

# VitaCE 990

3-O-Ethylascorbyl Ether

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2. Characteristics
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# I. INTRODUCTION

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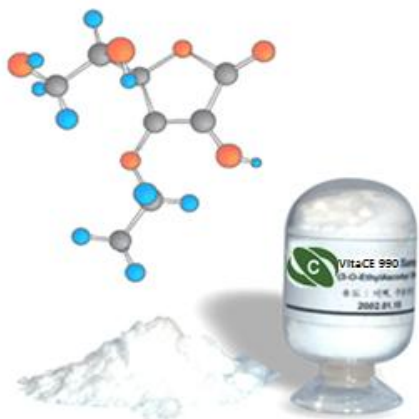
## 1. Name

- ☐ INCI Name: Ethyl ascorbic acid
- ☐ 3-O-Ethyl Ascorbyl Ether
- ☐ 3-O-Ethyl Ascorbic Acid
- ☐ Vitamin C Ethyl

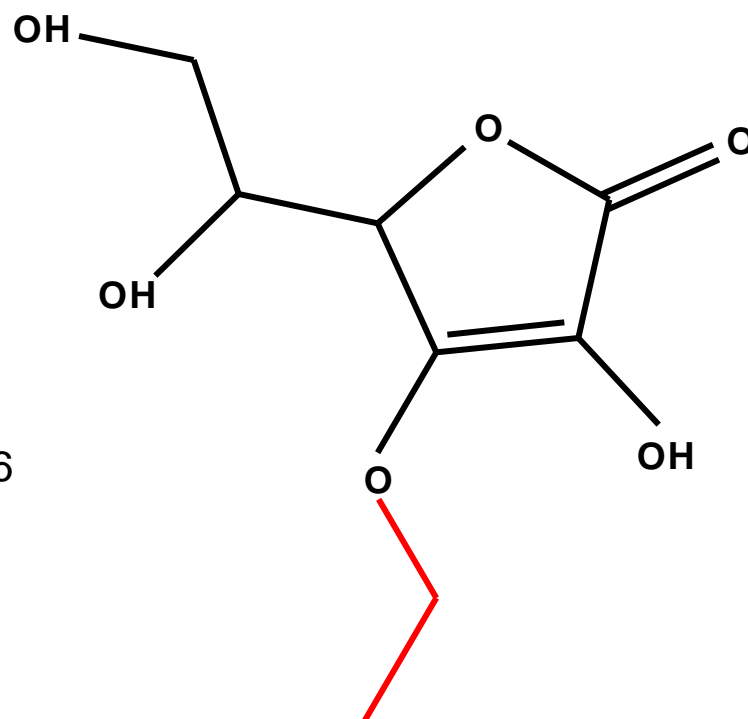


# I. INTRODUCTION

## 2. Structure



- ❑ Molecular formula :  $C_8H_{12}O_6$
- ❑ CAS No.: 86404-04-8
- ❑ Molecular weight : 204.18
- ❑ Vitamin-C content : 86.3 %



# I. INTRODUCTION

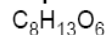
## 3. ICID

### 3-o-ETHYL ASCORBIC ACID

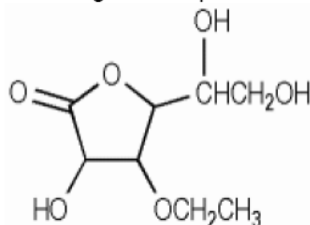
CTFA Monograph ID: 12488

CAS Nos.: 86404-04-8

Empirical Formula:



Definition: 3-O-Ethyl Ascorbic Acid is the organic compound that conforms to the formula:



**Chemical Class(es):** Alcohols; Ethers; Heterocyclic Compounds

**Function(s):** Skin-Conditioning Agent - Miscellaneous

**Ingredient Sources:** Plant; Synthetic

**Reported Product Categories:** Face and Neck Preparations (Excluding Shaving Preparations); Moisturizing Preparations; Skin Care Preparations, Misc.

**Technical/Other Name(s):**

L-Ascorbic Acid, 3-O-Ethyl Ether

**Trade Name(s):**

Activita C (Ried International)

Ethyl Ascorbic Acid (Spec-Chem Ind.)

Vitamin C Ethyl (Nippon Hypox)

International Cosmetic Ingredient Dictionary and Handbook, 12th Edition, Printed Edition Page Number: 947

**Cross References:** See note below regarding entries, and links.

International Buyers' Guide(1)

These hypertext links will activate when associated electronic books are purchased.



CHEMLAND Co., Ltd.

# I. INTRODUCTION

## 3. ICID

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PCPC FILE NUMBER: 23019

### TRADE NAMES WITH ASSIGNED INCI NAMES

TRADENAME: **Vita CE 990**

Assigned INCI Name(s):

MonolD: 12488 3-O-Ethyl Ascorbic Acid



# I. INTRODUCTION

## 4. Stability

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Conventional Vitamin C is easily oxidized and destroyed by heat, air, light, etc. Especially, when it is mixed with other cosmetics which needs to be stored long time. Vitamin C usually causes the problem of color change in cosmetic products.

In the other hand, Vitamin C ethyl is free from the those unstabilities. Vitamin C Ethyl is stable because it is metabolized as pure vitamin c in the living body.

This vitamin Ethyl C is stable whereas conventional vitamin C has a weakness that it is expedited to be oxidized in a normal subacid.

In the structure of Vitamin C, Vitamin C Ethyl replaces Ethoxy group in the 3rd place which has strong acid. Vitamin C Ethyl is protected from the metal ion. As a result it doesn't change in its color and has nor abnormal reaction.

