

*The Quality of Plant Oil*

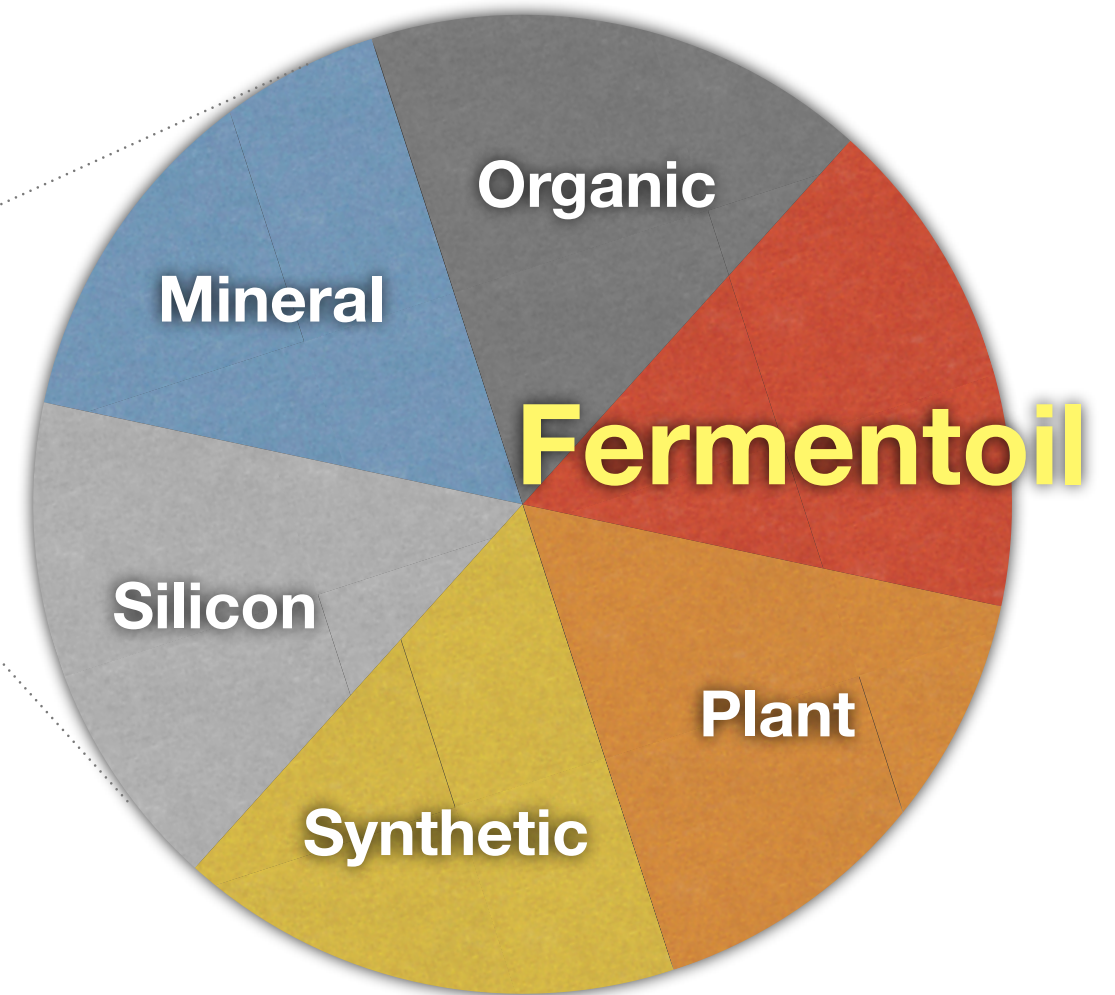
**KR Patent / PCT Pending**

# Fermentoil

Olive / Argan / Green tea seed / Meadowfoam seed oil / Jojoba seed oil /  
Sunflower seed oil / Safflower seed oil / Camellia seed oil

New generation of plant oil for developing your cosmetics

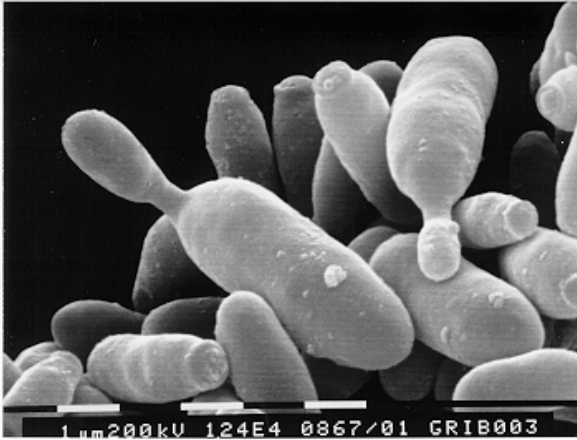
Plant oil fermentation increases nutritional values, improves skin feeling, absorption and compatibility for the cosmetic products through the microbial fermentation system



Choosing the best oil  
can make a difference  
in your formulation

Creating new category of oil  
through unique fermentation  
technology

## *Pseudozyma* sp. SY-16[KCTC 8950P]



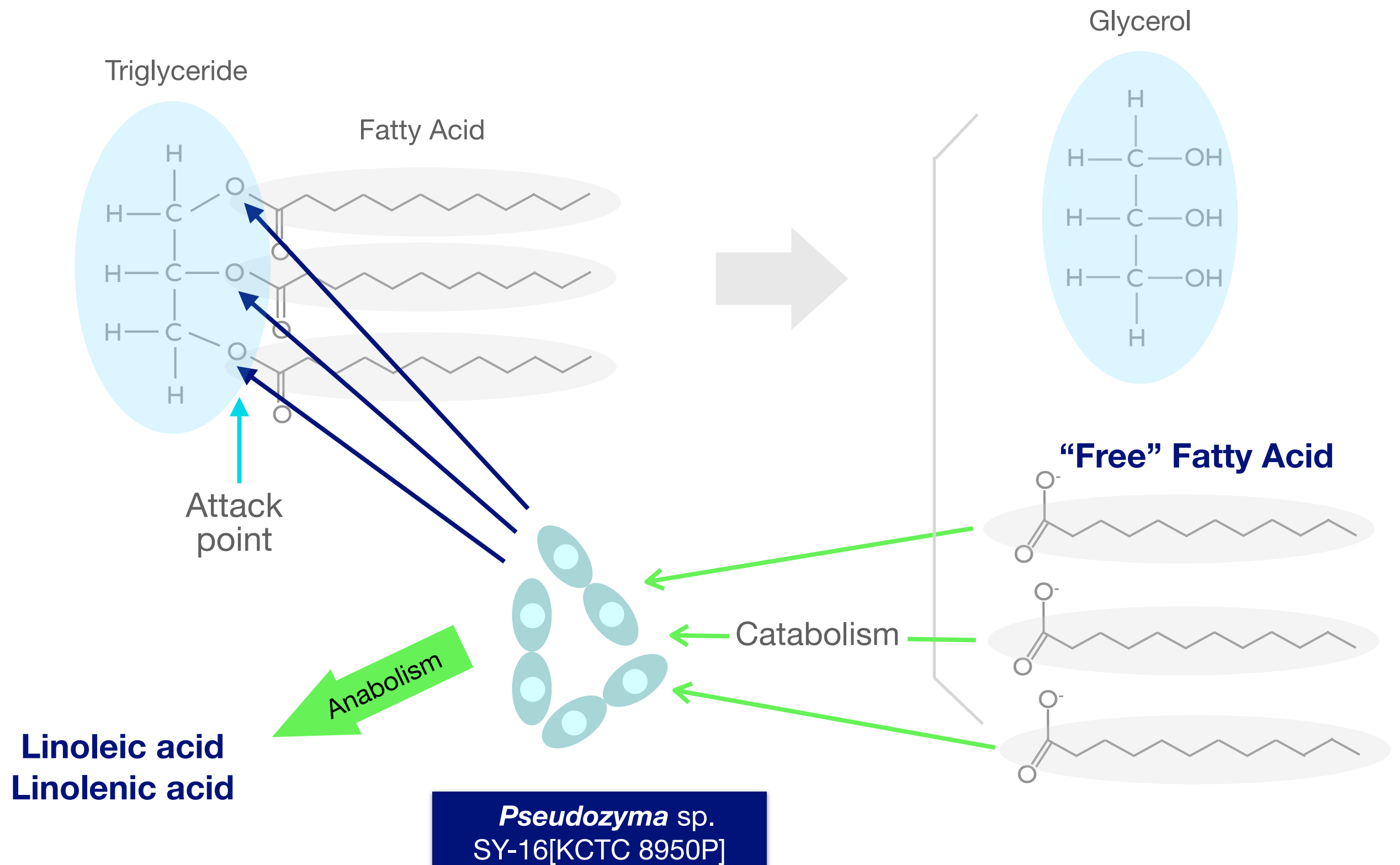
- Odorless in aerobic condition
- It changes the substance in plant oil by producing enzymes
- It produces various types of polysaccharides and lipids

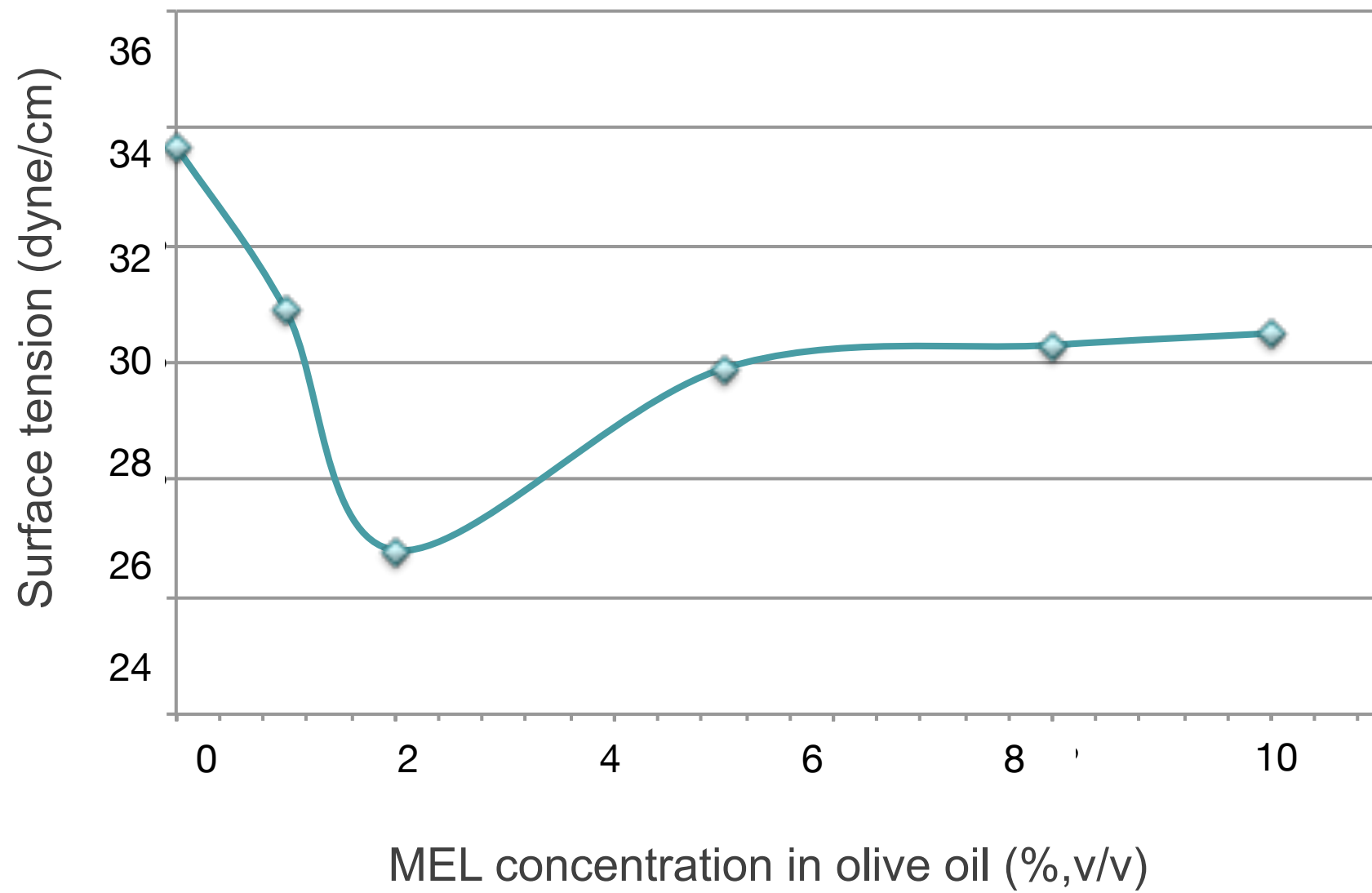
- KRIBB have researched to develop organisms that can clean the waste oil in the ocean
- They applied in coastal area(Tae-an, Korea) to decompose the oil leakage in 2009



