

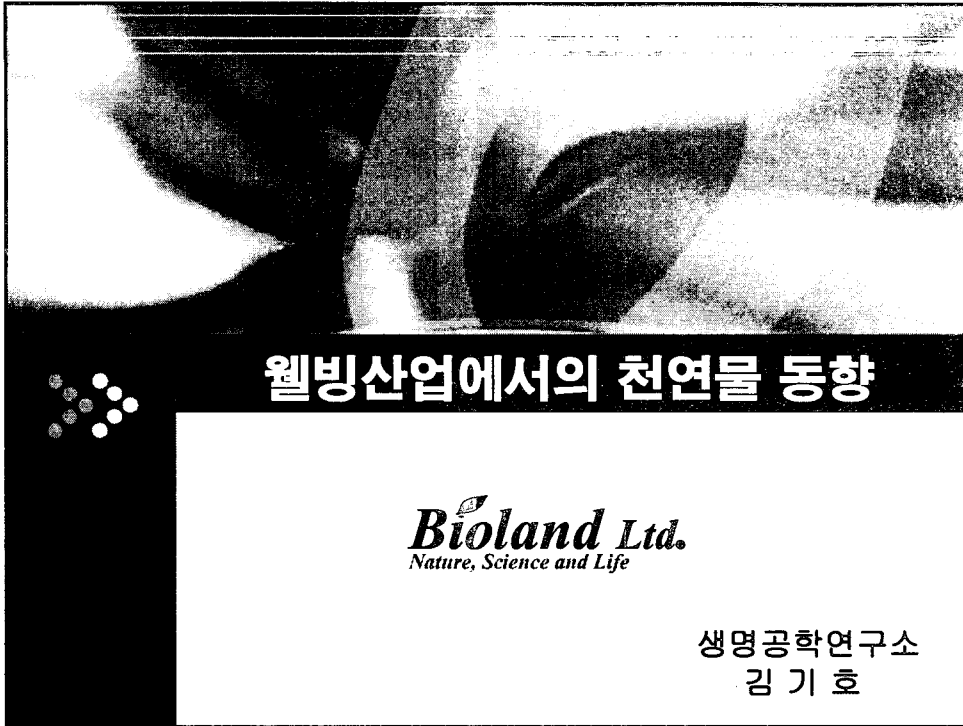
웰빙산업에서의 천연물 동향

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(주)바이오랜드 생명공학연구소

Tel: (041) 564-8615

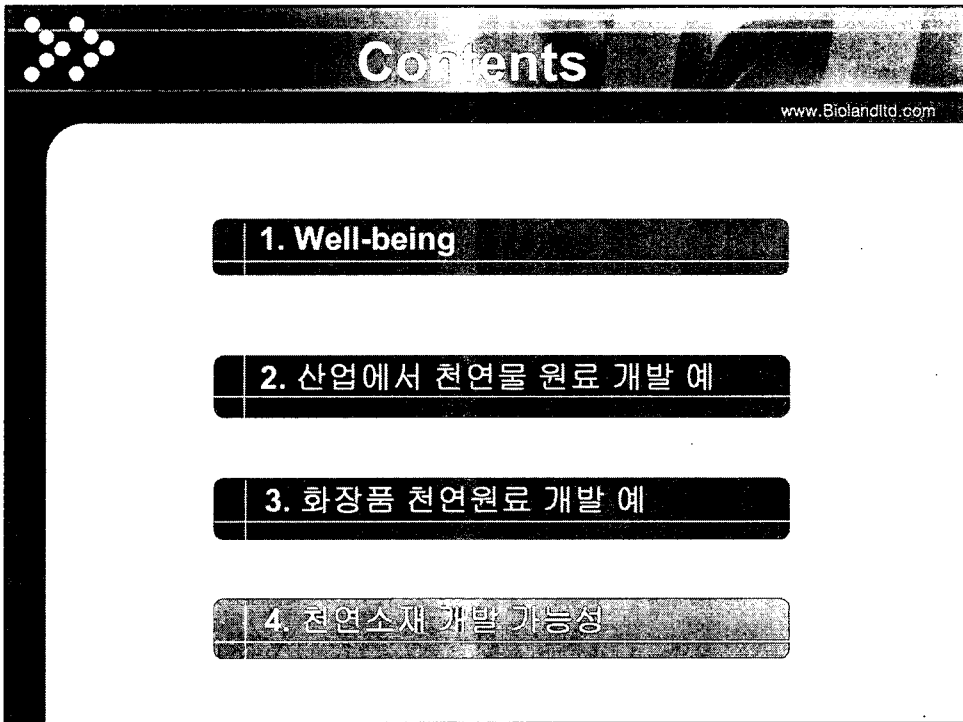
E-mail: biolandrnd@biolandltd.com



웰빙산업에서의 천연물 동향

Bioland Ltd.
Nature, Science and Life

생명공학연구소
김기호



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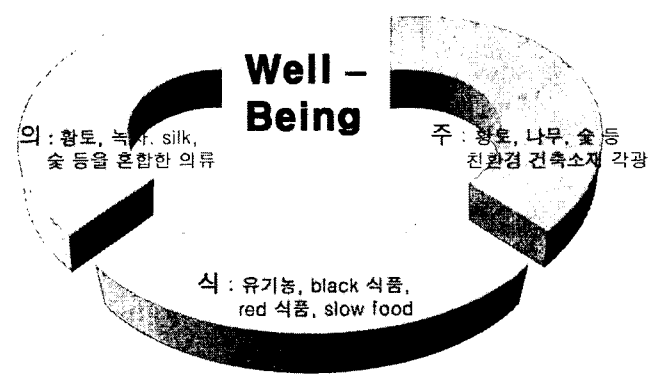
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Well - Being : 잘 먹고 잘 살자

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“웰빙” = “건강하고, 건강하고, 안전하고, 행복한 삶을 추구”



Well - Being : 건강/뷰티

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건강/뷰티 산업

천연물(식물성) 이용선호

자연주의 화장품 : organic, 한방 이너 뷰티 : 먹는 화장품

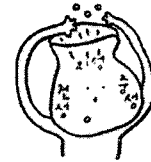
요가, 스파 : 정신적, 육체적 건강추구

유기농 식품 : 몸에 좋은 안전한 식품



인간의 정신적, 육체적 건강과 아름다움, 자연스러움을 지향

피부질환 관련 의약



천연물	효능 & 효과
세라미드, 알로에베라, 녹차, 황금, 꿀수오, 자소, 개박하, 꿀수오, 측백엽, 연근, 새우란	아토피 피부
알로에, 병풀(<i>centella asiatica</i>), 신미, 백지, 정향, 쑥초, 개나리, 모과, 무화과, 마늘, 박하, 호황련.	상처치료
보골지	COX-1 저해제
백강잠	5 α -reductase 저해제(피지생성억제)