2001 : permitted as a whitening functional material from Korea Food and Drug Administration

2003 : permitted as a QUASI-DRUGS from JFDA

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## II. Characteristics

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- ❑ Stabilized L-ascorbic acid (Vitamin C).
- ❑ white, odorless, crystallized powder
- ❑ Similar effect with L-ascorbic acid





### III. EFFECTIVENESS

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- ☐ Whitening
- ☐ Synthesis of Collagen
- ☐ Good Penetration



### III. EFFECTIVENESS

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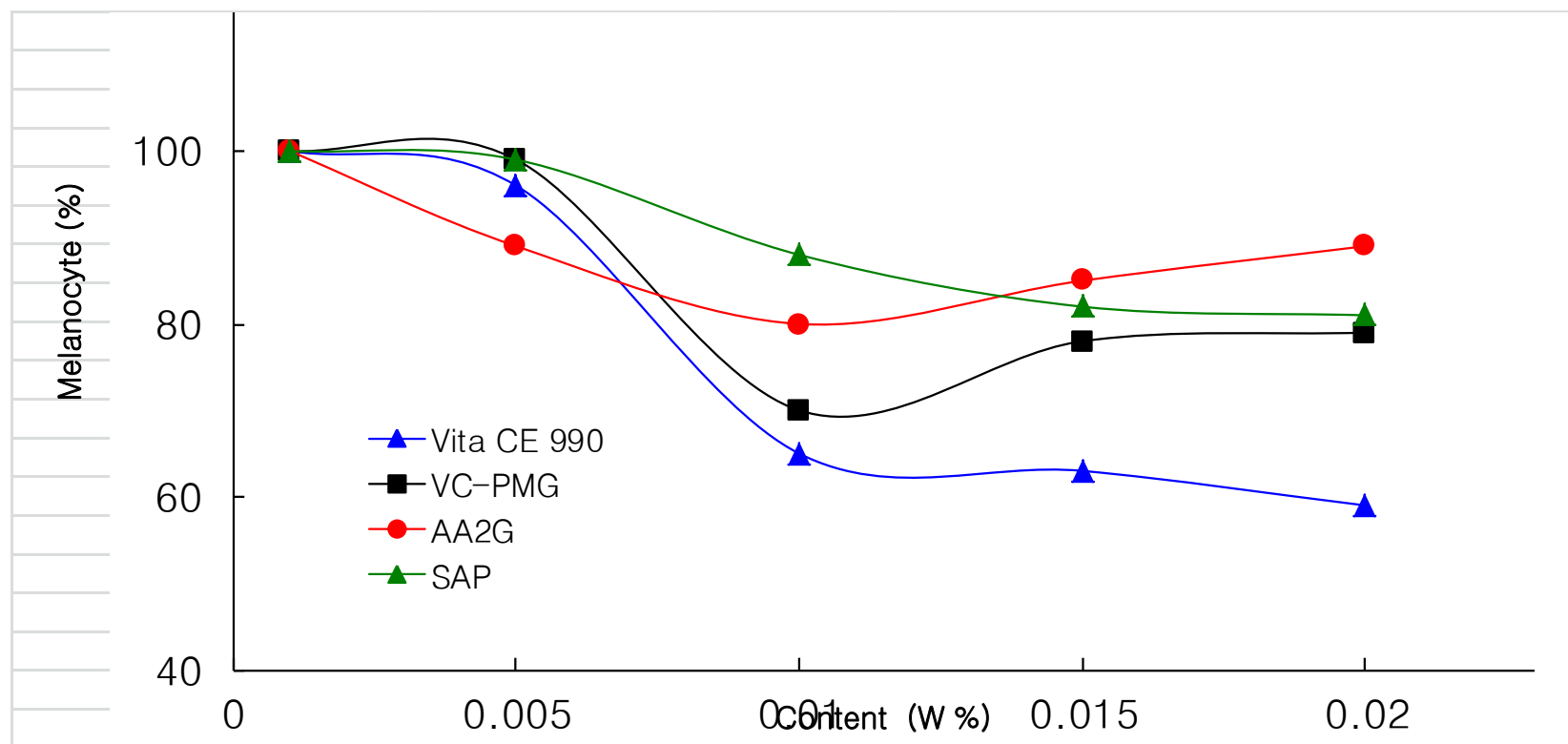
#### *1-1. Whitening*

- ❑ Decrease the formation of Melanocyte
- ❑ Excellent anti-ageing effect-Recover from:
  - Sun-damage
  - Discoloration
  - Dark spots