The patent was registered through cooperation with Damy and Korea Research Institute of Bioscience & Biotechnology

# Fermentation Process of Fermentoil



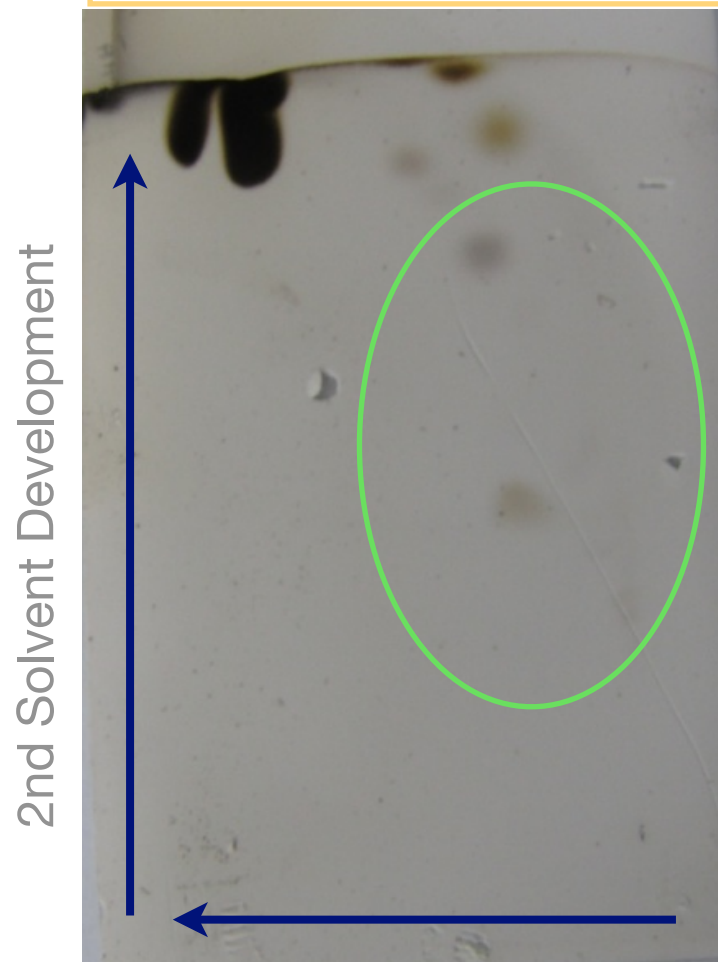


# Analysis of Free fatty acid Value

Detection method

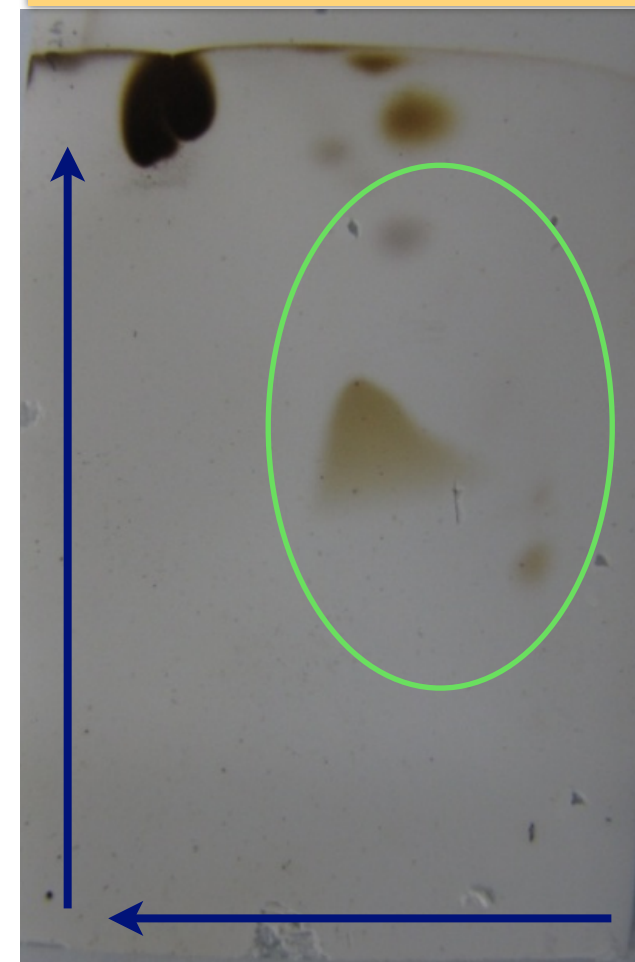
2D-TLC Analysis

Olive oil



1st Solvent Development

Fermentoil Olive



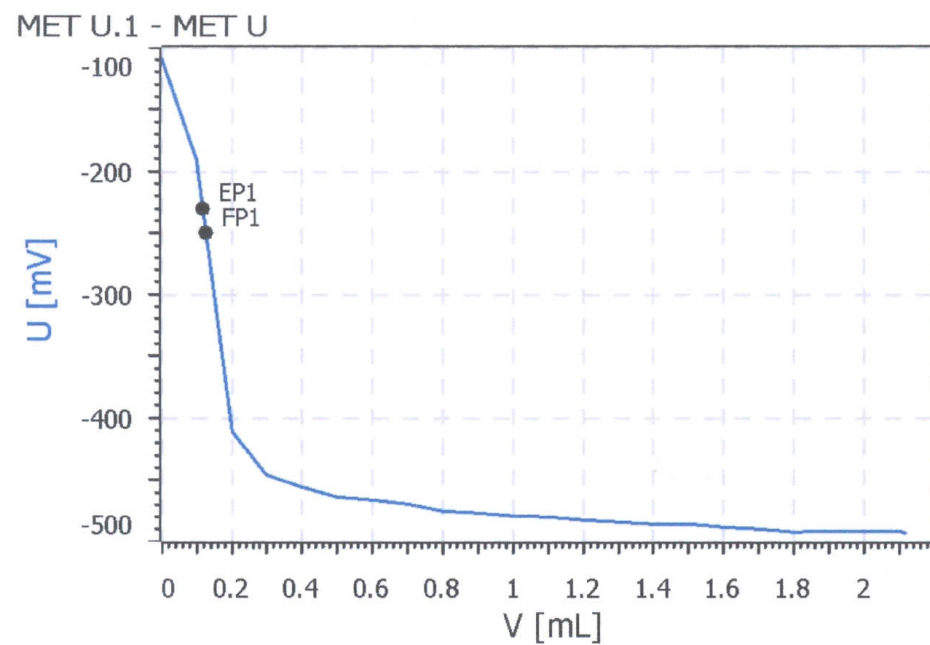
Comparing to the result of TLC Analysis,  
the amount of free fatty acid increased after fermentation

# Analysis of Free fatty acid Value

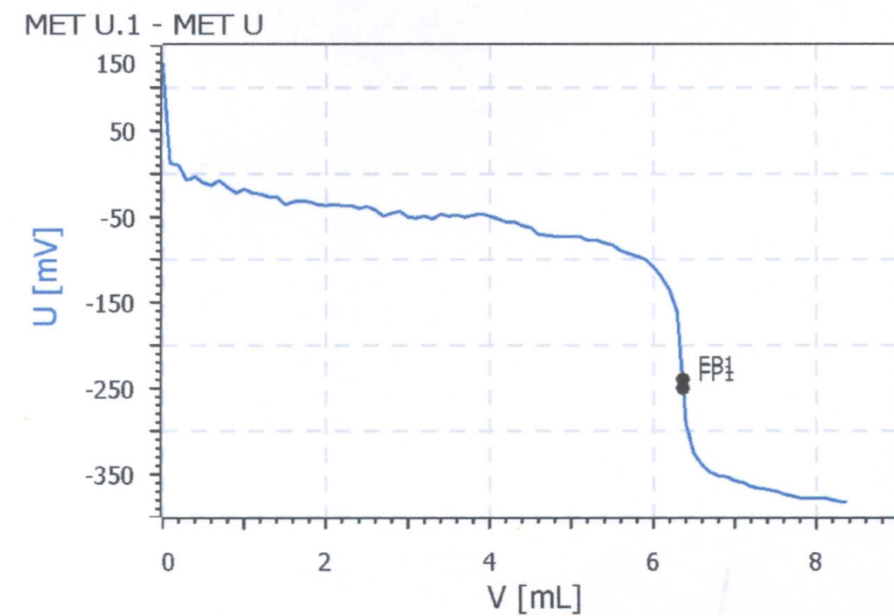
Detection method

Metrohm Titrato

Olive oil



Fermentoil Olive



	Olive oil	Fermentoil Olive
KOH(mg/g)	0.13	11.84

Comparing to the result before fermentation,  
the amount of free fatty acid increased by 90 times