모황련, 감황, 적작약, 치자, 호장근, 작약, 옥단피, 대황, 시화열매, 대나무, 땅두릅, 감호	여드름 예방/ 치료
산수유, 한련초, 오디	모발재생촉진
고삼추출물	5 α -reductase 저해제
인삼 감차, 산두근 보리열매, 알로에, 클로렐라, 동과인, 죽엽, 차전자, 금잔화, 꿀우꽃, 캐모마일, 사루비아, 옥단피, 연명초, 황금, 버찌, 자소, 작약, 감초	발모촉진 / 예방

기능성화장품



천연물	효능 & 효과
상백피, 천문동, 흑태, 감태, 유산균배양액의 가수분해물, 닥나무, 꾸지뽕 나무, 감초, 차나무, 옥단피(<i>matricaria chamomilla</i>), Coumarouna odorata, <i>Dipteryx alata vogel</i> , <i>Dipteryx oppositifolia willd</i> , 홍화, 생강, 지황, 작약, 삼나무, 미모사, 인삼, 맥문동, 봉선화, 산사나무, 쑥, 오이, 울무, 오가피, 참, 포도, 해조, 금은화, 천마, 알부틴, 유용성 감초 등	피부미백제
해조, 감초, 알로에, 사탕수수, 사철나무, 명일엽, 인진호, 금은화, 고량강	자외선차단제
느릅나무, 사과/파파야/파인애플 추출물, 벌꿀, 빈랑자, 강국, 백하수오, 알로에, 상항버섯, 송이버섯, 사향초, 차조기, 도라지, 로즈마리, 알로에, 으름, 석류, 벌꿀, 유자 등	주름개선제

여드름, 항염증, 피부개선 관련



천연물	효능 & 효과
올약, 오배자, 가자, 축백엽, 은형엽, 금은화, 연근, 고삼, 현삼, 자초, 삼백초, 감황, 적작약, 치자, 호장근, 차조기과, 가시나무, 두릅 등	여드름
마치현(항염/항자극화장료), 주목(항염증화장료), 갈근, 차조기, 자작나무, 박꽃, 낙화생, 올리브, 콩과식물 등	항염증
콩과식물, 작약, 장미, 모과, 산수유, 붓꽃, 복숭아, 버섯 등	피부개선

피부보습, 각질제거

천연물	효능 & 효과
알로에, 민트, 녹두, 어성초, 레몬, 표고버섯, 느릅나무, 녹두추출물, 옥수수, 백합, 작약, 연자육, 자황, 파고지, 오수유, 천련자 등	피부보습
녹영(각질화 정경화), 옥단 추출물(각층박리제), 대나무 추출물	각질제거





