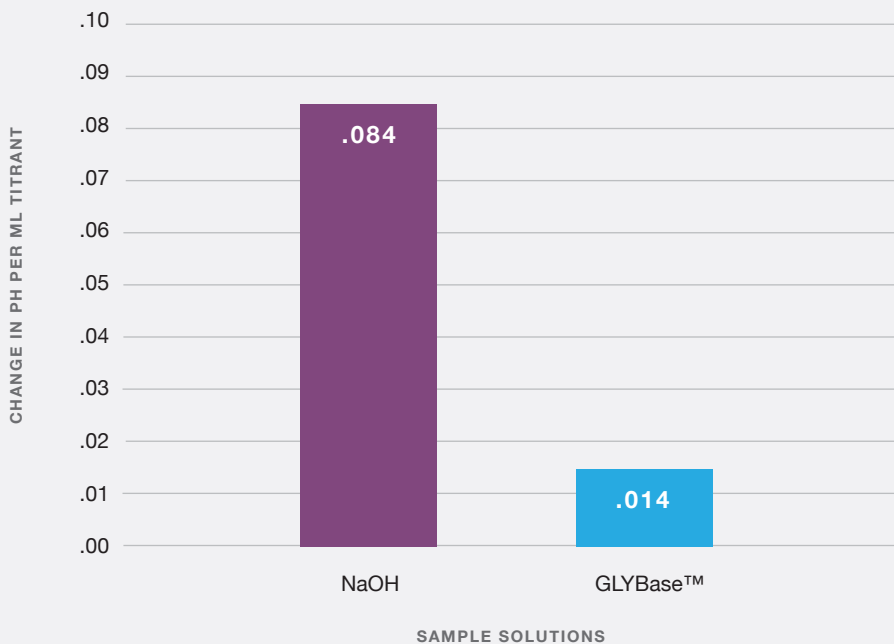


The Solution

CrossChem introduces **GLYBase™** (sodium glycolate), a next-generation buffering active designed to overcome the volatility and safety limitations of strong bases. By providing predictable, controlled buffering with reduced irritation risk, **GLYBase™** allows formulators to achieve stable, caustic-free systems across global markets.

The product is INCI-registered, regulatory-friendly, and offers a much gentler neutralization profile compared to the extreme causticity of sodium hydroxide. **GLYBase™** is highly versatile and can easily replace NaOH on a 1:1 molar equivalent basis in formulations requiring the neutralization of glycolic acid, lactic acid, or similar ingredients.

Figure 1 Change in pH per mL of Titrant



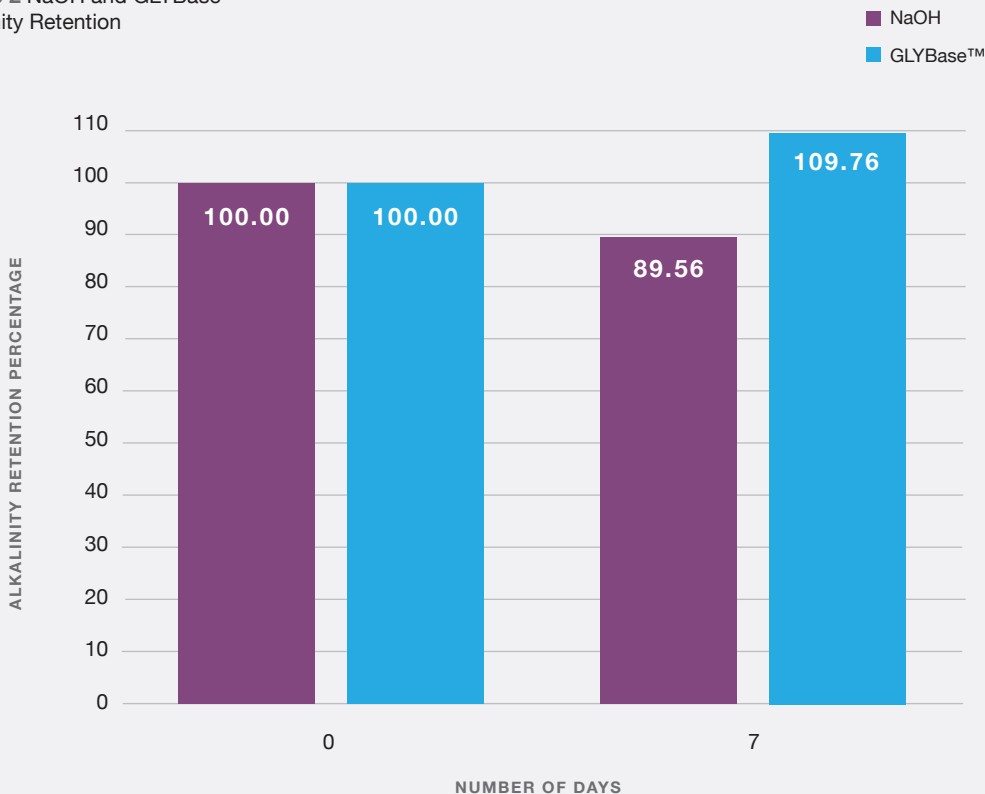
CrossChem in-house data

Precision Validation

A defining advantage of **GLYBase™** is its highly controllable buffering profile, which minimizes dangerous formulation overshoot. NaOH possesses a steep titration curve where near the point of neutralization, the addition of just 1 μ l of titrant can rapidly shift the pH by nearly an entire unit. In internal CrossChem testing, sample solutions buffered using sodium hydroxide demonstrated a rapid rate of change with a slope of 0.084 [10].

In stark contrast, solutions buffered using only **GLYBase™** exhibited a significantly gentler slope of 0.014 [10] **FIGURE 1**. Because the rate of pH change is nearly eight times greater in NaOH-buffered solutions [10], **GLYBase™** provides formulators with much finer, predictable control.

Figure 2 NaOH and GLYBase™ Alkalinity Retention



CrossChem in-house data

Stability Validation

GLYBase™ also exhibits enhanced resistance to the atmospheric reactions that cause CO₂-derived pH drift. In experimental testing, the pH retention of both NaOH and **GLYBase™** samples was tracked over time during exposure to atmospheric carbon dioxide. The NaOH samples exposed to CO₂ showed a rapid destabilization, drifting from 100% retention of their starting pH to under 90% in just one week [10].

Conversely, the open **GLYBase™** samples showed absolutely no shift in pH over the exact same timeframe [10] **FIGURE 2**. This data conclusively demonstrates that **GLYBase™** is highly resistant to pH distortion and is the ideal candidate for ensuring long-term formulation stability.



References

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[8] Carbon dioxide capture capacity of sodium hydroxide aqueous solution. J. Environ. Manag.

[9] Sodium Hydroxide-Based CO₂ Direct Air Capture. Ind. Eng. Chem. Res.

[10] pH Drift and Precision Formulation Internal Testing. CrossChem.



CROSSCHEM LIMITED | 100 WESTWOOD PLACE STE 430 | BRENTWOOD TN 37027 USA | +1 615 716 3510

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