

## TUDDS-Technology

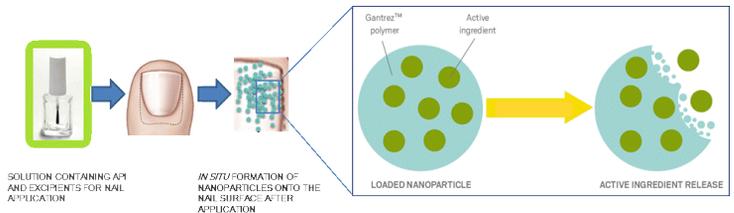
A new *in situ* Transungual Drug Delivery System to enhance penetration of antifungals through the nail

### Background

Transungual therapy is considered to be highly desirable to treat nail disorders such as onychomycosis due to its local effect and minimal adverse effect in comparison with systemic treatments. However, the effectiveness of topical therapy is limited due to the minimal drug permeability through the nail. Hence, there is a clear need in developing an effective transungual drug delivery systems (TUDDS) to allow the penetration of antifungals through the nail, reaching the infection site at a suitable concentration to eradicate the infection.

### Innovation

TUDDS-Technology is an *in situ* nanoparticle-based drug delivery system that increases the permeation of actives through the nail.

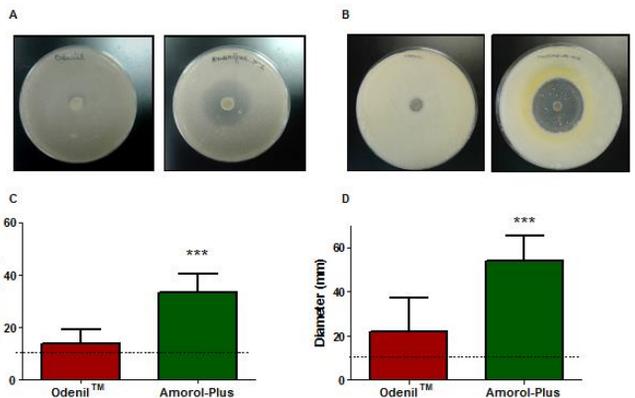


### Advantages

- ✓ Association of the API with a bioadhesive and biodegradable polymer
- ✓ Improve active penetration through the nail
- ✓ All excipients are GRAS listed and approved for both pharmaceutical and food use
- ✓ Excellent cosmetic properties
- ✓ Strong interaction with the nail and sustained release of the API
- ✓ Control of the API crystallization which enhances permeation to nail bed
- ✓ It is not a lacquer and does not need to be removed weekly!

#### *C. albicans*

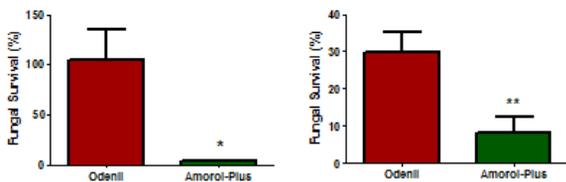
#### *T. rubrum*



Fungal inhibition after amorolfine treatment application onto the nail disc in *C. albicans* (A, C) and *T. rubrum* cultures (B, D). Inhibition zones (A, B) are represented as inhibition zone diameter (C, D). Plates used in *T. rubrum* cultures are larger (140x20 mm) than the ones used for *C. albicans* (90x14 mm). Quantification limit;-----.

#### A: *C. albicans*

#### B: *T. rubrum*



Fungal survival percentage after one application of amorolfine treatments (1 week) in *T. rubrum* (A) and *C. albicans* cultures (B). Amorol-Plus was compared statistically with Odenil™: p<0.05;\*; p<0.01:\*\*

Enhancement of Amorolfine penetration through the nail plate that **boosts the inhibitory and fungicidal activity of the active.**

### Fields of application

TUDDS-technology can be used for the delivery of drugs for the topical treatment of Onychomycosis, ungueal psoriasis and other nail related disorders.

**IP:** Intellectual property rights until 2032.

PCT/EP2012/056900. Nanoparticles comprising esters of poly (methyl vinyl ether-co-maleic anhydride) and uses thereof.

### BIONANOPLUS

Bionanoplus is a company specialized in providing solutions to drug delivery problems. Bionanoplus has developed different technology platforms and products based on different mucoadhesive polymeric systems that allow tackling delivery, processing, and efficacy issues of molecules with cheap and easy to scale-up technologies that fit market needs and regulatory requirements.

Bionanoplus is seeking for partner for out-licensing and/or product co-development