### III. EFFECTIVENESS

#### 1-2. Whitening Effect (Cell Test)



**Fig.1 Whitening Test by Melanocyte**



### III. EFFECTIVENESS

#### 1-3. Whitening Effect (Photograph)

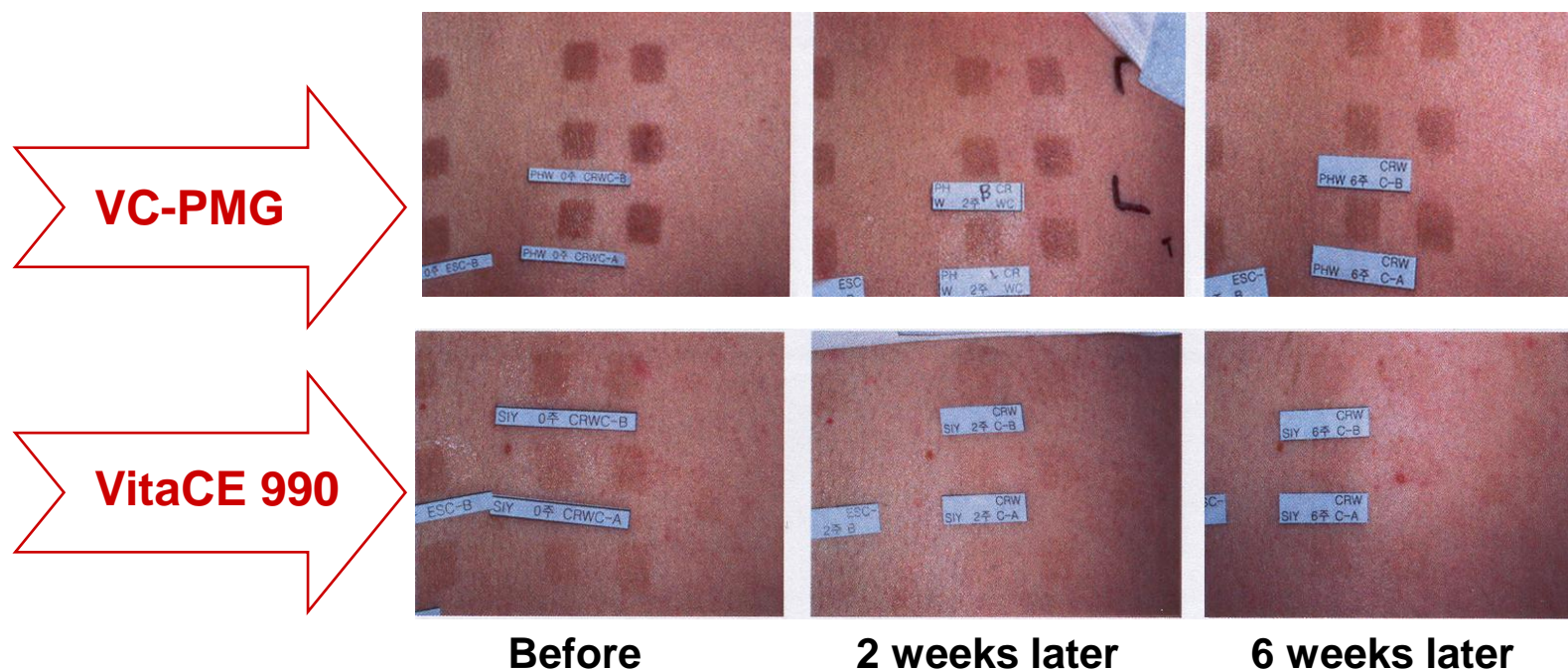
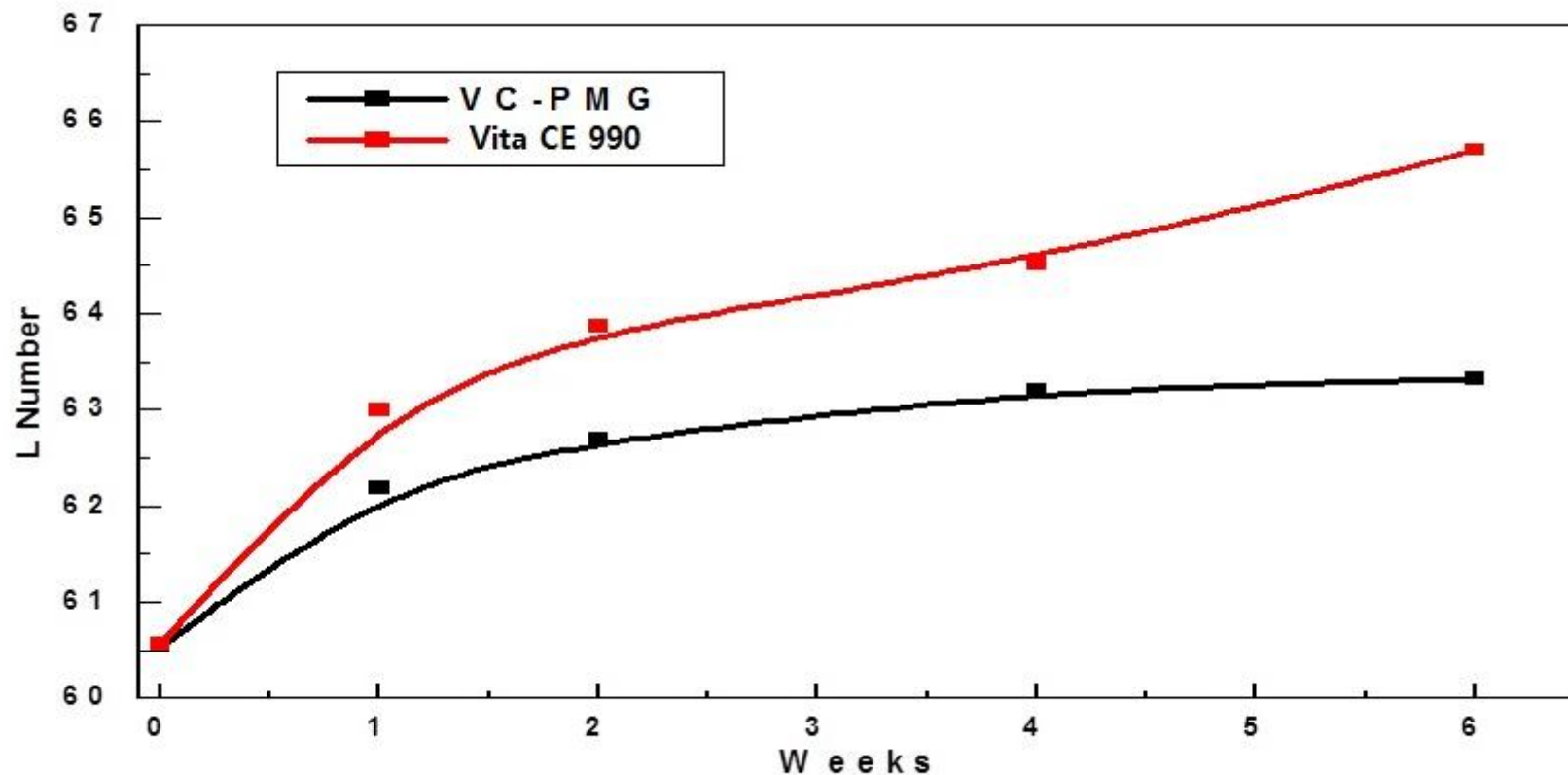


Fig. 3 Whitening Test ( Using 0.7 MED UV Ray)