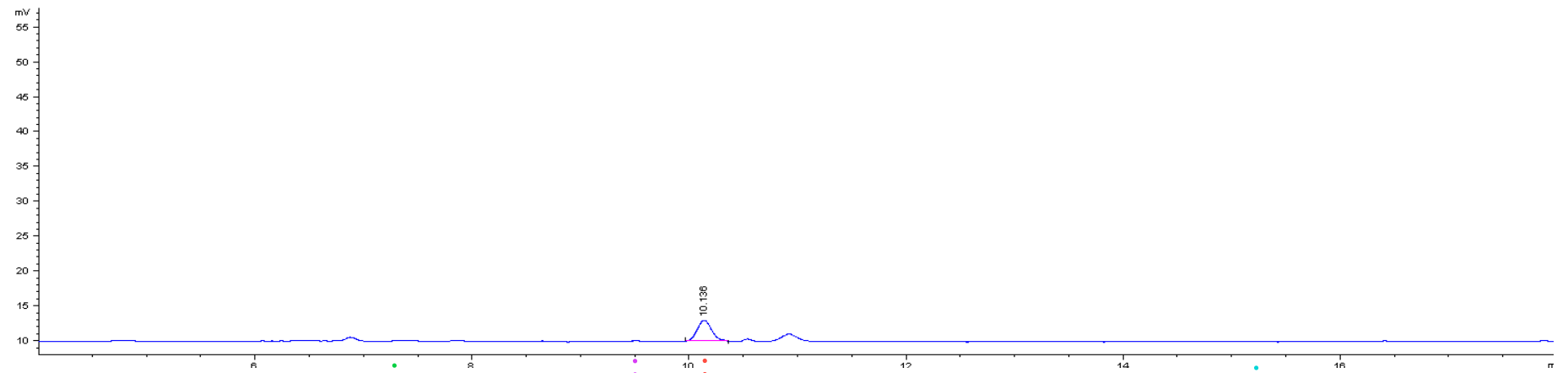
# Analysis of Free fatty acid Value

Detection method

HPLC Analysis

Olive oil

50% Olive oil

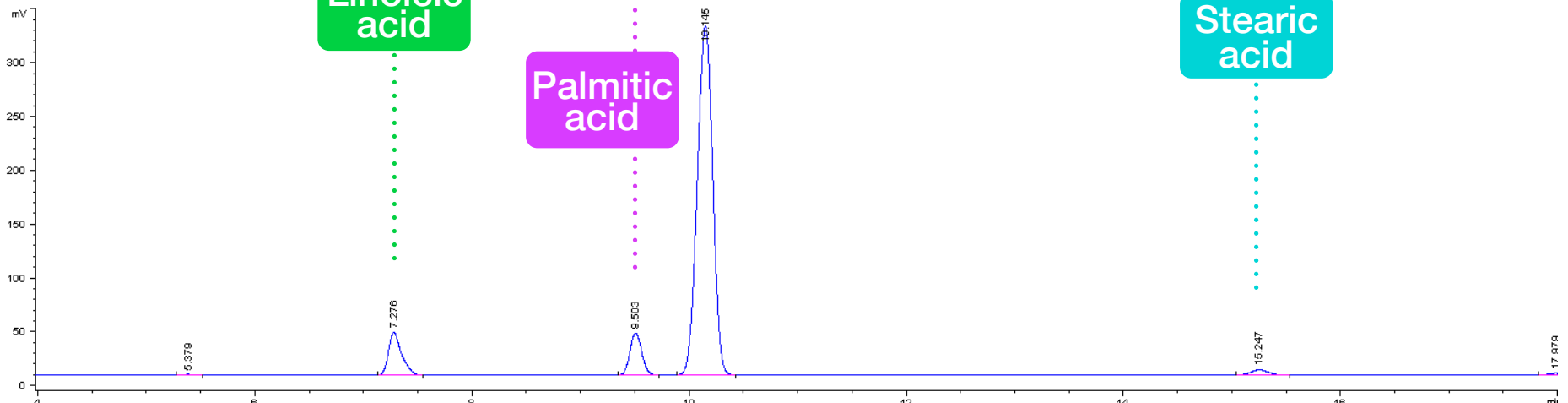


Oleic acid

Linoleic acid

Palmitic acid

Stearic acid



Fermentoil Olive

10% Fermentoil Olive

	Linoleic acid	Palmitic acid	Oleic acid	Stearic acid
Olive oil	0	0	374.4	0
Fermentoil Olive	5978.3	4740.7	27457.0	1668.3

73.3

(unit: ppm)

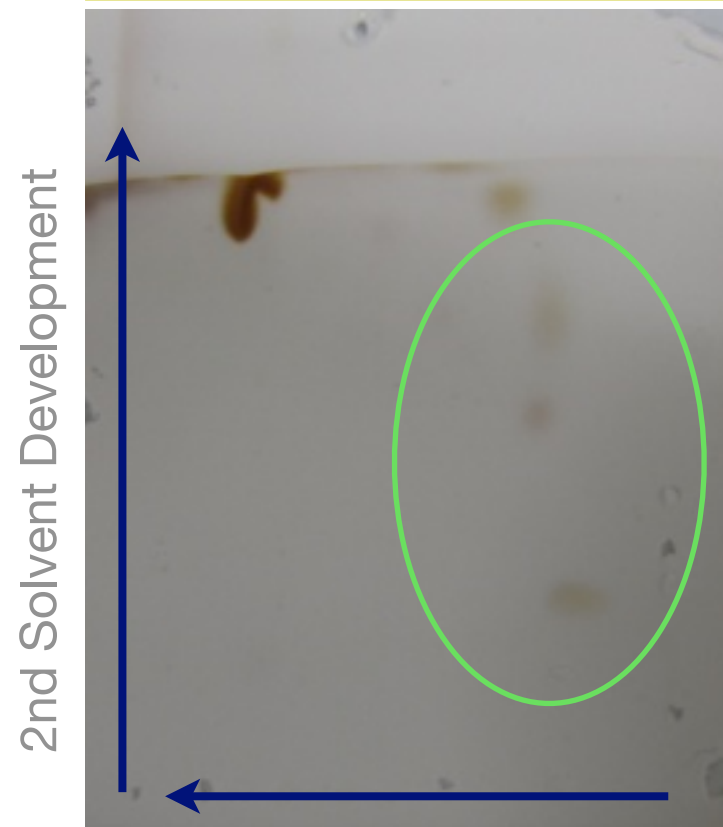


# Analysis of Free fatty acid Value

Detection method

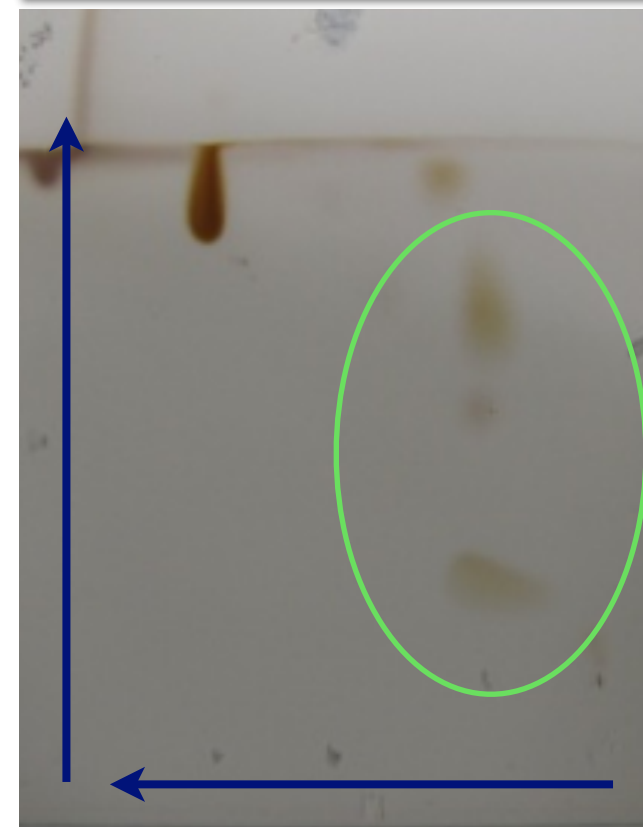
2D-TLC Analysis

Argan oil



1st Solvent Development

Fermentoil Argan



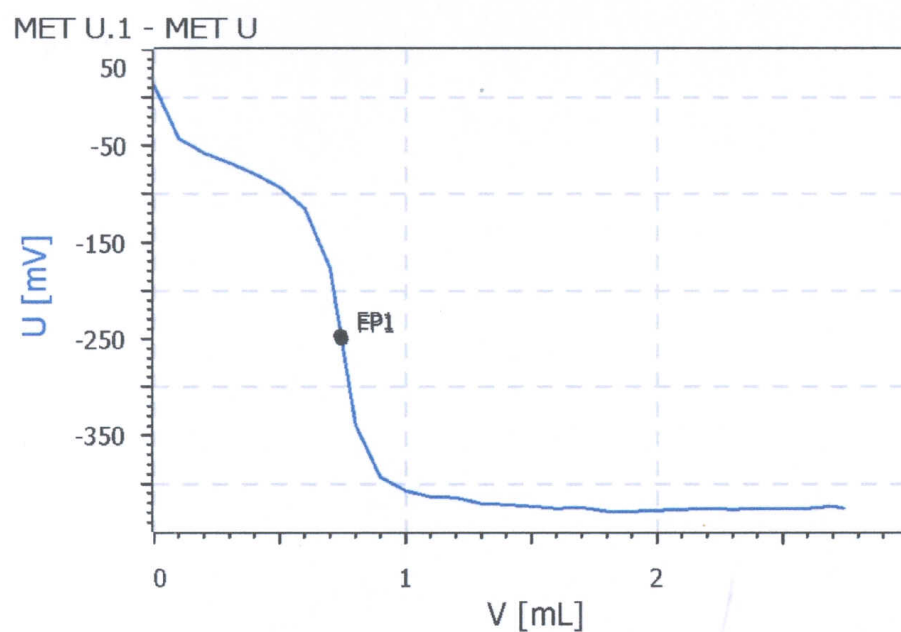
Comparing to the result of TLC Analysis,  
the amount of free fatty acid increased after fermentation

# Analysis of Free fatty acid Value

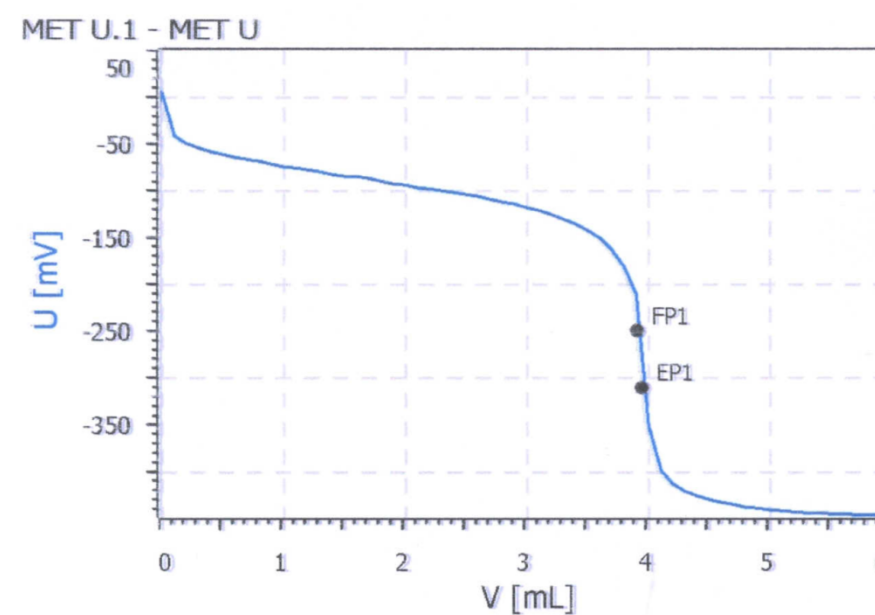
Detection method

Metrohm Titrato

**Argan oil**



**Fermentoil Argan**



	Argan oil	Fermentoil Argan
KOH(mg/g)	0.64	5.81

Comparing to the result before fermentation,  
the amount of free fatty acid increased by 9 times

