TFC-1067

Skin lightening

Selectively removes dark spots

- **Innovative and powerful active**
- **Selectively targets dark sports**
- **Highlights the skin's natural beauty**
- **Performs better than hydroquinone 2%**

Lightening Ingredient

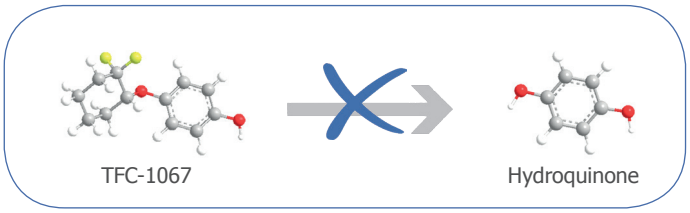
Name : TFC-1067
INCI name : Difluorocyclohexyloxyphenol
Functions: Bleaching - Antioxidants
CAS # 2001566-55-6

Mechanism of action : Human tyrosinase inhibitor

Patent Family : WO2016/139336 (France, Germany, UK, USA, Republic of Korea, China, Japan, Australia, Canada, Mexico, India, Hong Kong)

TFC-1067 is a synthetic active, part of the arbutins' family with no possible break down into hydroquinone

STABILITY AND TRANSCUTANEOUS DIFFUSION



No Hydroquinone released - No degradation (tested in the following conditions)	
Chemical conditions	**Biological conditions**
Water (ultrapure) 15 Days Bis Tris buffer (pH 6,5) 14 Days PBS, RT, 14 Days Ringer solutions (pH 6,8), RT 14 Days Ringer solutions (pH 5.5) 70°C, 24h Ringer solutions (pH 8,5) 70°C, 24h	Fibroblasts extract, RT, 48h Keratinocyte extract, RT, 48h Skin (tissue extract), RT 48h Sweat, RT, 48h

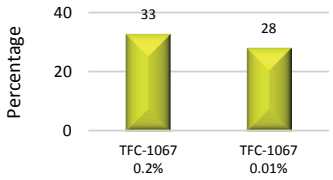
Flux determination (Franz cells) on human skin at T24h (n=3)

	ng TFC-1067 / g tissue	SD (ng/g)
EPIDERMIS	22 278	1 296
DERMIS	5 142	831

The quantity of TFC-1067 measured in epidermis was higher than that in dermis. TFC-1067 is able to reach the compartment of the skin where its activity is required (on melanocytes).

Transcutaneous diffusion: with high flux capacity and efficacy, TFC-1067 could be used at very low concentration in simple formulation.

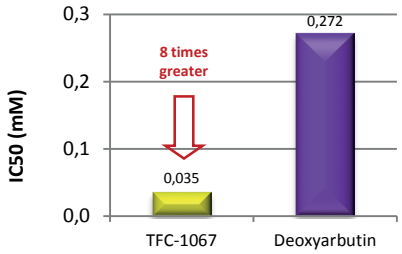
Resorption of TFC-1067



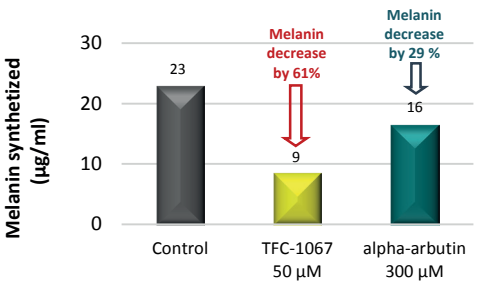
IN VITRO EFFICACY

TFC-1067 is more effective than deoxyarbutin and alpha-arbutin by inhibiting tyrosinase activity and melanin synthesis in human melanocytes cultures.

Inhibition of Human Tyrosinase



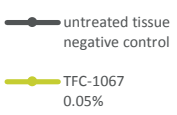
Inhibition of Melanin Synthesis by Human Melanocytes *in vitro*



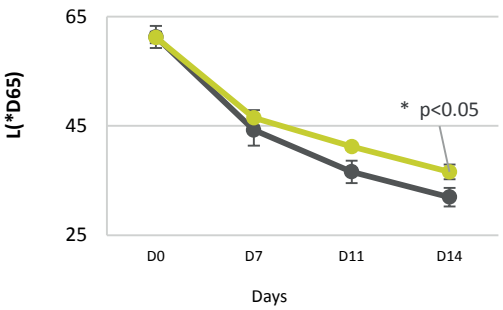
Effect of TFC-1067 over 10 days after a Stimulation by L-tyrosine 1mM (to induce melanin production)

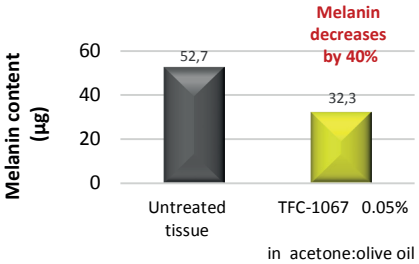
Efficacy on melanoderm skin explants: topical application every 2 days of TFC-1067 at 0.05% decreases melanin content and significantly increases the brightness with no sign of toxicity.