### III. EFFECTIVENESS

#### 1-4. Whitening Effect (Chromameter Test)



**Fig.2 Whitening Test ( In Vivo) by Chromameter CR-300**

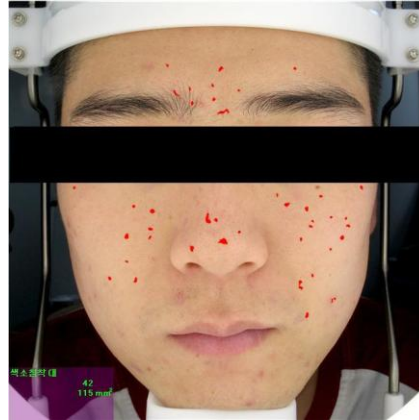


### III. EFFECTIVENESS

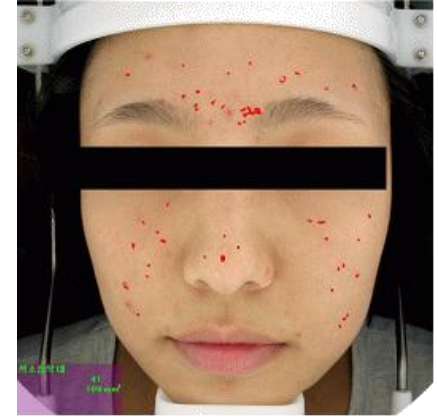
Improvement effect of pigmented skin  
used 0.5%, 1%, 2% of Vita CE 990 for 3months



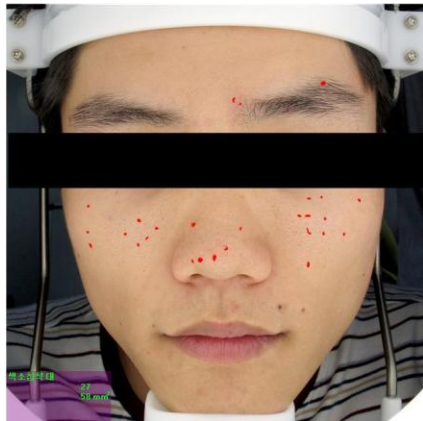
(a) Before



(a) Before

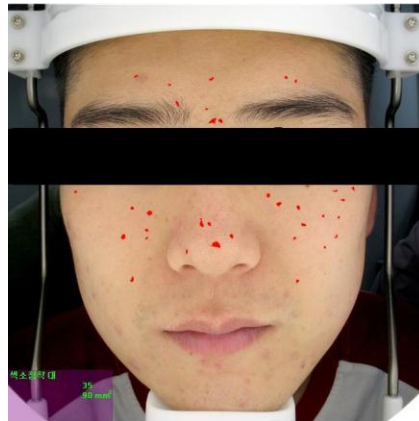


(a) Before



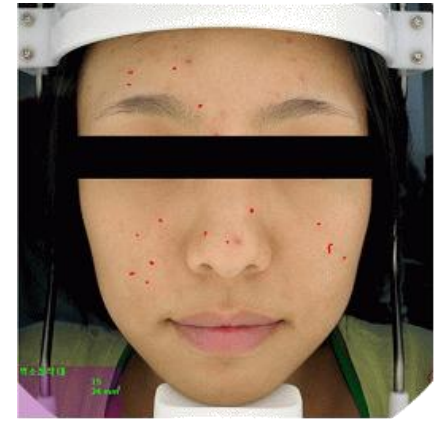
(b) After(0.5%)

12% reduction in melanin area



(b) After(1%)