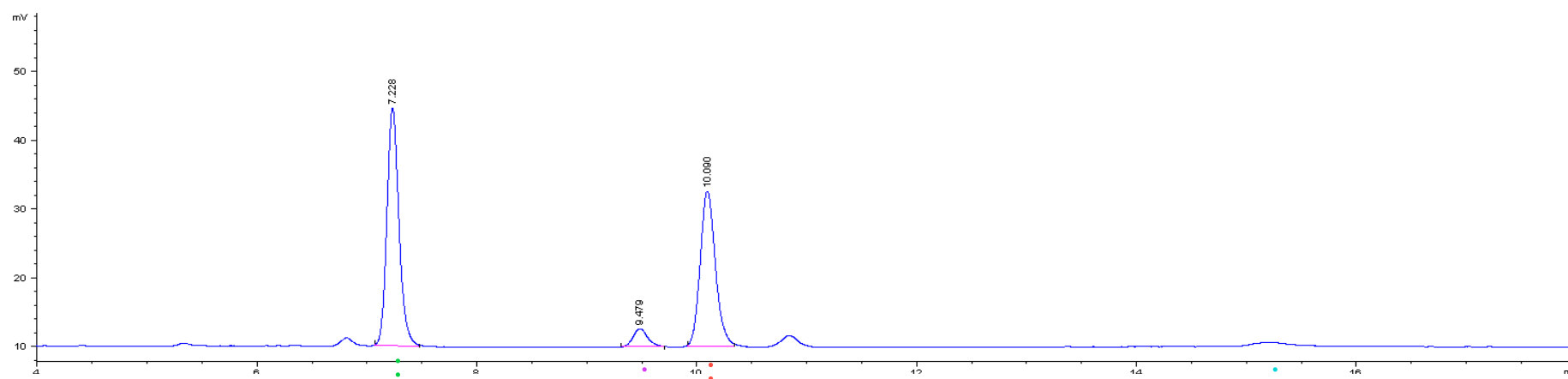
# Analysis of Free fatty acid Value

Detection method

HPLC Analysis

**Argan oil**

50% Argan oil

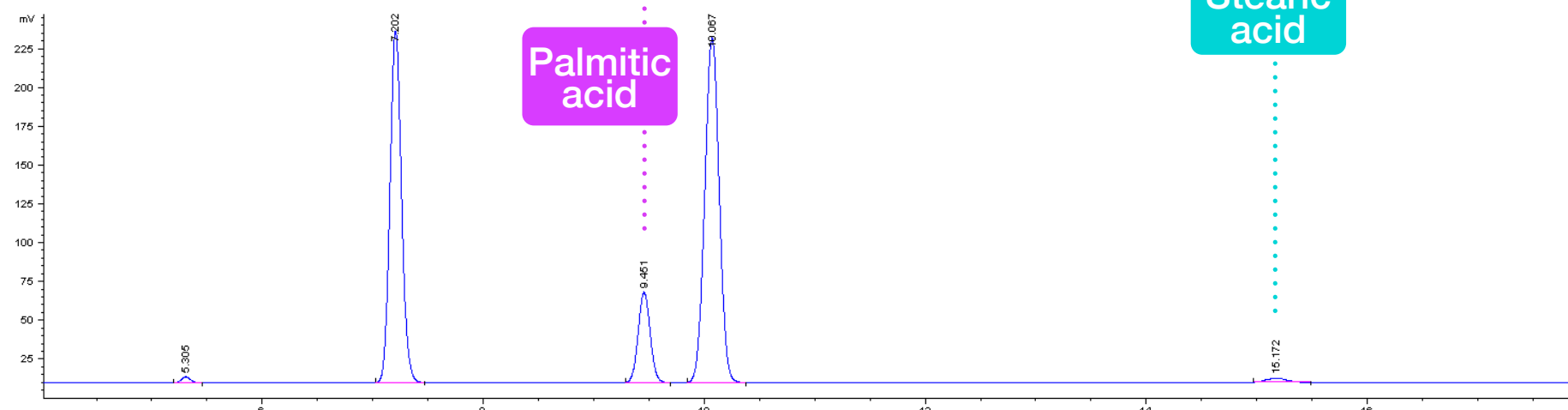


Linoleic acid

Oleic acid

**Fermentoil Argan**

10% Fermentoil Argan



Palmitic acid

Stearic acid

	Linoleic acid	Palmitic acid	Oleic acid	Stearic acid
Argan oil	1240.3	378.7	1160.6	262.7
Fermentoil Argan	16926.3	5628.0	21053.3	1549.0

13.6

14.9

18.1

5.9

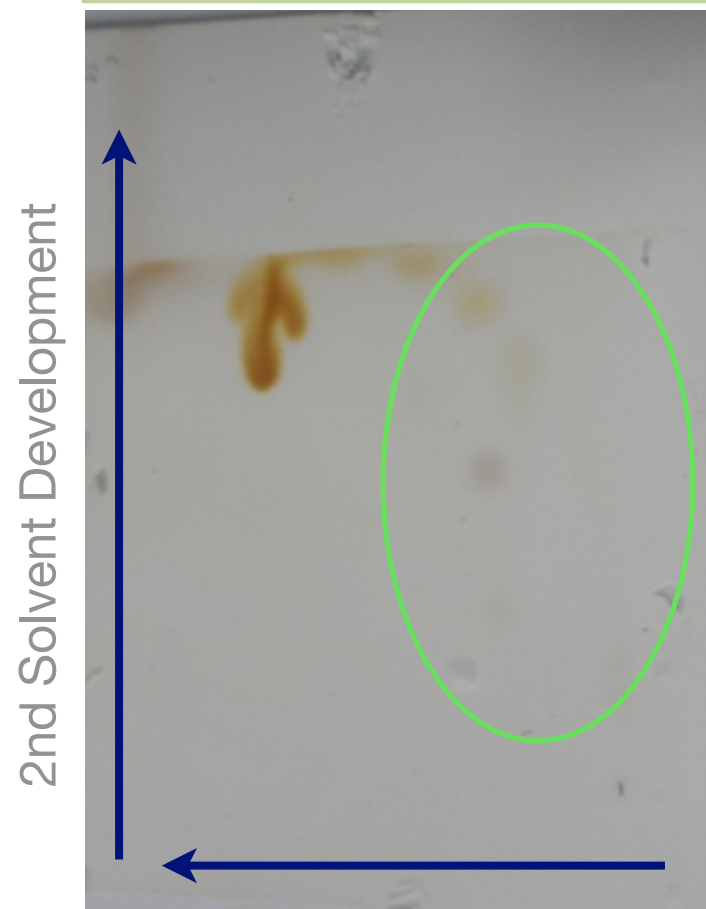
(unit: ppm)

# Analysis of Free fatty acid Value

Detection method

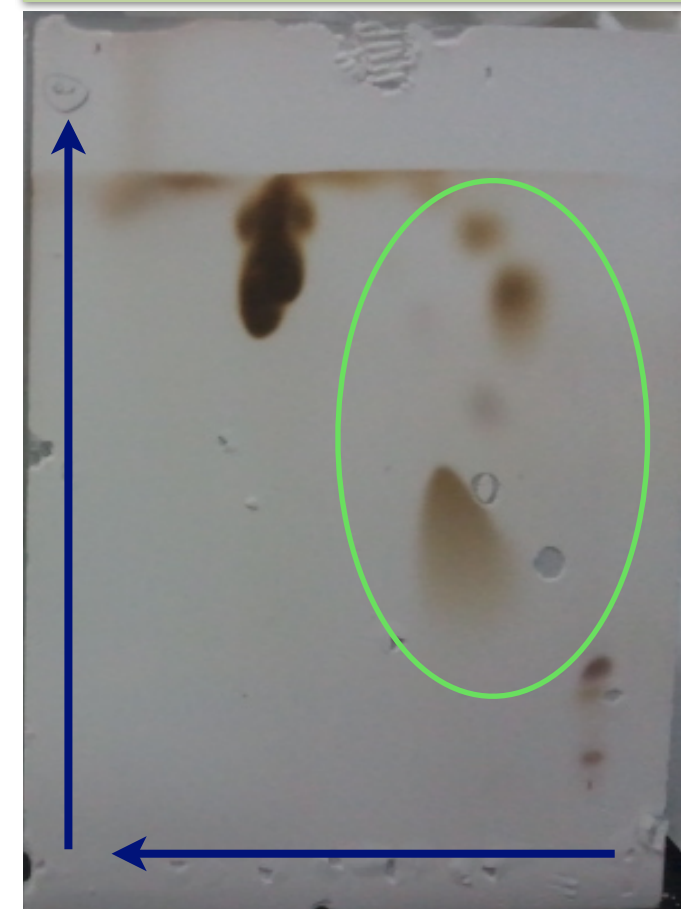
2D-TLC Analysis

Green tea seed oil



1st Solvent Development

Fermentoil GTS



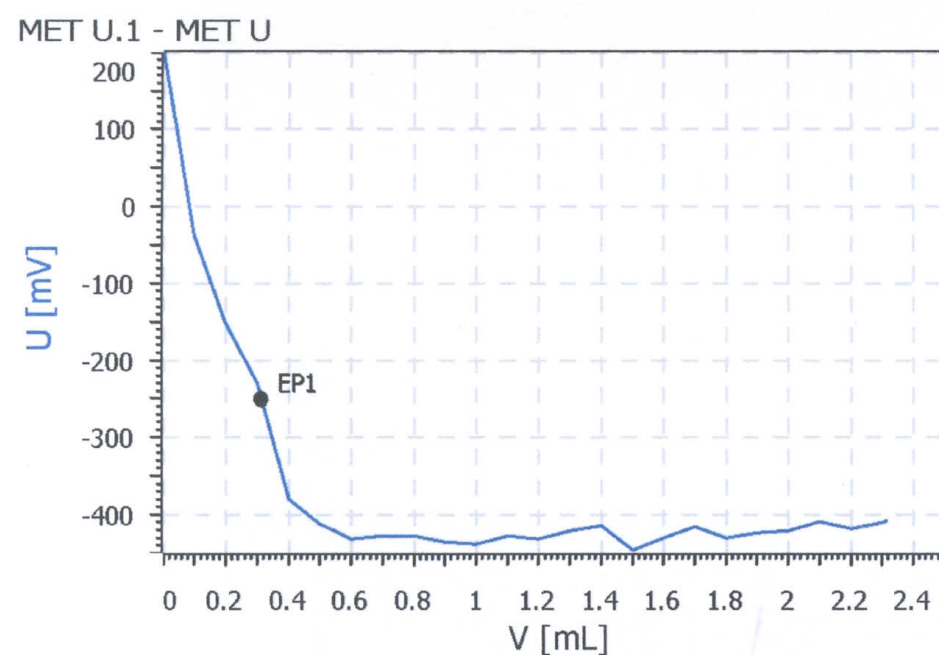
Comparing to the result of TLC Analysis,  
the amount of free fatty acid increased after fermentation