마치현 (*Portulaca Oleracea L.*)

→ 쌍떡잎식물 쇠비름과(*Portulacaceae*)의 한해살이풀

→ 효능

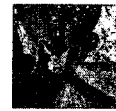
- Anti-inflammatory
- Anti-irritation effect

→ 특허

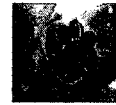
1. KOREA : Cosmetic composition containing portulaca oreracea L. extract for anti-inflammation and anti-irritation (P.No.2000 25345)
2. JAPAN: Cosmetic composition containing portulaca oreracea L. extract for anti-inflammation and anti irritation (P.No.2001 193307)



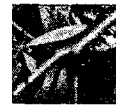
Flowers



Leaves



Seeds



Stems



Anti-irritation

Human patch Test

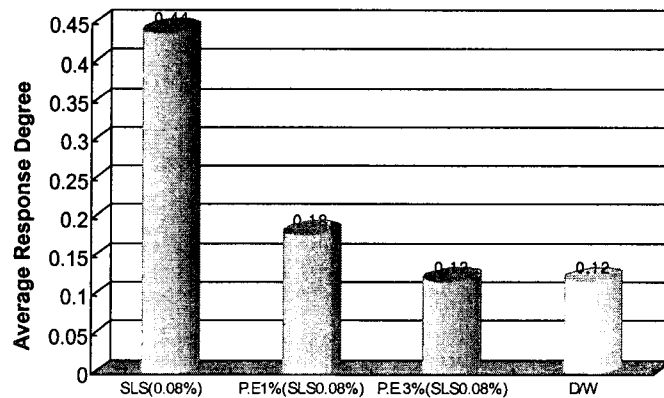
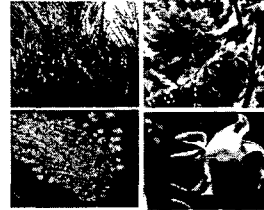


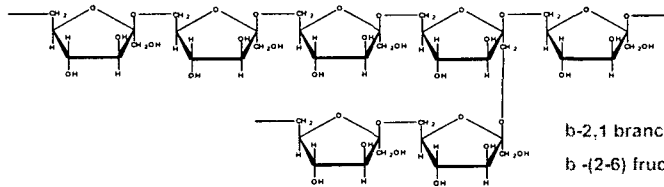
Fig 2. Average response degree by local application of Portulaca Extract

Fructan

- 천연 식물에 존재하는 고분자 다당 (보리, 밀, 백합, 다알리아 등)
- 미생물에 의해서 생산 : *Zymomonas mobilis*, *Bacillus polymyxa*, *Pseudomonas prunicola*
- 수용성 우수
- 알콜과의 혼화성 우수



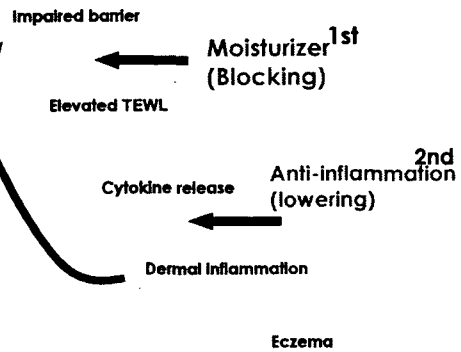
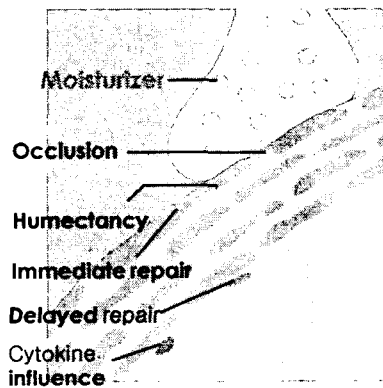
Fructan 의 구조

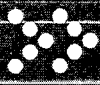


b-2,1 branch가 있는 b-(2-6) fructose polymer

Fructan

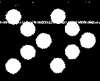
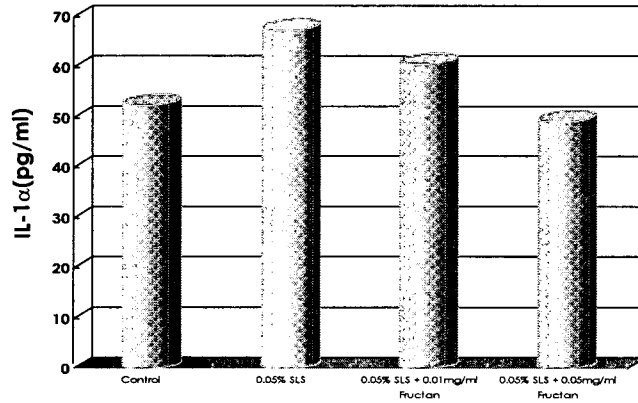
Effect : Moisturizing & Anti-irritation