22% reduction in melanin area

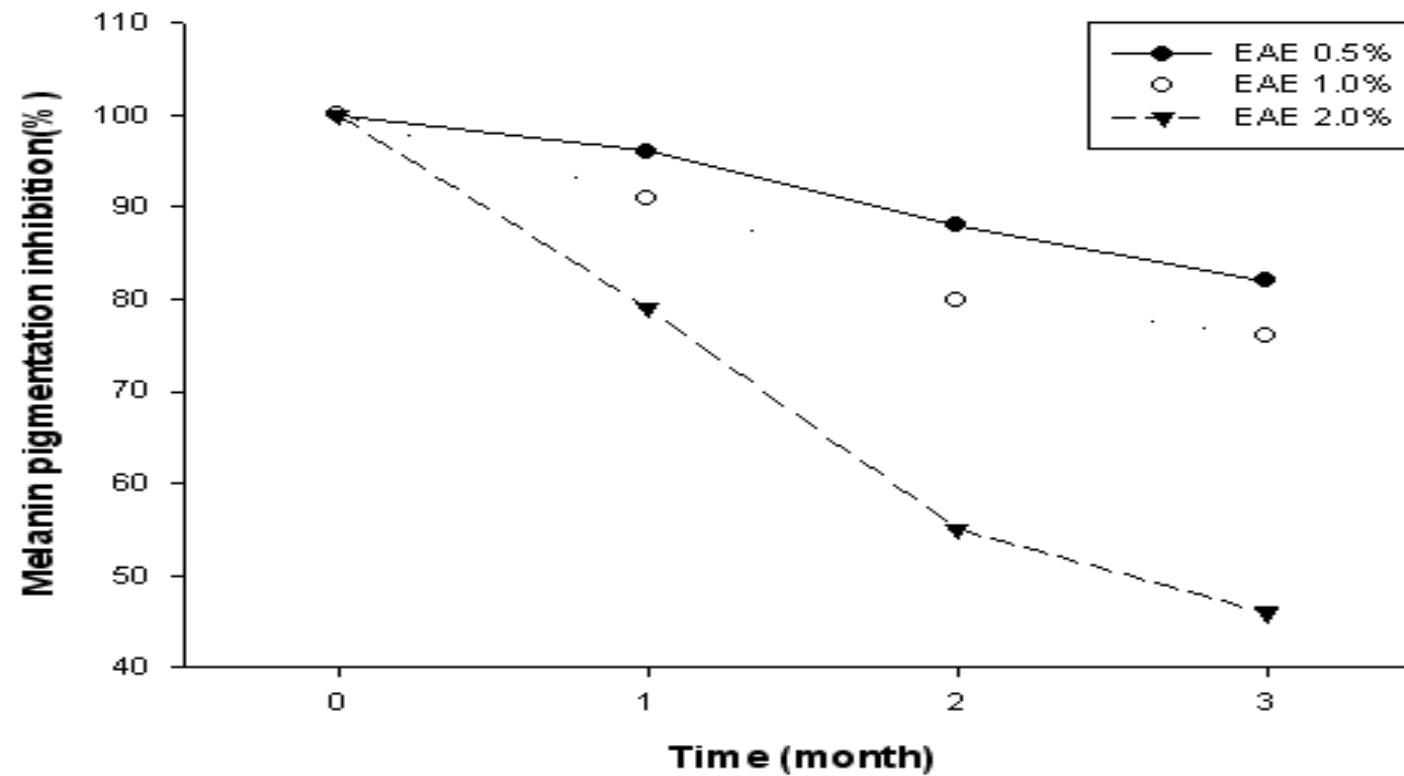


(b) After(2%)

89% reduction in melanin area

### III. EFFECTIVENESS

Effect of whitening on melanin pigmentation inhibition



### III. EFFECTIVENESS

1-5. Comparison Whitening effect with other Vitamin C Derivatives

Tested substance	Sample concentration(%)	Rate of inhibition of UV-introduced melanization of DHICA(%)
Ascorbic acid (vitamin-C)	0.1	70
VC – PMG	0.1	20
AA – 2G	0.1	20
Ethly ascorbyl ether	0.1	80
Ethly ascorbyl ether	0.01	40

- VC-PMG : Magnesium-L-Ascorbyl-2-Phosphate
- AA-2G : Ascorbate-2-O-Glucoside



### III. EFFECTIVENESS

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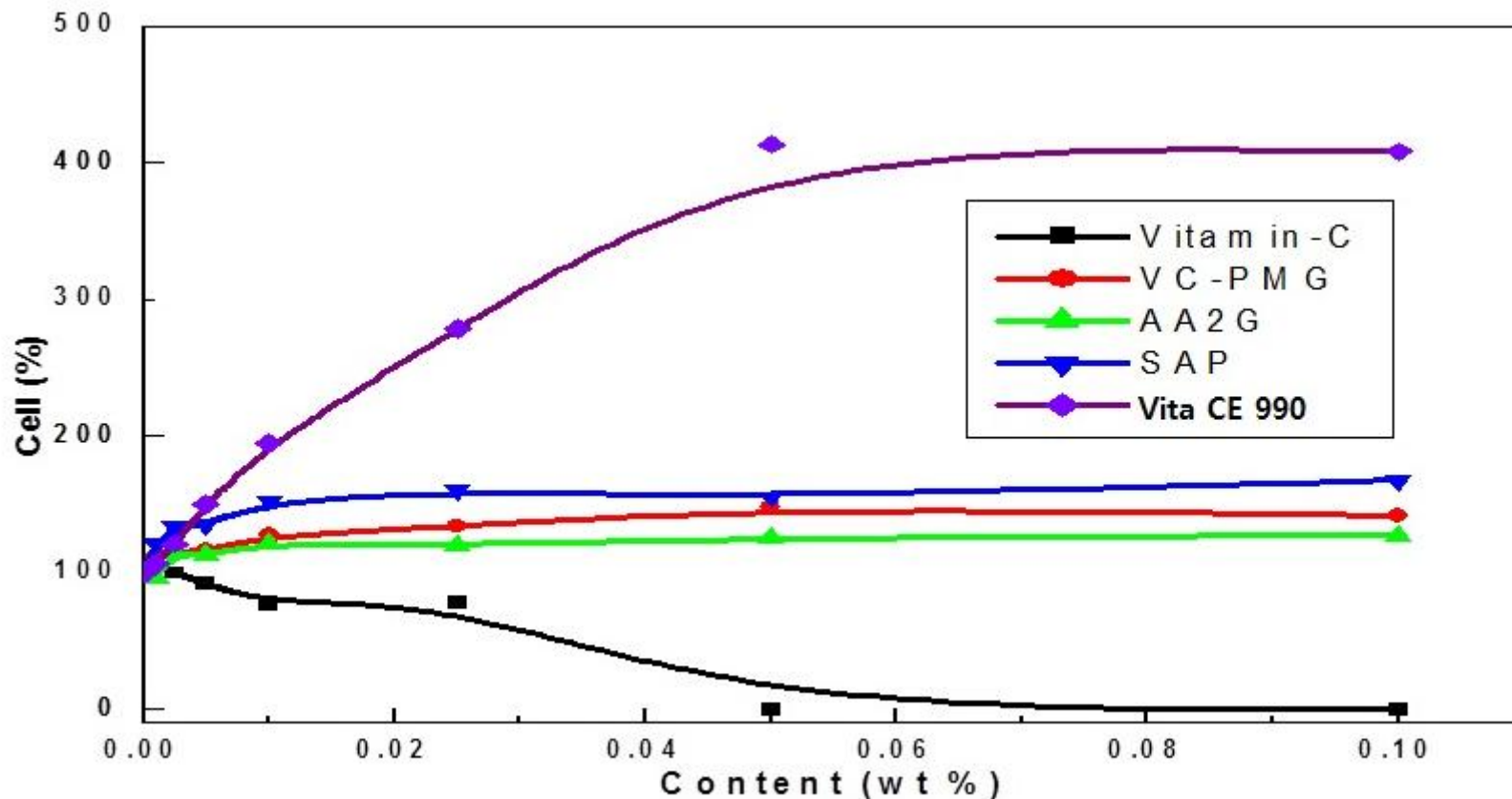
#### *2-1. Formation & Synthesis of Collagen*

- ☐ Helps Collagen synthesis
- ☐ Recover damaged Collagen
- ☐ Reduces the Copper Ion of Tyrosinase