# Analysis of Free fatty acid Value

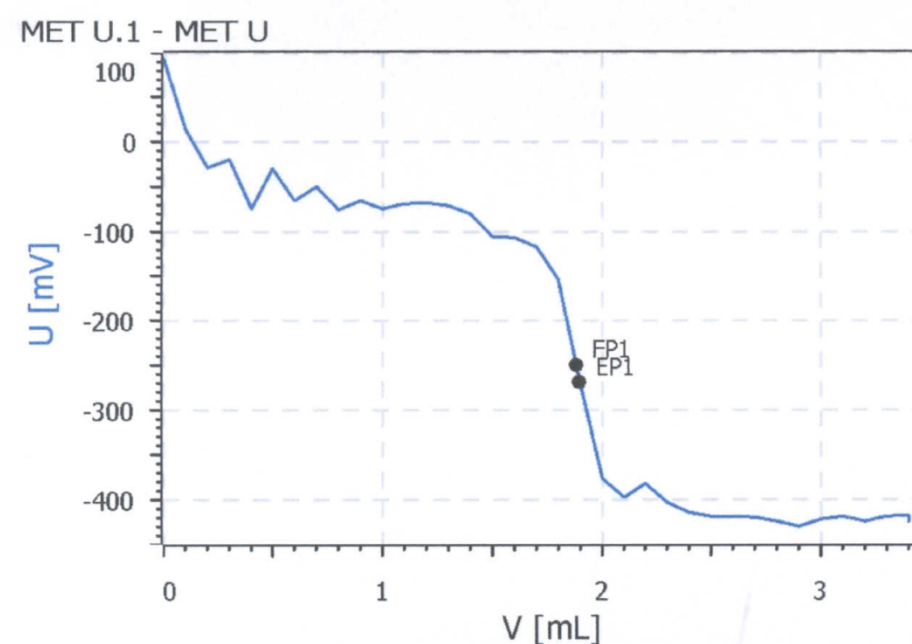
Detection method

Metrohm Titrato

Green tea seed oil



Fermentoil GTS



Green tea seed oil

Fermentoil GTS

KOH(mg/g)

0.21

15.38

Comparing to the result before fermentation,  
the amount of free fatty acid increased by 70 times

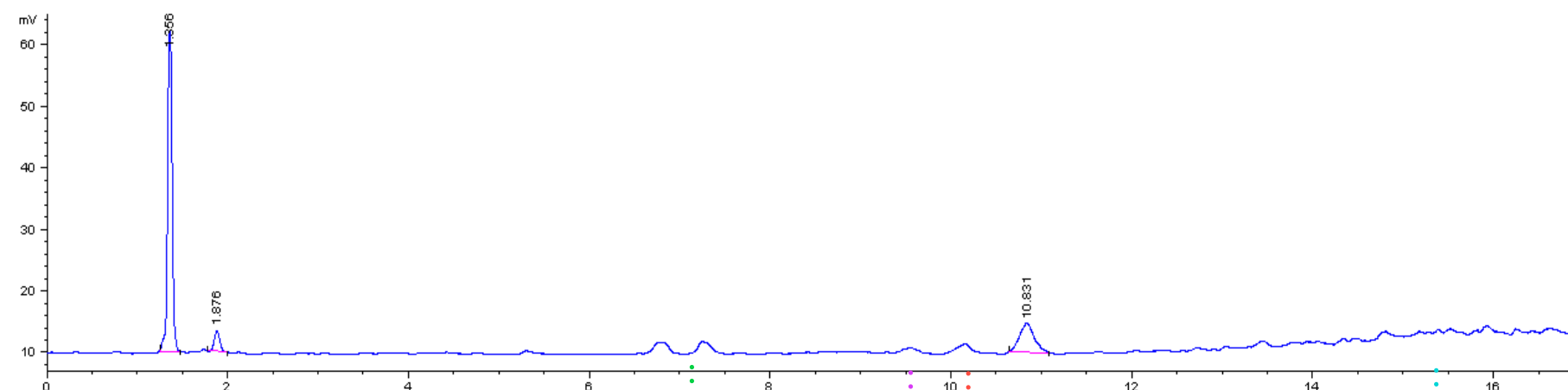
# Analysis of Free fatty acid Value

Detection method

HPLC Analysis

**Green tea seed oil**

50% Green tea seed oil



Linoleic acid

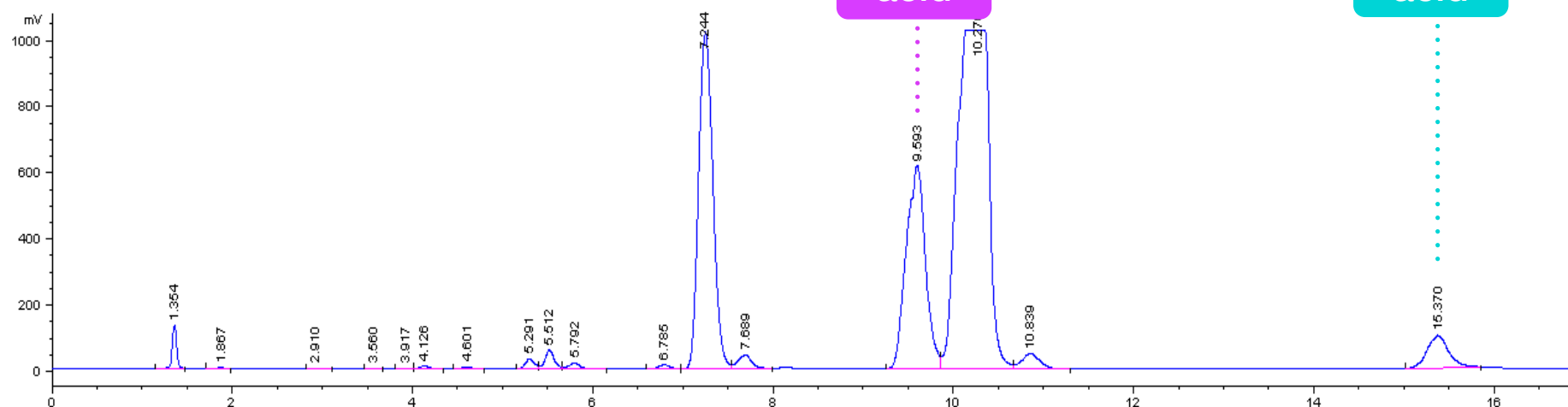
Oleic acid

Palmitic acid

Stearic acid

**Fermentoil GTS**

25% Fermentoil GTS



Linoleic acid

Palmitic acid

Oleic acid

Stearic acid

Green tea seed oil

234.7

243.6

0

0

Fermentoil GTS

9549.193

4790.789

31031.54

4989.309

40.68

19.66

(unit: ppm)

# Morphology Change

Detection method

Optical microscope



*Pseudozyma*

Oil Feeding(0hr)

Fermentation(60hr)

Fermentation(120hr)

Magnification : X1000

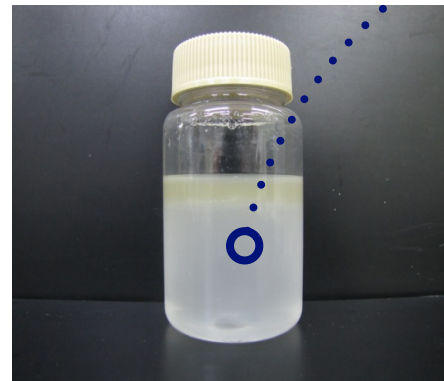
Morphology of oil particle was observed during fermentation process by optical microscope



Olive oil



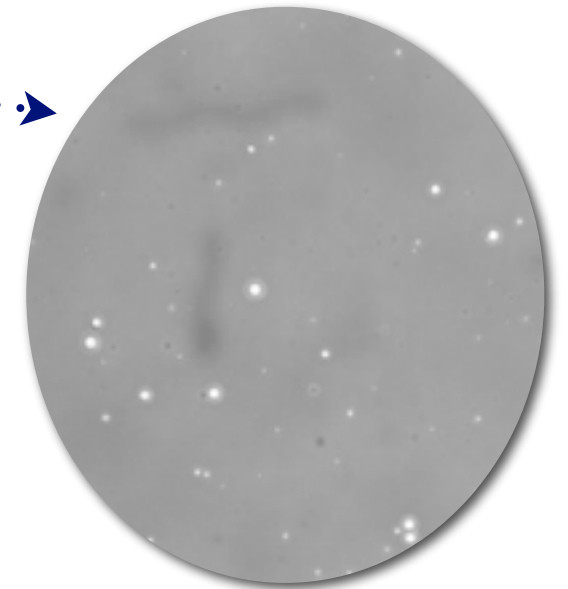
pH9.0



pH7.0



pH5.0



Fermentoil  
Olive



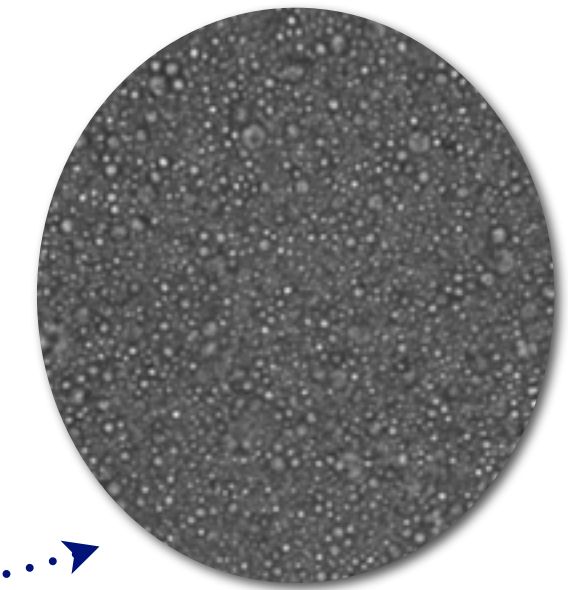
pH9.0



pH7.0



pH5.0

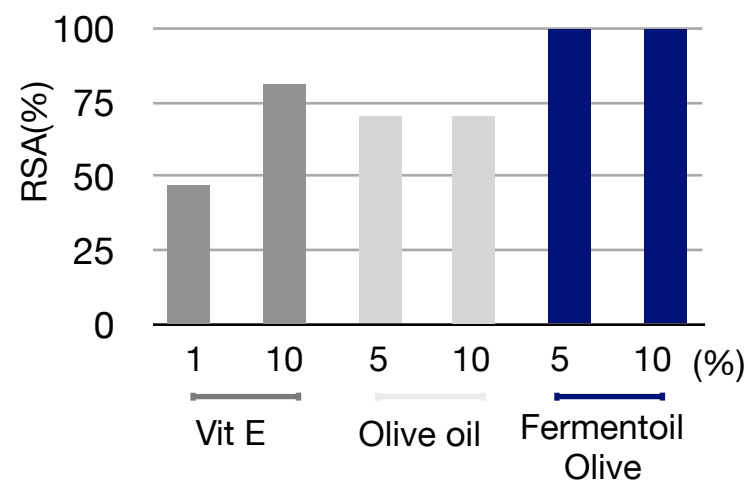


The emulsifying capacity of Fermentoil Olive can be showed in a wide range of pH comparing to other olive oil

