PRESCRIPTION MONOGRAPH

Compounded Active Ingredients: Minoxidil/Ketoconazole/Arginine/Spironolactone
Form: Topical Solution

Drug Class:

- Minoxidil: Antihypertensive vasodilator
- Ketoconazole: Imidazole antifungal with anti-inflammatory activity
- Arginine: Amino acid; nitric-oxide precursor
- Spironolactone: Mineralocorticoid receptor antagonist with antiandrogen activity

Mechanism of Action[1,2,3,4]**:**

When compounded together, Minoxidil, Ketoconazole, Arginine, and Spironolactone have the potential to provide a multi-targeted approach aimed at both stimulating regrowth and addressing scalp health. They are intended to work by:

- Stimulate vascular and follicular activity by opening potassium channels in dermal papilla cells, to enhance blood flow and nutrient delivery to follicles, promoting local growth factors.
- Control yeast and fungal overgrowth that can contribute to flaking, itching, and scalp irritation.
- Improve production of nitric oxide, to support blood flow and nutrient delivery to the scalp
- Lower levels of DHT (a hormone linked to hair loss) in the scalp, to help protect hair follicles from shrinking and to slow down shedding.

Indications Commonly Prescribed For:

- Androgenetic alopecia
- Cosmetic hair quality: To improve density, thickness, and retention.

Before Use: Let your healthcare provider know if you have any medication allergies before you take this compounded preparation. Let your healthcare provider know if you have any liver or kidney problems. Let your healthcare provider know of all supplements you are currently taking.

Contraindications:

- Hypersensitivity to any component.
- Scalp irritation or dermatitis where barrier is compromised
- Pregnancy
- Cardiovascular disease
- Renal Impairment

Cautions: Let your healthcare provider know if you experience any adverse side effects. Benefits persist only while on therapy.

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Warnings and Precautions:

- Initial shedding: Temporary increased shedding may occur during the first several weeks of minoxidil treatment as follicles transition.
- Systemic absorption risk: monitor for hypotension, tachycardia, hyperkalemia, and edema. Use with caution for patients at high risk for hyperkalemia, hypotension, or renal impairment.
- Scalp conditions**:** Use with caution with psoriasis, eczema, or other compromised barrier.
- May lower serum DHT; counsel men of reproductive age.
- Treatment discontinuation: Benefits from minoxidil are generally not permanent after therapy is stopped. Newly maintained or regrown hair may gradually be lost over several months as follicles return toward their untreated growth pattern.
- Cardiovascular disease: Use cautiously in patients with hypotension, arrhythmias, heart failure, or significant cardiovascular disease because systemic minoxidil absorption can produce cardiovascular effects.

Adverse Reactions: If you experience any side effects or adverse reactions, including those not listed, please contact your healthcare provider. Seek emergency care if symptoms are severe.

Common:

- Mild skin irritation, redness
- Itching, Dryness
- Initial shedding
- Flaking, scaling
- Unwanted facial hair growth
- Contact dermatitis
- Folliculitis
- Headache, dizziness

Rare:

- Nausea
- Changes in blood pressure
- Edema
- Tachycardia, arrythmia
- Chest pain
- Electrolyte abnormalities
- Palpitations
- Hormonal effects

Interactions:

- Concurrent strong vasodilators or antihypertensives may have additive hypotensive effect if absorption is higher than expected.
- Avoid concurrent scalp irritants (retinoids, acids).
- ACE inhibitors or ARBs: If sufficient spironolactone is absorbed systemically, combined potassium-retaining effects could theoretically increase the risk of hyperkalemia.
- Potassium supplements or potassium-sparing diuretics: Concurrent exposure may further increase potassium concentrations with systemic spironolactone exposure.
- Additive antiandrogen effect with spironolactone or other antiandrogens.

Use in Specific Populations:

- Pregnancy: Avoid if pregnant or planning pregnancy due to teratogenic risk
- Pediatrics: Avoid unless under dermatologic supervision
- Geriatrics: Start with the lower minoxidil strength (2%) and monitor tolerability

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Storage:

- Store in original container at room temperature (up to 30°C or 86°F)
- Store in a cool dry place away from heat, sunlight, and moisture

How to Use: This compounded preparation is provided as a topical solution in a spray bottle. Apply the directed number of sprays evenly to the affected areas of the scalp, usually once or twice daily as instructed by your provider. Gently massage the solution into the scalp if recommended. Wash your hands after application. Avoid getting the solution in your eyes, mouth, or on broken skin. If you miss a dose, apply it as soon as you remember, but do not double the application if it is nearly time for the next one. Consistent use is important, and desired results may take several weeks to become noticeable.

Monitoring Parameters:

- Skin/hair response over 8–12 weeks
- Prostate screening (men >50): Adjust PSA interpretation if systemic absorption suspected
- Hormonal: Ask women about menstrual changes or breast tenderness if using higher topical spironolactone doses
- For patients at increased risk of systemic spironolactone exposure, consider:
    - Serum potassium
    - Renal function
    - Blood pressure

Citations:

1. Li M, Marubayashi A, Nakaya Y, Fukui K, Arase S. Minoxidil-induced hair growth is mediated by adenosine in cultured dermal papilla cells: possible involvement of sulfonylurea receptor 2B as a target of minoxidil. *J Invest Dermatol*. 2001;117(6):1594-1600. doi:10.1046/j.0022-202X.2001.01570.x
2. Wang C, Du Y, Bi L, Lin X, Zhao M, Fan W. The efficacy and safety of oral and topical spironolactone in androgenetic alopecia treatment: a systematic review. *Clin, Cosmetic and Investigational Dermatology*. 2023;16:603-612. doi:10.2147/CCID.S398950
3. Fields JR, Vonu PM, Monir RL, Schoch JJ. Topical ketoconazole for the treatment of androgenetic alopecia: A systematic review. *Dermatol Ther*. 2020;33(1):e13202. doi:10.1111/dth.13202
4. Duan S, Li G, Chu Y, et al. Arginine Metabolic Disruption Impairs Hair Regeneration via ROS-Mediated Inactivation of mTOR Signaling in Androgenetic Alopecia. *Adv Sci (Weinh)*. 2025;12(40):e04579. doi:10.1002/advs.202504579

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