Anti-inflammation test on Artificial skin (3'D)

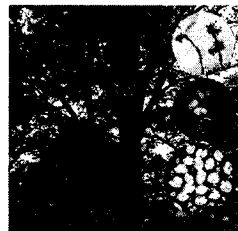
Interleukin-1 α release



유근피(Ulmus davidiana)

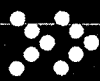
• 분류 : 쌍떡잎식물 뽕나무과 느릅나무과의 낙엽활엽 교목

- 효능
 - Anti-inflammatory
 - Moisturizing



• 특징
점액질 : 우수한 수분보유력과 상처 치유력으로 자극적인 요소로부터 피부 보호

- 민간 이용
 - 느릅나무 뿌리껍질을 물에 담가 두면 끈적끈적한 진이 많이 생기는데 그 진을 먹거나 피부에 바른다. 주염을 섞어 피부에 바르면 각종 피부질환을 치료하고 피부를 아토피하고 매끄럽게 하는 효과
 - 느릅나무 잎은 부작용이 없는 천연 수면제

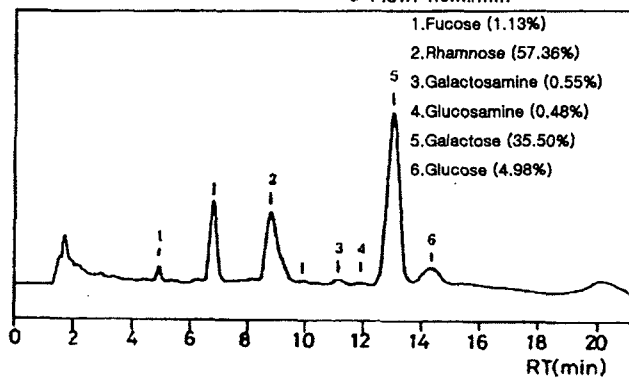


Ulmus extract

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HPLC Chromatogram

- ↓ System: Bio-LC DX-300
- ↓ Column: CarboPac PA1 (4.5 x 205mm)
- ↓ Mobile Phase: 1.6mM NaOH
- ↓ Flow: 1.0ml/min

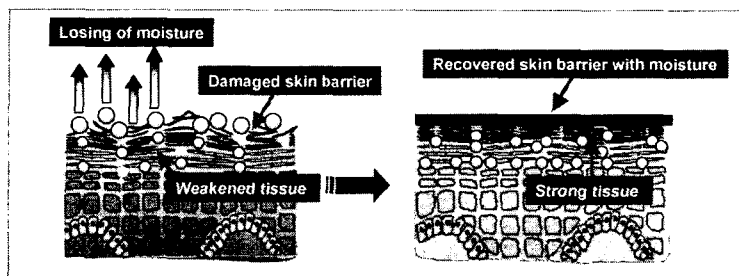


Ulmus extract

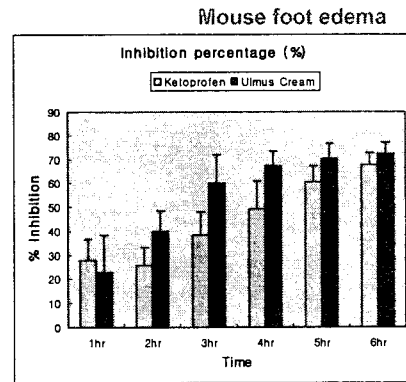
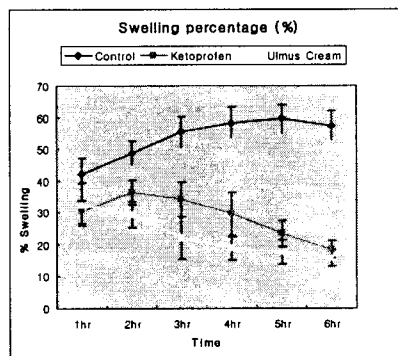
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Ulmus Extract

Skin moisturizing
Anti-inflammatory



Anti-inflammatory

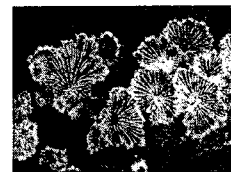


SC-glucan

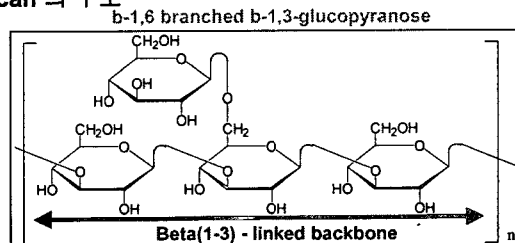
1. '*Schizophyllum commune*' (치마버섯)을 액체 배양하여 얻은 고순도의 β -glucan 으로 수용성 천연 고분자.