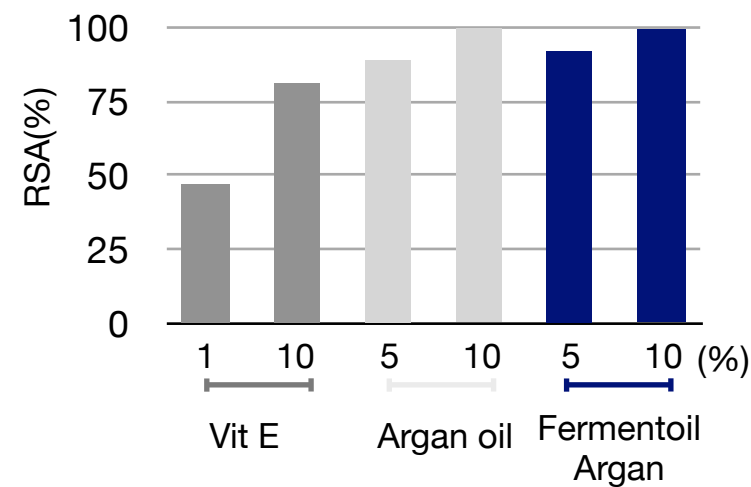
# Anti-oxidative Effect

DPPH assay

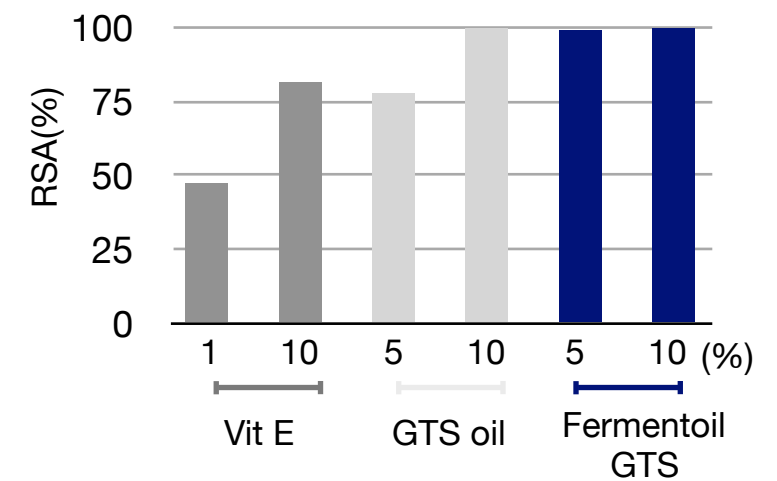
\*RSA : Radical Scavenging Activity



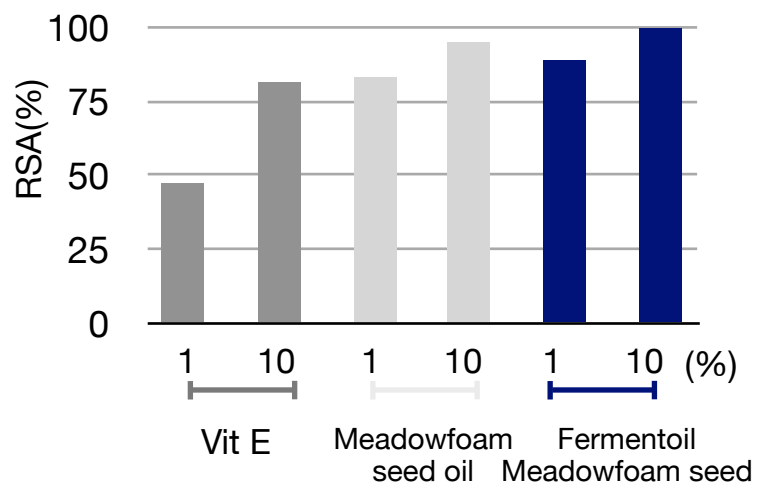
Fermentoil Olive



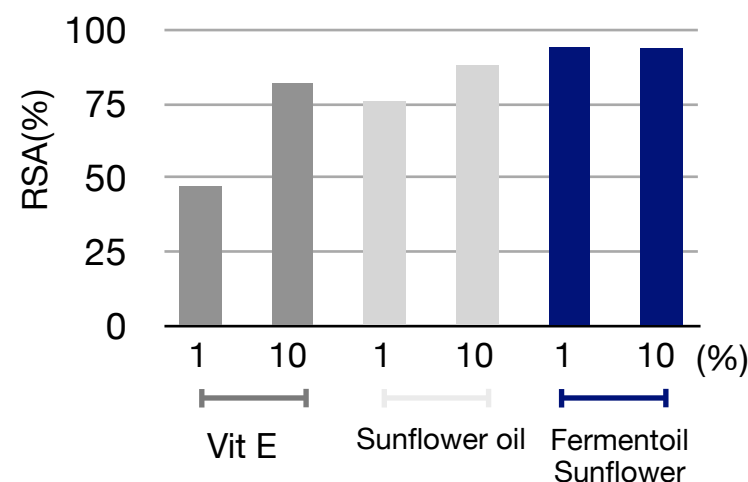
Fermentoil Argan



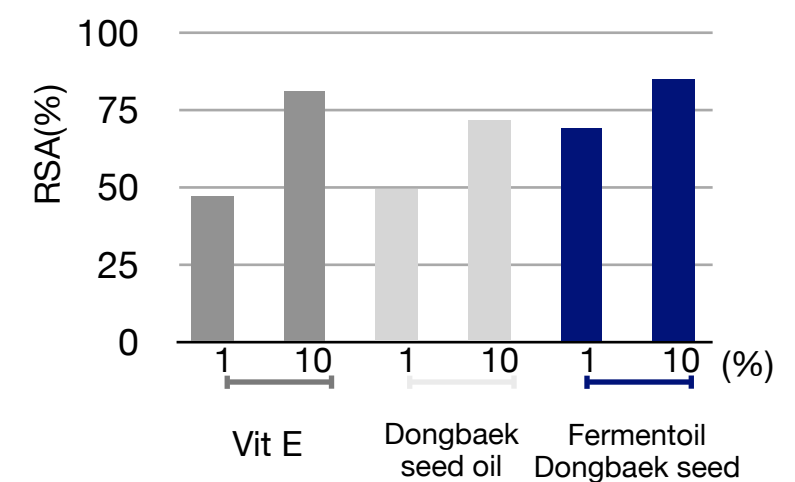
Fermentoil Green tea seed



Fermentoil Meadowfoam seed



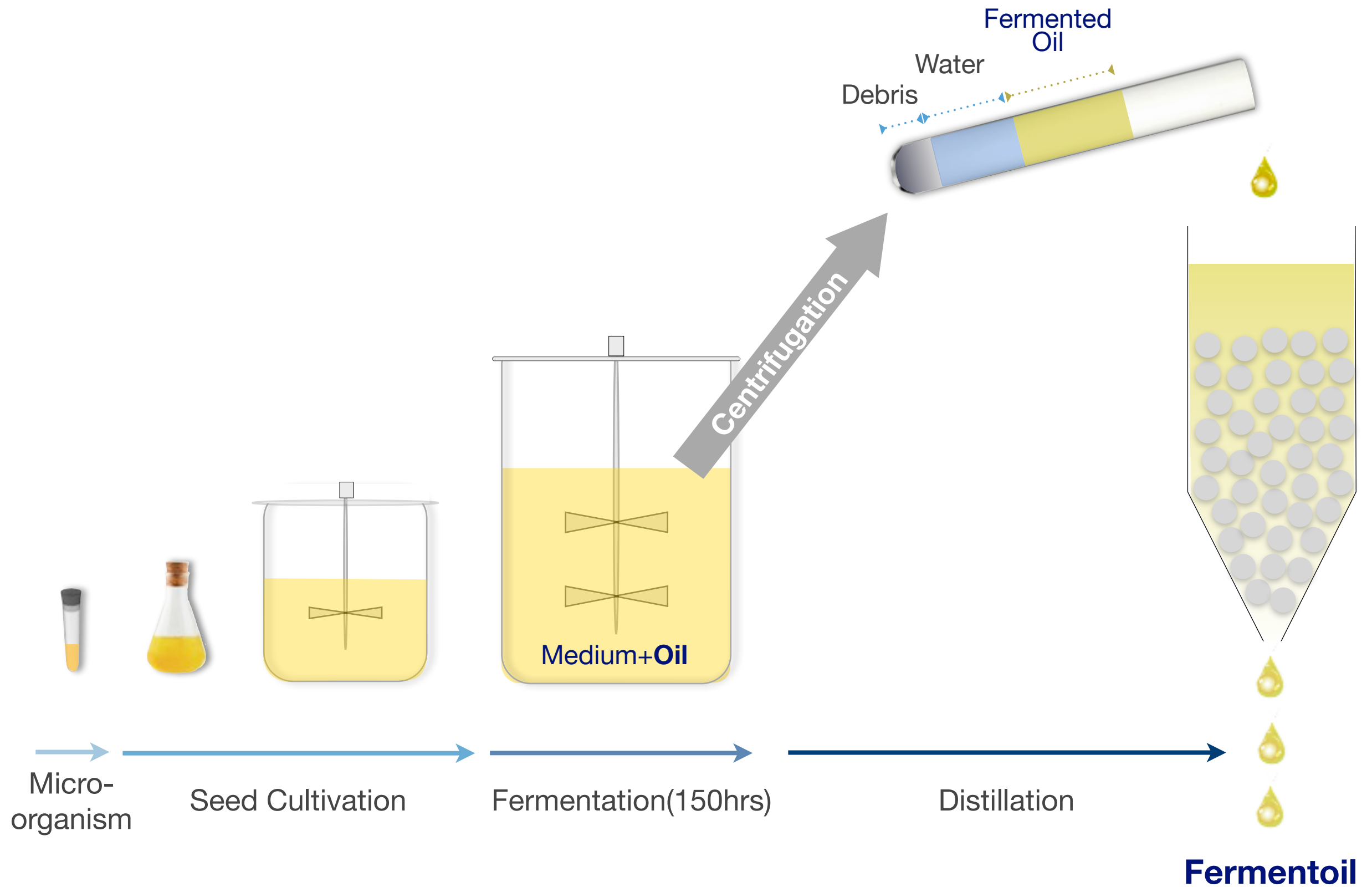
Fermentoil Sunflower seed

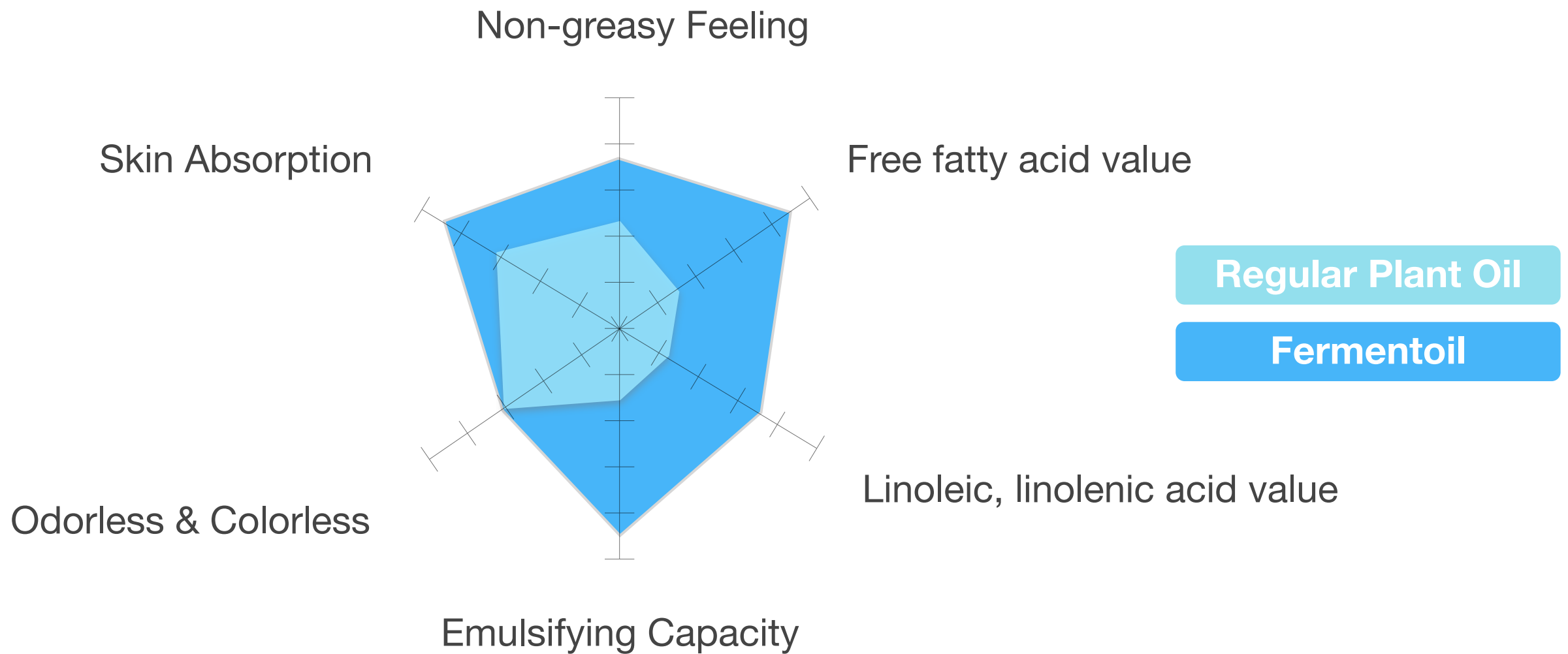


Fermentoil Camellia seed

The overall RSA of oil is improved after fermentation

# Production Process of Fermentoil

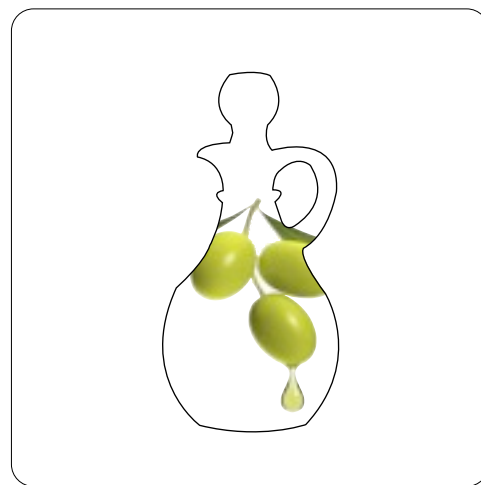




General plant oil has been improved in quality and compatibility through Damy's fermentation technology

# Olive oil

Recommended for dry skin



## Material

- Oleic acid
- Vitamin E
- Polyphenol

## Benefits

- Moisturizing
- Anti-aging
- Antioxidant activity
- Protection against UVB damage
- Antio-inflammation

## Story

- Olive oil is used in traditional medicine and food from 6,000 years ago
- Olive oil used for Fermentoil  
Olive is grown with fertile soil and rich sunlight of Italy



# Argan oil

Recommended for sensitive skin



## Material

- Linolenic acid
- Oleic acid
- Vitamin E
- Polyphenol

## Benefits

- Moisturizing
- Anti-sebum
- Anti-aging
- Wound healing
- Anti-acne

## Story

- Called as a 'Golden liquid presented from God'
- Popular oil for hair care with its nutrition
- Rigidly selected Argan grown under optimal conditions of Morocco
- Valuble oil that only 1 liter is obtained from 7 trees

# Green tea seed oil

Recommended for oily and acne skin



## Material

- Unsaturated fatty acid
- Vitamin E
- Polyphenol

## Benefits

- Moisturizing
- Antioxidant activity
- Antiseptic
- Fungicide and bactericide

## Story

- Green tea seed is praised as the beauty secret of the Geishas.
- Green tea seed is recognized as very precious oil in Eastern Asia
- It is valuable oil that only 25ml is obtained from 800 green tea seeds



# Meadowfoam seed oil

Recommended for oily and acne skin



## Material

- Eicosenoic acid
- Oleic acid
- Linoleic acid
- Vitamin E

## Benefits

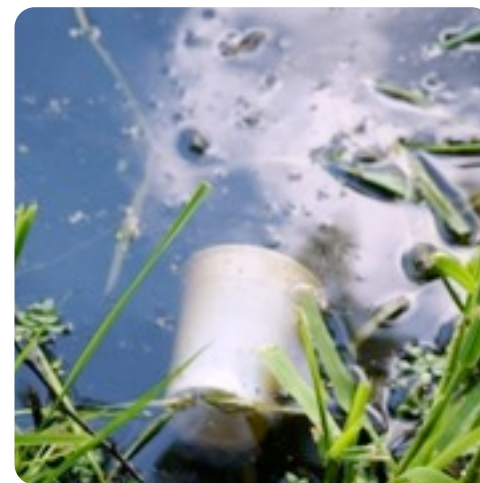
- Moisturizing
- Antioxidant activity
- Skin nutrition
- Skin rejuvenating
- Anti-aging
- Recovery of hair damages

## Story

- 'Meadowfoam' received its name because of its resemblance while in bloom to the white foam in the meadow blowing on the ocean.
- Meadowfoam seed has been studied for pharmaceutical use as well as cosmetic industry because of its medicinal efficacy.
- Premium oil which contains high contents of long chain fatty acid.

# Sunflower seed oil

Recommended for sensitive skin



## Material

- Linoleic acid
- Phytosterol