Lightening Effect on Melanoderm Skin Explants Over 14 Days

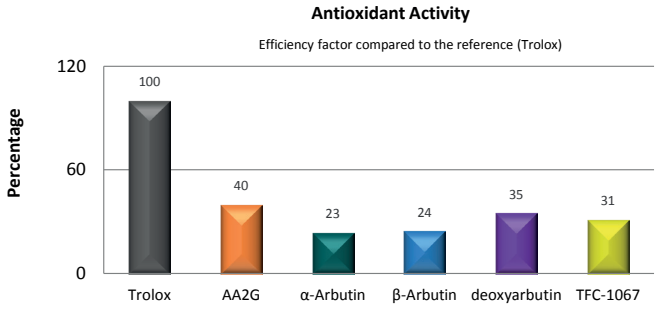


Measure of Brightness





TFC-1067 has a free radical scavenging activity (DPPH assay). The antioxidant activity of deoxyarbutin and TFC-1067 are similar and slightly higher than α-arbutin and β-arbutin and closed to Ascorbic Acid 2-Glucoside.
TFC-1067 can prevent the damaging effects of the ROS including atypical pigmentation.



CLINICAL EFFICACY

Study :

- Face cream containing only one lightening active TFC-1067 (0.2%) or Hydroquinone (2%)
- Skin Lightening Efficacy for 12 weeks. Mean of 23 subjects

Results :

- Dermatologist and subject evaluations
- Dermaspectrophotometer readings on dyschromic (dark spot) or normal skin (assessments for pigmentation on the melanin scale)

Face cream treatment TFC-1067 (0.2%) vs Hydroquinone (2%)

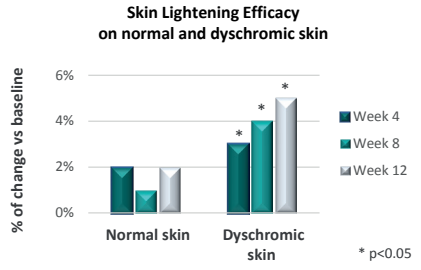
TFC-1067 (0.2%) selectively targets dark spots, highlights the skin's natural beauty and performs better than Hydroquinone (2%).

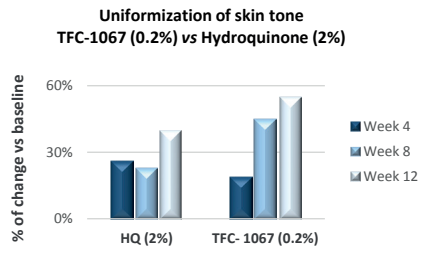
Using spectrophotometer, a statistically significant improvement was observed on dyschromic skin after 4 to 12 weeks of use. TFC-1067 selectively targets dark spots compared to hydroquinone and leads to a better skin tone uniformization of the dyschromic skin.

A statistically significant improvement was reported :

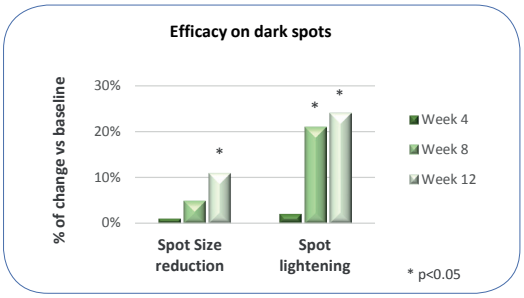
- after 8 weeks of use by the dermatologist and the subject on the dark spot intensity.
- after 12 weeks of use by the dermatologist on both dark spot size and intensity and by the subject on both dark spots intensity and skin tone.

Spectrophotometer readings

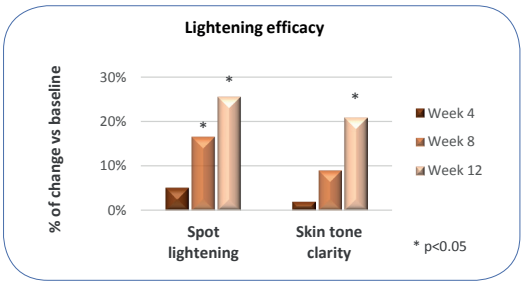




Dermatologist evaluation



Subject evaluation



Therapeutic Fluorine Chemistry

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