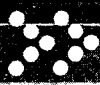
2. 저자극성으로 민감성 또는 아토피성에 좋은 원료

- 효능
 - Moisturizing
 - Immunity improvement(저항력 증강)
 - Anti-irritation / Anti-inflammatory



▪ SC-glucan 의 구조





Moisturizing

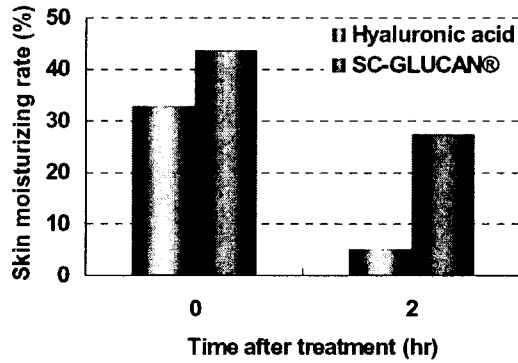
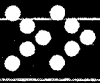


Fig 1. Moisturizing efficacy of SC-GLUCAN®
 ** SMR % = (CT - CU) x 100 / (CU - initial CT)
 0.4 % SC-GLUCAN®, 0.5 % Hyaluronic acid



Anti-irritation

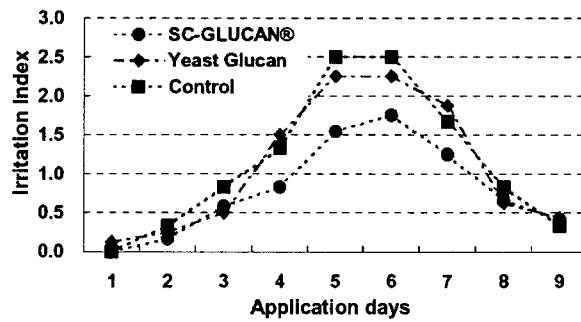
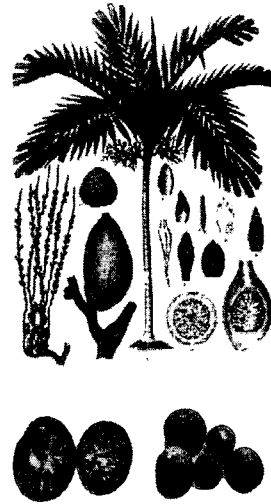


Fig 3. Changes of irritation index of SC-GLUCAN®
 ** Irritation caused by retino!
 Five-step scale (1 = No visible irritation, 2 = Slight irritation,
 3 = Definite irritation, 4 = Moderate irritation and 5 = Severe irritation)

빈랑자(*Areca catechu* Linn)

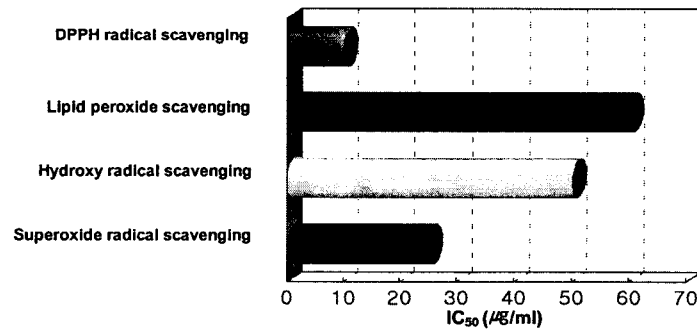
분류 : 야자과의 높이 10-18m 되는 키 큰 나무
 분포 : 인도네시아, 필리핀, 인도, 스리랑카, 중국남부,
 말레이시아 등에서 생산
 빈랑자 : 빈랑나무 열매 씨

효능 : 항노화효과 ;Anti-wrinkling effect



Areca catechu Extract

Concentration of Areca catechu Extract	DPPH Radical scavenging	Lipid peroxide scavenging	Hydroxy radical scavenging	Superoxide radical scavenging
IC ₅₀ (µg/ml)	10	60	50	25



