



High-Purity Alkaloid Salts for Solid-Dose Tablets

An objective, technical briefing on the physical properties, thermodynamic profiles, and mechanical compactibility of Mitragynine Fumarate and Mitragynine Acetate for pharmaceutical-style direct compression tableting.

THE SCIENCE OF SALT SELECTION IN TABLETING

In the pharmaceutical industry, converting a basic alkaloid molecule into a crystalline salt form is a standard, highly regulated optimization step. When a basic drug is paired with a specific organic counter-ion (such as fumarate or acetate), the resulting salt modifies the physical properties of the active ingredient—enhancing water solubility, accelerating dissolution, and improving mechanical stability during high-speed compression without altering the primary biological mechanism of the alkaloid.

THERMODYNAMIC & MECHANICAL PROFILES

1. Mitragynine Fumarate

Crystalline Standard (Anhydrous)

A highly crystalline dicarboxylic salt form. Widely used in modern pharmaceuticals (e.g., fumarates of tenofovir, quetiapine, or ketotifen) due to its superior solid-state stability.

- ✓ **Extremely Low Hygroscopicity:** Resists moisture absorption under ambient humidity, reducing the risk of tablet swelling or cracking.
- ✓ **Thermal Stability:** High melting point ensures a robust, stable crystalline lattice suited for heat-generating high-speed tablet runs.
- ✓ **Punch Face Release:** Low surface adhesion prevents common press defects like "capping" or "sticking" to punch tips.

2. Mitragynine Acetate

Bioavailability Accelerator

A high-solubility monocarboxylic salt form. Draws direct parallels to pharmaceutical-grade acetates (e.g., peptide acetates or abiraterone acetate) designed for rapid release profiles.

- ✓ **Rapid Disintegration:** Highly polar lattice allows rapid disintegration and hydration inside gastric fluids.
- ✓ **Excellent Compactibility:** Exhibits strong plastic deformation characteristics, forming tough tablets at lower compaction pressures.
- ✓ **Processing Parameters:** Slightly higher moisture sensitivity requires controlled relative humidity (RH < 40%) during staging and blending.

COMPARATIVE TECHNICAL SPECIFICATIONS

PROPERTY	MITRAGYNE FUMARATE	MITRAGYNE ACETATE
Counter-Ion Class	Dicarboxylic Acid (Fumaric Acid, GRAS-listed)	Monocarboxylic Acid (Acetic Acid, USP/NF)
Physical Form	Anhydrous crystalline powder, off-white to beige	Semi-crystalline powder, off-white
Dissolution Kinetics	Steady, sustained release; highly predictable curve	Rapid, immediate release; high initial concentration
Hygroscopicity	Negligible (Stable up to 75% relative humidity)	Moderate (Best handled in RH-controlled environments)
Tablet Compatibility	Outstanding flow; ideal for Direct Compression (DC)	High compressibility; requires anti-tack glidants

Solid-Dose Compression Engineering Guidelines:

Both salt forms are supplied by Chemesis as free-flowing crystalline solids, dry-milled and optimized for direct compression formulations. To ensure optimal machine feed and eject parameters on high-speed rotary tablet presses, our R&D team recommends utilizing **0.5% - 1.0% Sodium Stearyl Fumarate (SSF)** or Magnesium Stearate as an eject lubricant, alongside **0.25% - 0.5% Colloidal Silicon Dioxide (Aerosil)** to maximize powder bed flowability in the press hopper.