

Bi-Layer Tablet for Enhanced Bioavailability of Atorvastatin via CYP3A4 Inhibition

Technology Domain: Pharmaceuticals

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Technology Summary:

This invention presents a novel bi-layer tablet formulation and preparation method designed to significantly enhance the bioavailability of atorvastatin, a cholesterol-lowering drug. The key technical solution is a dual-layer tablet: one layer contains atorvastatin calcium (9 mg), and the other contains naringin (19 mg), acting as a bioenhancer. The key inventive feature lies in the tablet's dual-release pattern, where the naringin layer is designed to release first. This pre-release allows naringin to inhibit the Cytochrome P450 (CYP3A4) enzyme in the gastrointestinal tract, which typically metabolizes atorvastatin into an inactive form, thereby preventing its pre-systemic breakdown.

As a result, the subsequent release of atorvastatin is more efficiently absorbed, leading to a substantial increase in its bioavailability (e.g., AUC increased by 4.6 times in animal models, achieving similar efficacy with a 9-fold lower atorvastatin dose compared to standard formulations). The use of this invention is to provide a more effective and potentially cost-efficient treatment for abnormal lipid levels and cardiovascular disease prevention, allowing for lower therapeutic doses of atorvastatin with enhanced patient outcomes.