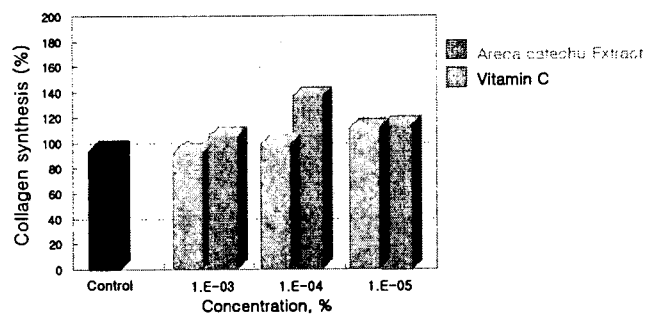


Improvement of collagen synthesis

Method

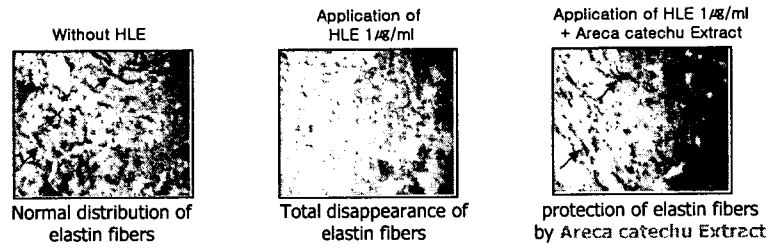
1. Fibroblast culture (10% FBS in DMEM supplemented with 10% FBS containing 20mCi/ml L[2,3,4,5-H³]-proline)
2. Incubate at 37°C in 5% CO₂ incubator for 24hours.
3. Added Protease inhibitors.
4. The media and cells were mixed
5. Measured the radioactivity of the media and cells together.

Results



Anti-elastase activity - using skin section

Results



Elastin : The brown-red fibers



주름개선 및 탄력 증진 효과

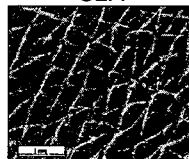
		Anti-wrinkle effect		Elasticity
		Roughness (arbitrary units)	Mean depth (peak depth, μm)	ds (mm)
Control cream	Before	32.7	40.5	0.0475
	After	28.3	40.0	0.0480
Areca catechu Extract Containing cream	Before	33.4	52.0	0.0575
	After	28.0	40.0	0.0375



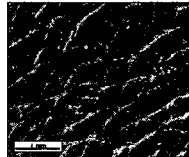
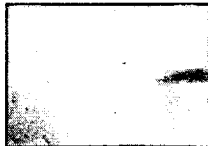
Picture



SEM



The Wrinkles of the Skin Surface Before Application of Areca Catechu Extract-containing Cream

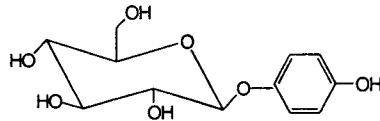


The Wrinkles of the Skin Surface After Application of a Cream Containing Areca Catechu Extract(3%)

알부틴 (arbutin)

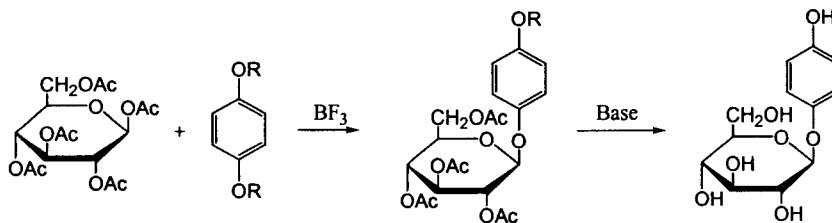
▪ **Common Name: Arbutin**

▪ **Arbutin** is one of the main components of **Ericaceae** and its chemical name is hydroquinone-β-D-glucopyranoside. Nowadays, it is produced by chemical synthesis and commonly used as a functional whitening agent for cosmetics



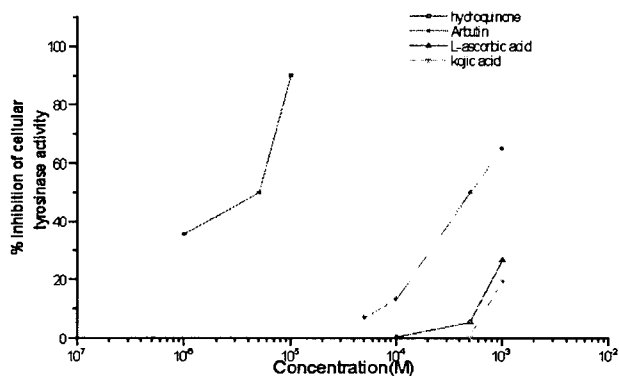
Arbutin

알부틴 제조





Inhibition of cellular tyrosinase activity



hydroquinone에 비해서는 1/100의 효과지만 다른 kojic acid나 ascorbic acid에 비해서는 더 높은 억제율을 보임.
 (Ref : The Journal of Pharmacology and Experimental Therapeutics " Arbutin : Mechanism of its Depigmenting Action in Human Melanocyte culture" vol. 276, 765 ~769, 1996)



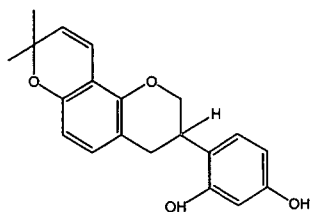
감초 (*Glycyrrhiza glabra L.*)

분류 : 쌍떡잎식물 장미목 콩과의 여러해살이풀.