### III. EFFECTIVENESS

#### 2-4. Formation & Synthesis of Collagen

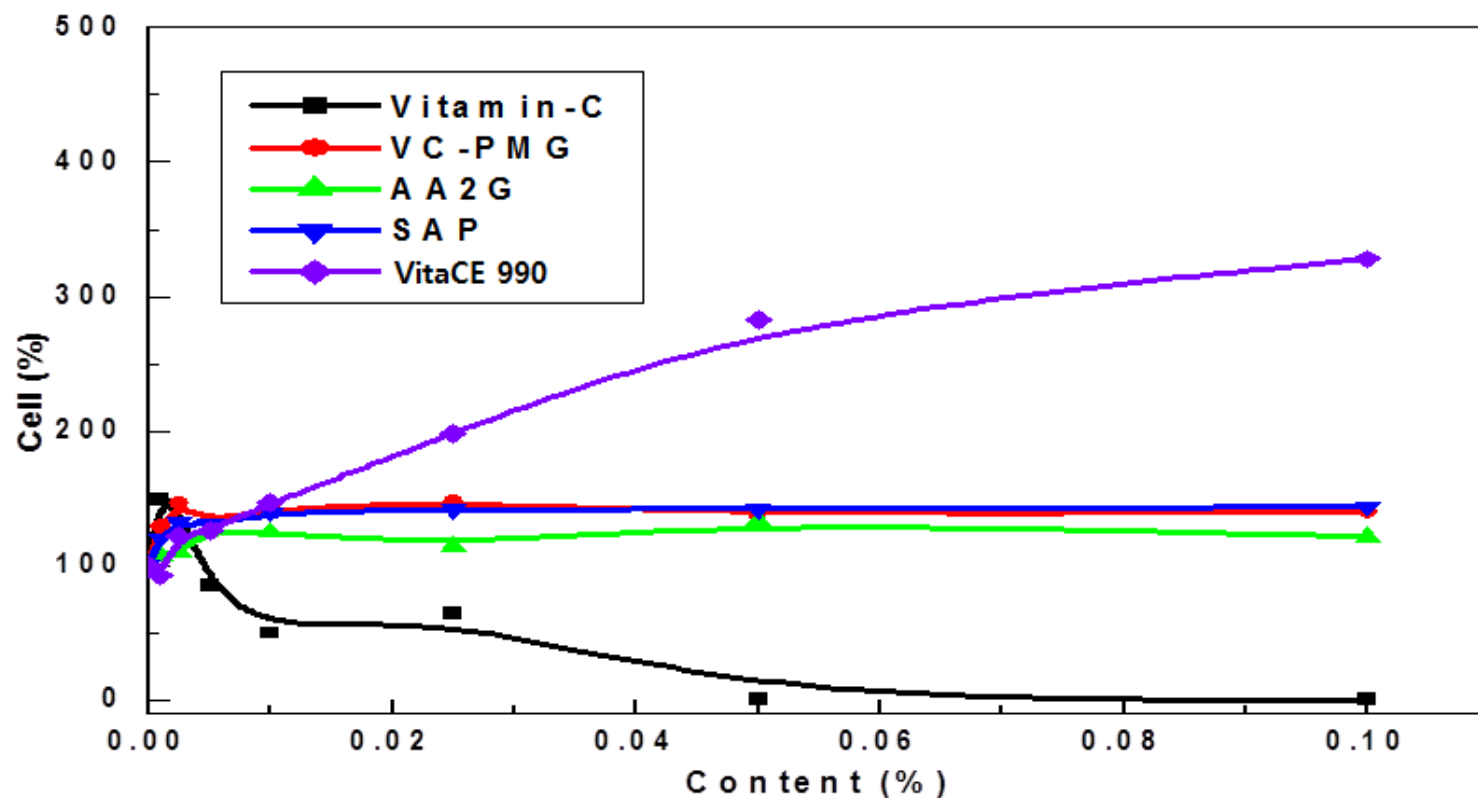


**Fig. 5 Cell Toxicity Test by 10% FBS Environment**



### III. EFFECTIVENESS

#### 2-5. Formation & Synthesis of Collagen



**Fig. 6 Cell Toxicity Test by 4% FBS Environment)**



### III. EFFECTIVENESS

#### 2-6. Delivery of Vitamin C to skin

- ❑ Low Molecular Weight
- ❑ Good Water solubility (L-ascorbic acid)
  - Ether bonding

Table 1. Comparison by Vitamin-C Derivative

Item	Formula	M/W	V-C Contents
VC-PMG	$C_6H_8O_9P_3/2Mg$	303.5	62.0
AA2G	$C_{12}H_{18}O_{11}$	362	51.9
SAP	$C_6H_6O_9P_3Na$	334	56.3
VitaCE 990	$C_8H_{12}O_6$	204.2	86.3



