Advanced Skin Technology:
Nanocosmeceutical Formula Incorporated With Palm-Based Kojic Monooleate

PATENT NO. PI2012700896

Castor oil

- Oleaginous vehicle
- Emollient

PBKMO

- Anti-bacteria
- Anti-oxidant
- Anti-tyrosinase

Lemon oil

- Anti-bacteria
- Fragrance smell

Xanthan gum

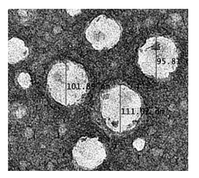
- Thickener
- Stabilizer

Potassium sorbate

- Natural preservative

PBKMO NANOEMULSION FORMULATION

Compatibility

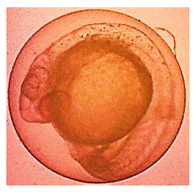


- ✓ Oil-in-Water nanoemulsion
- ✓ pH 6.28

Efficiency

- ✓ Tyrosinase inhibition: 74.14%
- ✓ Melanin inhibition : 36.8%
- ✓ Anti-oxidants:
  - i. Phenolic content : 8.14mg/g
  - ii. Flavonoid content : 1.547mg/g
  - iii. DPPH inhibition : 13 %

- ✓ Antimicrobial

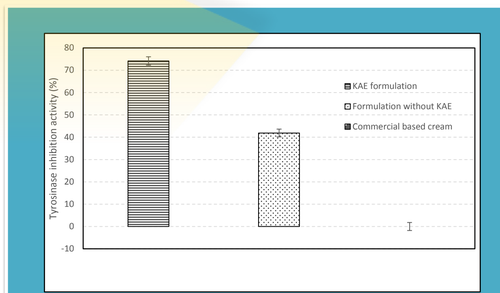


Safety

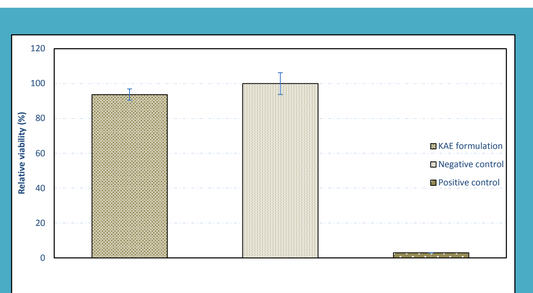
- ✓ Non-irritant to skin
- ✓ Non-toxic :
  - *i.* *In vitro* cytotoxicity (3T3 cell) : IC_{50} >100µg/mL
  - *ii.* *In vivo* zebrafish embryo : LC_{50} > 500µg/mL

INTRODUCTION OF TECHNOLOGY

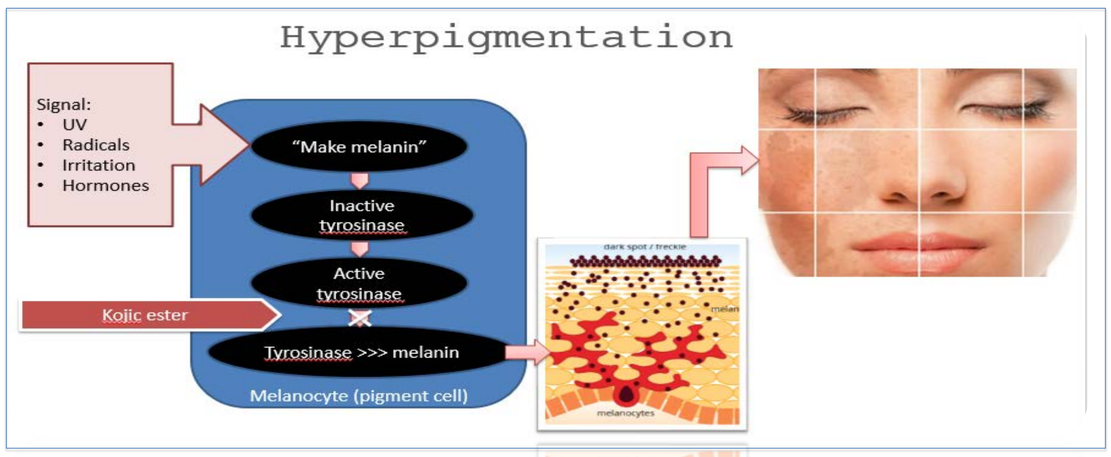
Palm-based kojic monooleate (PBKMO) is an active ingredient that has been enzymatically modified so that it can be used in nanocosmecutical formulation. Modern researchers have shown that PBKMO has anti-tyrosinase, anti-microbial, anti-inflammatory and anti-oxidant effects. This product can be used as an alternative for harmful ingredients available in counter such as mercury, hydroquinone and paraben. Nanoemulsion was used to encapsulate the bioactive ingredient formulation since it is challenging due to poor solubility and low bioavailibility which may hinder their delivery effectivity. This product useful as hyperpigmentation therapy where it blocks the excess production of melanin and contained safe (non-toxic) and natural ingredients which is suitable to be used for consumer.



Tyrosinase inhibition activity of PBKMO formulation and formulation without PBKMO at 30.03% (v/v) concentration



Skin irritation assay of PBKMO formulation and formulation without PBKMO at 30.03% (v/v) concentration using Epiderm™ tissue culture



INVENTION

PBKMO nanoemulsion formulation is safe, non-toxic,cost efficient and effective in reducing hyperpigmentation problems.

ADVANTAGES

- Skin compatibility
- Strong antioxidant
- Environmental friendly method
- Effective in reducing hyper-pigmentation
- Nontoxic & non irritant
- No harmful chemicals, no metal, natural safe and natural preservatives

MARKET POTENTIAL

1. PBKMO (raw) is suitable for B2B market:
   - Cosmetic industry
   - Food industry
2. PBKMO formulation is suitable for B2C market:
   - Skin pigmentation inhibitor product

Consumer/End User

- OEM/ ODM/ Cosmetic manufacturer
- Women and men range in age between 18- 50 y/o with hyperpigmentation problem

Project Leader : Dr. Siti Efliza Ashari
Team members : Sharifah Nurfadhlin Afifah Syed Azhar, Muhammad Azimuddin Roselan, Nur Farzana Izzati Mohd Jaslina, Prof. Dr. Rosfarizan Mohamad.
Dept./Faculty : Chemistry, Fac of Science
Email : ctefliza@upm.edu.my | 03 8947 7847
Expertise : Organic Chemistry, Enzyme Biotechnology, Industrial Biotechnology, Nanotechnology

PROSPERING THROUGH INNOVATION