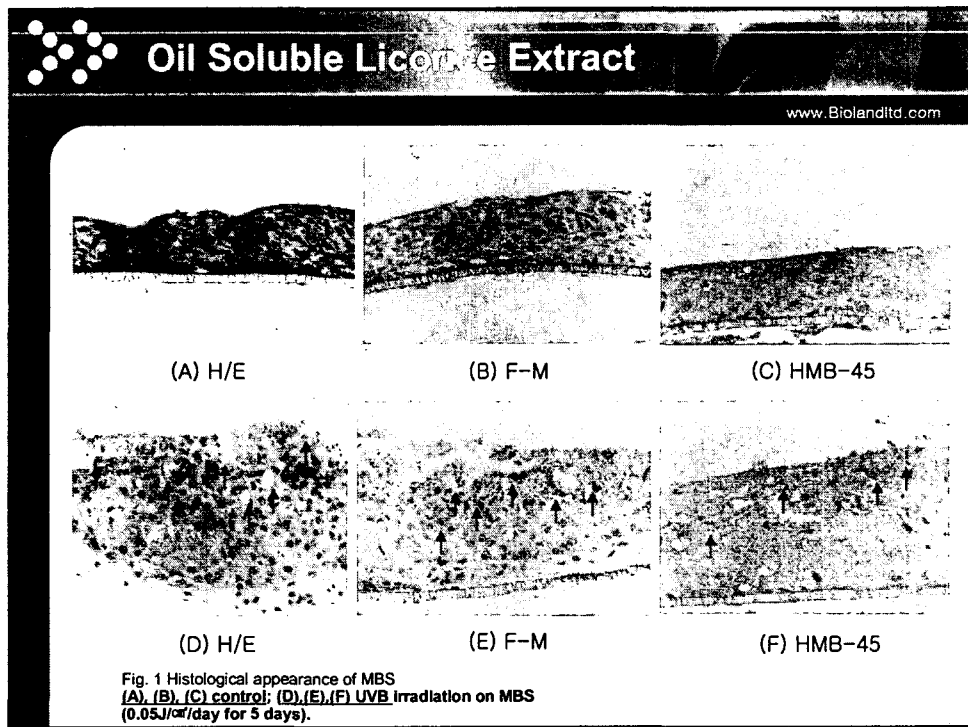
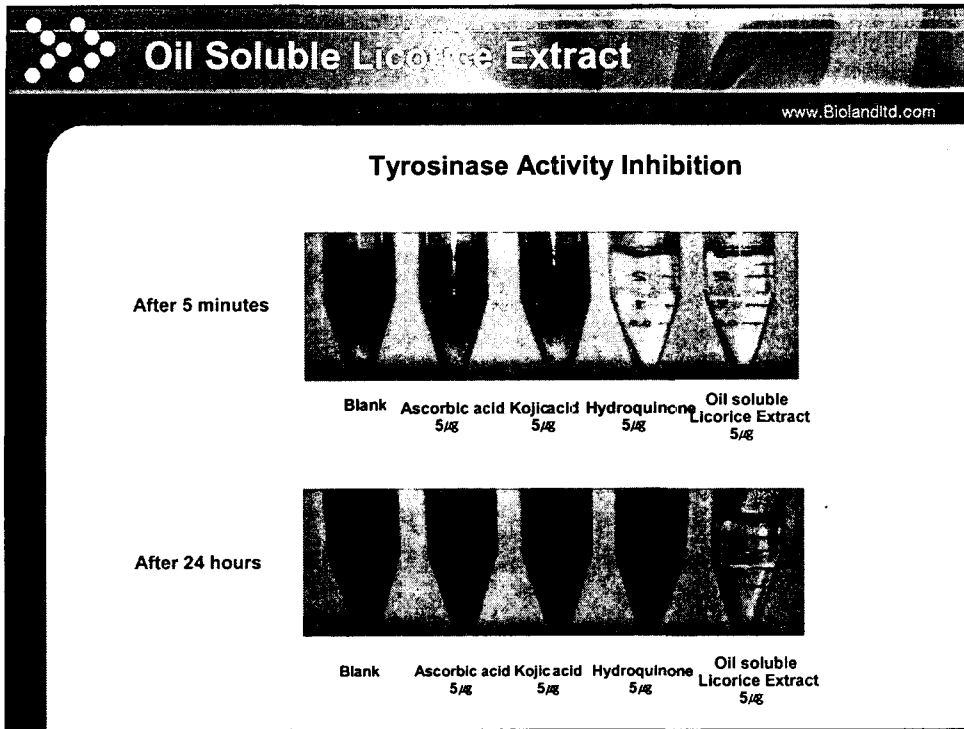
학명 : *Glycyrrhiza glabra L.*

주요성분: Glycyrrhizin, glycyrrhizinic acid, flavonoids, isoflavonoids

효능 : Whitening, Anti Inflammation



glabridin



Oil Soluble Licorice Extract

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(1) H/E (2) F-M (3) HMB-45

(4) H/E (5) F-M (6) HMB-45

Fig. 2 Influence of topically applied OSLP and UVB on MBS.
(1), (2), (3) : only 1/g/ml licorice extract;
(4), (5), (6) : licorice extract and UVB Irradiation on MBS
 (0.05J/cm²/day for 5 days).