## IV. STABILITY

### 1. STABILITY by pH

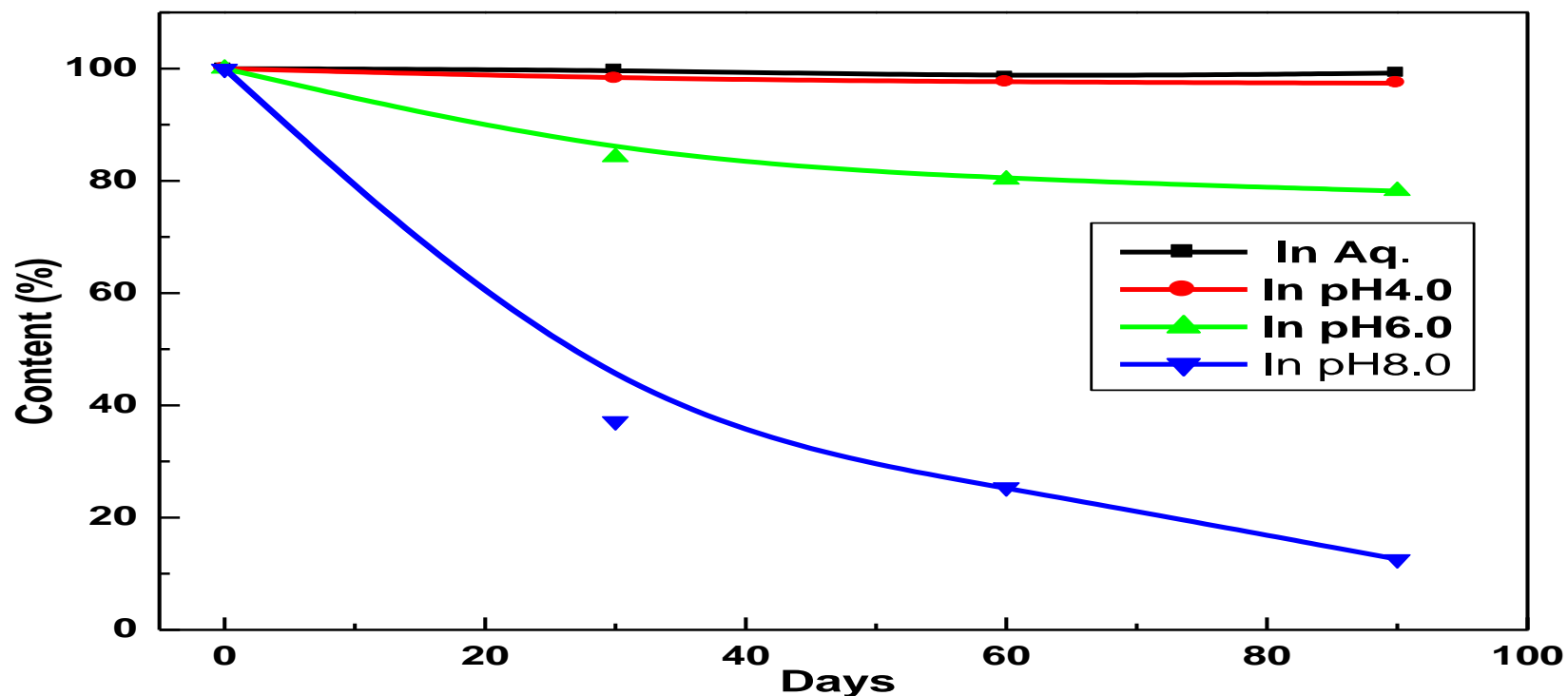


Fig. 7 Stability by Buffer solution (40°C for 90 days)



## IV. STABILITY

### 2. *Stability in formulation*

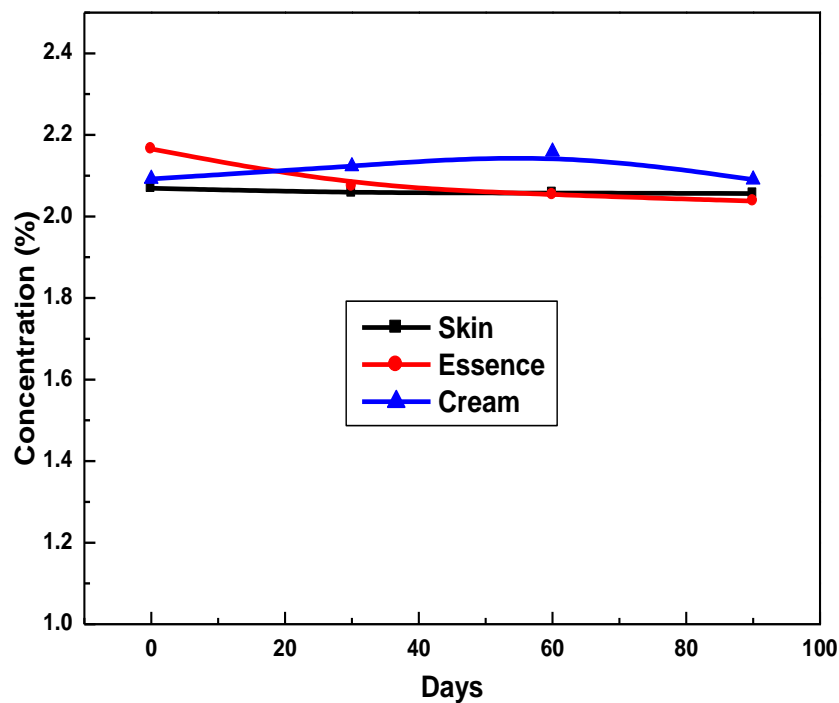
**Table 2. Test Condition**

Storage environment :	Skin, Essence in Incubator (40 °C), Cream to room temperature
Analysis environment :	Column (X-Terra15cm), Eluant (Buffer), Flow rate (0.8mL/min), Detector (UV 245nm), Temperature(20 °C), Pressure(1,650-1,750 psi)
Period of Analysis :	90 days (per 1 month)
Test Item :	Skin, Essence, Cream
Analysis samples :	2 types per 1 item and 3 samples of each type



