



Azelaic Acid

is a naturally occurring dicarboxylic acid found in grains like wheat, barley, and rye. It is widely used in dermatology and cosmetics for its multifunctional benefits, particularly in treating acne, rosacea, and hyperpigmentation. Azelaic acid is known for its anti-inflammatory, antimicrobial, and skin-brightening properties.

Chemical Properties of Azelaic Acid:

1. **Chemical Structure:**

- **Molecular Formula:** C₉H₁₆O₄
- **Molecular Weight:** 188.22 g/mol
- **Structure:** Azelaic acid is a saturated, straight-chain dicarboxylic acid with the chemical structure HOOC-(CH₂)₇-COOH. It has two carboxylic acid groups (-COOH) at either end of the nine-carbon chain, which contribute to its acidic nature and reactivity.

2. **Physical Appearance:**

- **Form:** Azelaic acid is typically a white, odorless, crystalline powder.
- **Solubility:** It is sparingly soluble in water but more soluble in alcohol and organic solvents, making it suitable for a variety of formulations, including creams, gels, and serums.

3. **Stability:**

- **pH Stability:** Azelaic acid is stable in formulations with a pH range of about 4 to 5. This slightly acidic environment is optimal for maintaining its effectiveness.
- **Temperature Stability:** It is stable under normal storage conditions but should be kept away from excessive heat and light to prevent degradation.

4. **Mechanism of Action:**

- **Antimicrobial:** Azelaic acid inhibits the growth of bacteria like *Propionibacterium acnes* (associated with acne) and *Staphylococcus epidermidis*, helping to reduce acne-related inflammation and breakouts.