- Vitamin E
- Polyphenol

## Benefits

- Moisturizing
- Antioxidant activity
- Improvement of skin irritation
- Bactericide

## Story

- Sunflower seed has been used by American Indian tribes for body painting, decorations, ointments, skin and hair care.
- Sunflower is a plant which has strong self purification capacity ; Sunflower was used for purifying contaminated wastewater site in Ohio and removed more than 95% of uranium in 24h (Dushenkov et al., 1997 a,b, 1995)

# Safflower seed oil

Recommended for dry skin



## Material

- Linoleic acid
- Vitamin E

## Benefits

- Moisturizing
- Antioxidant activity
- Antiseptic
- Fungicide and bactericide

## Story

- Safflower has been traditionally used for fabric dyeing in Korea.
- Safflower has been used for color makeup especially on lips and cheeks by women of Joseon dynasty.
- Safflower seed is used as food oil.



# Camellia seed oil

Recommended for dry skin and hair care



## Material

- Oleic acid
- Camellin
- Camelia saponin

## Benefits

- Moisturizing
- Antioxidant activity
- Conditioning effect
- Improvement of skin irritation

## Story

- Dongbaek blooms in winter.
- Dongbaek seed is traditionally used for hair nutrition and hair polish in Korea.
- 7 Dongbaek forest are designated as Korean natural monument.

# Advantage of Fermentoil



## Olive oil

- Moisturizing
- Antioxidant activity
- Protection against UVB damage
- Anti-inflammation



## Argan oil

- Moisturizing
- Anti-sebum
- Anti-aging
- Wound healing
- Anti-acne



## Green tea seed oil

- Moisturizing
- Antioxidant activity
- Antiseptic
- Fungicide and bactericide



## Meadowfoam seed oil

- Moisturizing
- Antioxidant activity
- Skin nutrition
- Anti-aging



## Jojoba seed oil

- Moisturizing
- Antioxidant activity
- Anti-inflammation
- Bactericide



## Sunflower seed oil

- Moisturizing
- Antioxidant activity
- Improvement of skin irritation
- Bactericide



## Safflower seed oil

- Moisturizing
- Antioxidant activity
- Antiseptic
- Fungicide and bactericide



## Camellia seed oil

- Moisturizing
- Antioxidant activity
- Conditioning effect
- Improvement of skin irritation

## Improved Application in cosmetics

- Non-greasy feeling
- Improved skin absorption
- Improved emulsifying capacity
- Improved compatibility
- Increased beneficial free fatty acid value

DAMY Fermentation

Fermentoil Olive

Fermentoil Meadowfoam seed oil

Fermentoil Safflower seed

Fermentoil Argan

Fermentoil Jojoba seed

Fermentoil Camellia seed

Fermentoil Green tea seed

Fermentoil Sunflower seed

*The Quality of Plant Oil*

# Korean Medicinal Herb Fermentoil Series

New generation of plant oil to improve your cosmetics

Benefits of Korean medicinal herb are added in Fermentoil Series.