## IV. STABILITY

(a) TYPE-I



(a) TYPE-II

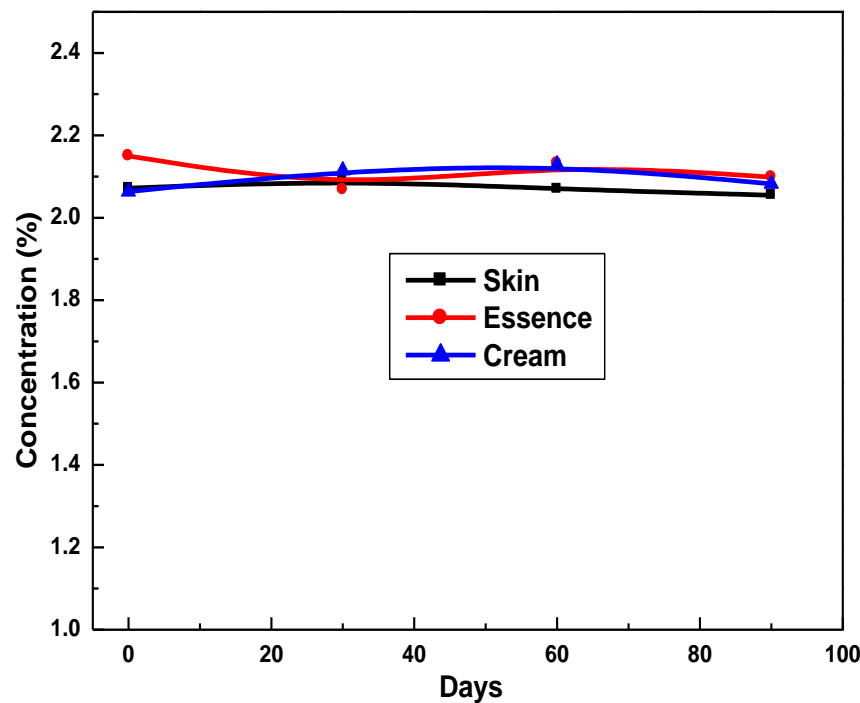
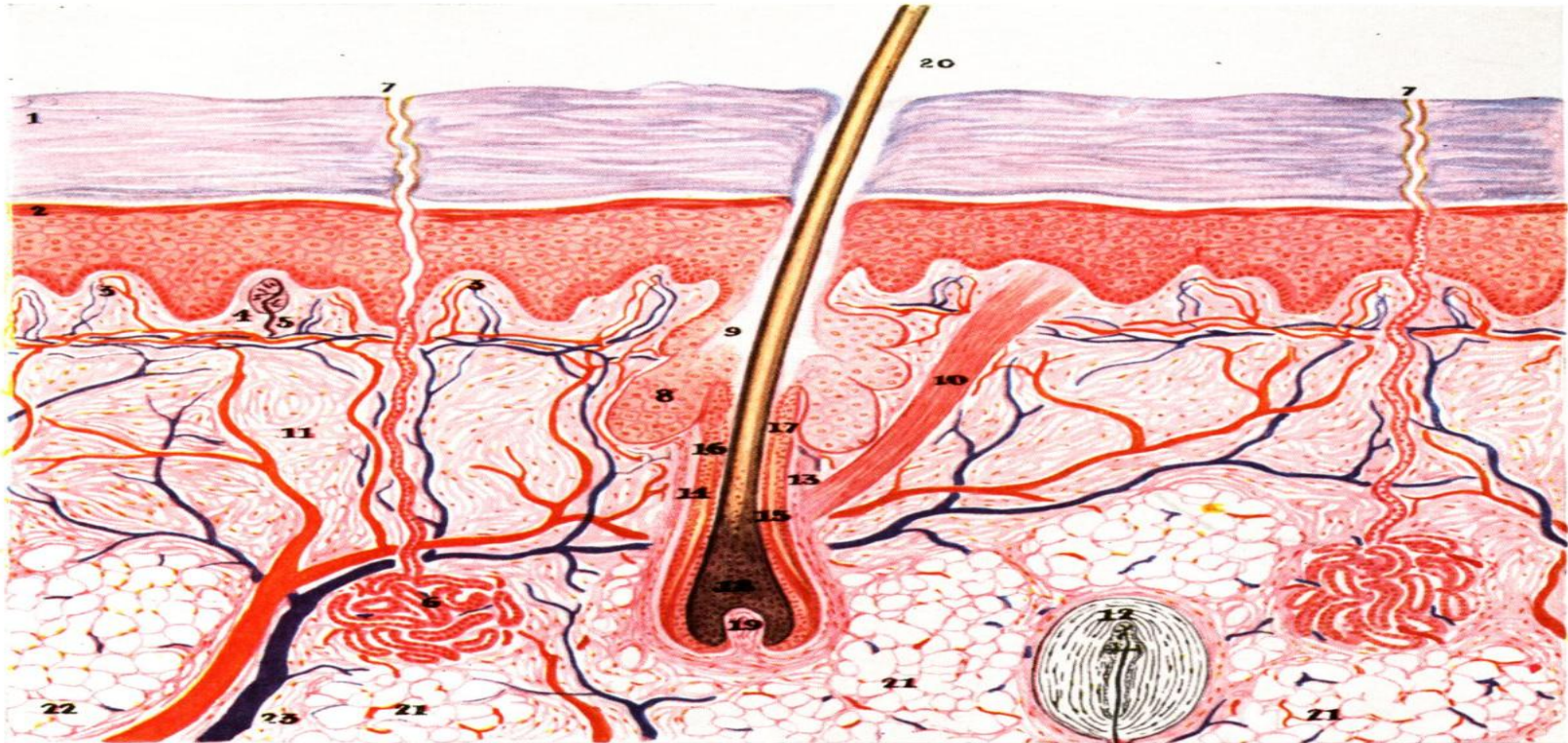


Fig. 8 Change of VitaCE 990 as Time goes on



# VI. Skin Penetration

## 6-2. Skin Penetration of a Cream containing VitaCE 990



1. Epidermis
2. Granular Pigmented Layer
3. Papillæ with Blood Vessels
4. Papilla with Touch Organs
5. Nerve Fibers
6. Sweat Glands
7. Outer openings Sweat Glands
8. Sebaceous Gland
9. Sebaceous Duct
10. Hair Muscles
11. Connective Tissue Fibers
12. Pacinian Corpuscle

13. Hair Follicle
14. Outer Sheath of Hair
15. Inner Sheath of Hair
16. Outside of Hair
17. Core of Hair
18. Bulb of Hair
19. Papillæ at root of Hair
20. Shaft of Hair
21. Adipose (fatty) Tissue Cells
22. Arteries
23. Veins



# VI. Skin Penetration

**6-4. Comparison the contained quantity of Nano emulsion absorbed PBS Buffer**