**KR Patent / PCT Pending**

Angelica  
Artemisia  
Red ginseng  
Glycyrrhiza  
Leonurus  
Saururus  
Shiunko

# Angelica gigas

Recommended for oily and acne skin



## Material

- Nodakenin
- Decursin
- Isoimperatorin

## Benefits

- Anti-wrinkle
- Anti-oxidation
- Anti-inflammation
- Anti-microbes
- Moisturizing

## Story

- Angelica has been used as a medicine for more than 2000 years.
- Angelica is known to help nourishing of the blood according to Dongeuibogam\*

\* Dongeuibogam(東醫寶鑑) : Korean traditional medicinal book written in Sun Dynasty, 1596~1610 (National Treasure)



# Artemisia princeps

Recommended for oily and acne skin



## Material

- Polyphenol

## Benefits

- Anti-microbes
- Anti-inflammation
- Anti-oxidation
- Brightening

## Story

- Artemisia describes in the myth of the Dangun.
- Artemisia princeps is mentioned more than 500 times as prescription in Dongguk-eui-bo-gam\*
- Wide range of use in Korea ; Insect repellent, spa, food and skin care

# Panax ginseng

Recommended for sensitive and aged skin



## Material

- Ginsenoside Rg1
- Ginsenoside Rb1

## Benefits

- Wound healing
- Hydrating
- Anti-inflammation
- Anti-stress
- Collagen synthesis

## Story

- Panax ginseng has been used from 1000 years ago.
- Panax ginseng has known to help recover one's energy according to Dongeuibogam\*

\* Dongeuibogam(東醫寶鑑) : Korean traditional medicinal book written in Sun Dynasty, 1596~1610 (National Treasure)

# Glycyrrhiza uralensis

Recommended for sensitive skin



## Material

- Glycyrrhizin
- Liquirtin

## Benefits

- Anti-oxidation
- Anti-inflammation
- Anti-irritation
- Brightening

## Story

- Glycyrrhiza uralensis has been used with most medicinal herbs together for its multi-functional effect in Korean traditional prescription.
- Glycyrrhiza uralensis has been known to help promotion of blood circulation, detoxification according to Dongeuibogam\*

\* Dongeuibogam(東醫寶鑑) : Korean traditional medicinal book written in Sun Dynasty, 1596~1610 (National Treasure)

# Leonurus sibiricus

Recommended for aged and dehydrated skin



## Material

- Oleic acid
- Linoleic acid
- Leonurin
- Saponin

## Benefits

- Anti-oxidation
- Anti-aging
- Anti-microbes

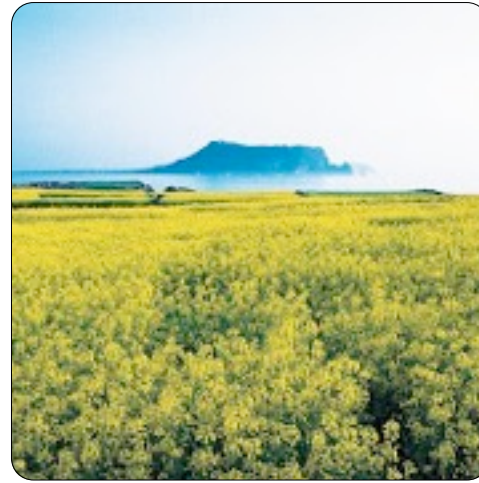
## Story

- The Korean herb name 'Ikmocho' means "Good for mother".
- Wu Tse-t'ien, the first woman emperor of China used it for beauty.
- Leonurus sibiricus is known to have efficacy for pregnancy.



# Saururus Chinensis

Recommended for aged and dehydrated skin



## Material

- Quercetin
- Quercitrin
- Methyl-n-nonyl-ketone

## Benefits

- Anti-oxidation
- Brightening
- Soothing
- Anti-microbes

## Story

- There are only 2 genus in Saururus species
- Native plant only grown in Jeju island
- Saururus Chinensis is known to help detoxification

# Shiunko

Recommended for sensitive skin



## Material

- Z-ligustilide
- Shikonin

## Benefits

- Anti-oxidation
- Anti-microbes
- Proliferation
- Collagen secretion
- Anti-inflammation

## Story

- Shiunko is traditional ointment which is made of Angelica sinensis and Lithospermum erythrorhizon.
- The dying of Lithospermum erythrorhizon has been loved as a symbol of emperor and elegance from 2000 years ago.

**Olive oil**

- Moisturizing
- Antioxidation activity
- Protection against UVB damage
- Anti-inflammation

**Korean medicinal herb**

DAMY Fermentation

**Improved Application in cosmetics**

Non-greasy Feeling  
Improved Skin Absorption  
Improved Emulsifying Capacity  
Improved compatibility  
Increased beneficial free fatty acid value

Fermentoil Angelica

Fermentoil Artemisia

Fermentoil Red ginseng

Fermentoil Glycyrrhiza

Fermentoil Leonurus

Fermentoil Saururus

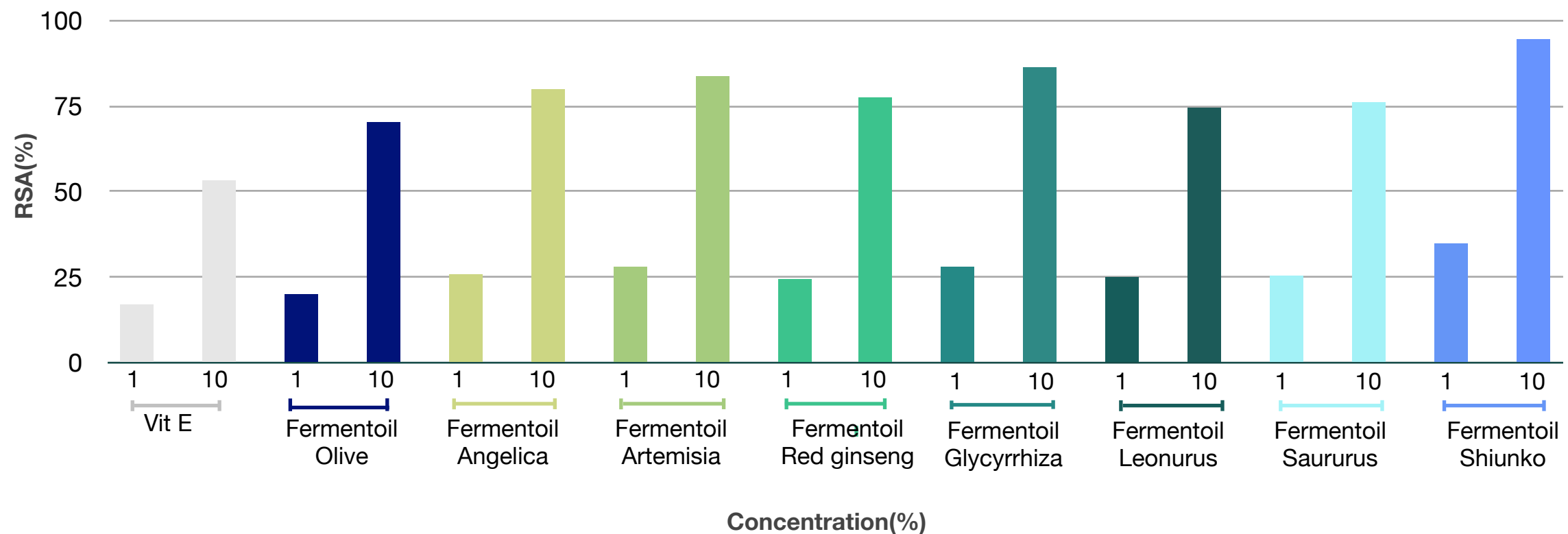
Fermentoil Shiunko



# Anti-oxidative Effect

DPPH assay

\*RSA : Radical Scavenging Activity



The overall RSA of oil is improved after fermentation

# Fermentoil Series

Fermentoil Series	INCI name	Benefits & Uses	Recommended Dosage
Fermentoil Olive	Candida Bombicola/Glucose/Methyl Rapeseedate Ferment, Olea Europaea(Olive)Fruit Oil	<ul style="list-style-type: none"> <li>- Non-greasy feeling</li> <li>- Improved skin absorption</li> <li>- Improved emulsifying capacity</li> <li>- Improved compatibility</li> <li>- Increased beneficial free fatty acid value</li> </ul>	Up to 99%, depending on formulation
Fermentoil Argan	Candida Bombicola/Glucose/Methyl Rapeseedate Ferment, Argania Spinosa Kernerl Oil		
Fermentoil Green tea seed	Candida Bombicola/Glucose/Methyl Rapeseedate Ferment, Camellia Sinensis Seed Oil		
Fermentoil Meadowfoam seed	Candida Bombicola/Glucose/Methyl Rapeseedate Ferment, Limnanthes Alba(Meadowfoam)Seed Oil		
Fermentoil Sunflower seed	Candida Bombicola/Glucose/Methyl Rapeseedate Ferment, Helianthus Annuus(Sunflower)Seed Oil		
Fermentoil Safflower seed	Candida Bombicola/Glucose/Methyl Rapeseedate Ferment, Carthamus Tinctorius(Safflower)Seed Oil		
Fermentoil Camellia seed	Candida Bombicola/Glucose/Methyl Rapeseedate Ferment, Camellia Japonica Seed Oil		

# Korean Medicinal Herb Fermentoil Series

Korean Medicinal Herb Fermentoil Series	INCI name	Benefits & Uses	Recommended Dosage
Fermentoil Angelica	Pseudozyma Epicola/Apricot kernel Oil/Olive Fruit Oil/ Sunflower Seed Oil/Sweet Almond Oil/ Angelica Gigas Root Extract Ferment Extract Filtrate	- Based on the benefits from Fermentoil, adding functional elements from each Korean medicinal herb	Up to 99%, depending on formulation
Fermentoil Artemisia	Pseudozyma Epicola/Apricot kernel Oil/Olive Fruit Oil/ Sweet Almond oil/Sunflower Seed Oil/ Artemisia Princeps Extract Ferment Extract Filtrate		
Fermentoil Red ginseng	Pseudozyma Epicola/Apricot kernel Oil/Olive Fruit Oil/ Sunflower Seed Oil/Sweet Almond Oil/ Panax Ginseng Root Extract Ferment Extract Filtrate		
Fermentoil Glycyrrhiza	Pseudozyma Epicola/Apricot kernel Oil/Olive Fruit Oil/ Sweet Almond oil/Sunflower Seed Oil/ Licorice Root Extract Ferment Extract Filtrate		
Fermentoil Leonurus	Pseudozyma Epicola/Apricot kernel Oil/Olive Fruit Oil/ Sunflower Seed Oil/Sweet Almond Oil/ Leonurus Sibiricus Extract Ferment Extract Filtrate		
Fermentoil Saururus	Pseudozyma Epicola/Apricot kernel Oil/Olive Fruit Oil/ Sunflower Seed Oil/Sweet Almond Oil/ Saururus Chinensis Extract Ferment Extract Filtrate		
Fermentoil Shiunko	Pseudozyma Epicola/Apricot kernel Oil/Olive Fruit Oil/ Sunflower Seed Oil/Sweet Almond Oil/ (Angelica Gigas/Lithospermum Erythrorhizon)Root Extract FermentExtract Filtrate		