Sophora root Extract

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고삼 (Sophora angustifolia Sieb.)

- > **Common Name:** Sophora root Extract
- > **INCI Name:** SOPHORA ANGUSTIFOLIA ROOT EXTRACT
- > **Technical/other name:** Sophora angustifolia, Sophora Extract etc.
- > **Parts used:** roots
- > **Main effects**
 - * Anti-bacterial
 - * Anti-inflammatory

O=C1CCN2CC3CCN(C3)CC21

Matrin

O=C1CCN2CC3CC(O)CCN3C21

sophoranol

Sophora root

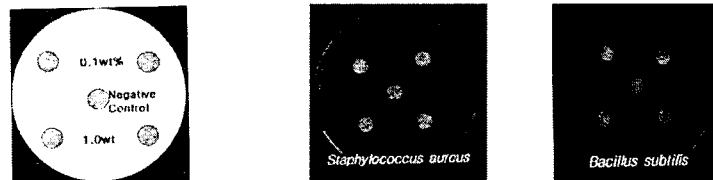
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Agar Diffusion Method

Fig 1. Antimicrobial activity of Sophora Root Powder against *Propionibacterium acne*



Fig 2. Antimicrobial activity of Sophora Root Powder against *Staphylococcus aureus* and *Bacillus subtilis*



Gastrodia elata

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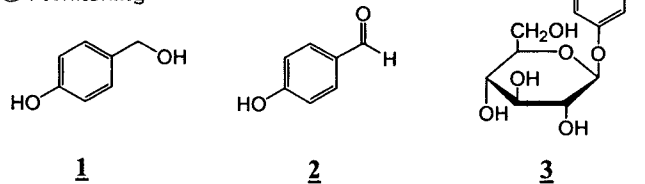
천마 (*Gastrodia elata*)

분류 : 난초과의 여러해살이풀.

학명 : *Gastrodia elata*

주요성분: Gastrodin, 4-Hydroxybenzyl alcohol, 4-Hydroxybenzaldehyde

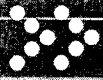
효능 : Whitening



Chemical Structures of Isolated Phenolic Compounds.

1 : 4-Hydroxybenzyl alcohol, 2 : 4-Hydroxybenzaldehyde,

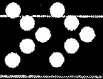
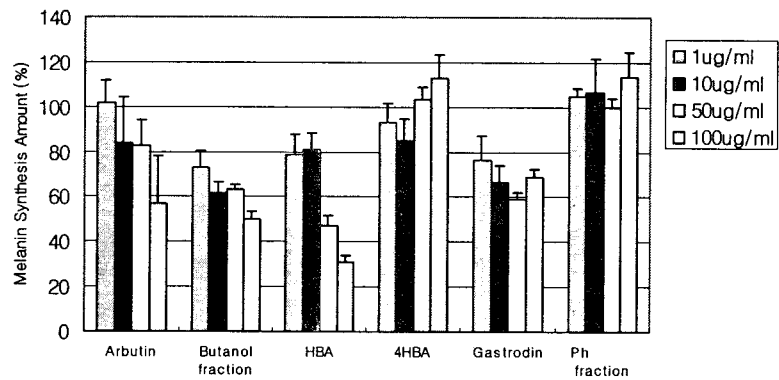
3 : Gastrodin(4-D-Glucopyranosyloxybenzyl alcohol)



Gastrodia elata

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Inhibitory Activity of Melanin Synthesis in B16 Melanoma Cell lines. (HBA : 4-Hydroxybenzyl alcohol, 4HBA : 4-Hydroxybenzaldehyde)



Dandelion Extract

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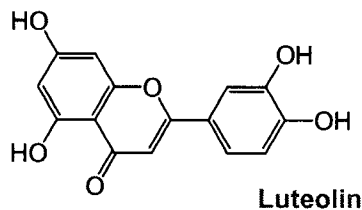
민들레 (*Taraxacum mongolicum*)

분류 : 국화과의 다년생 초본

학명 : *Taraxacum mongolicum*

주요성분 : Luteolin, quercetin, luteolin 7-glucoside

효능 : Anti Inflammation, Cell protection

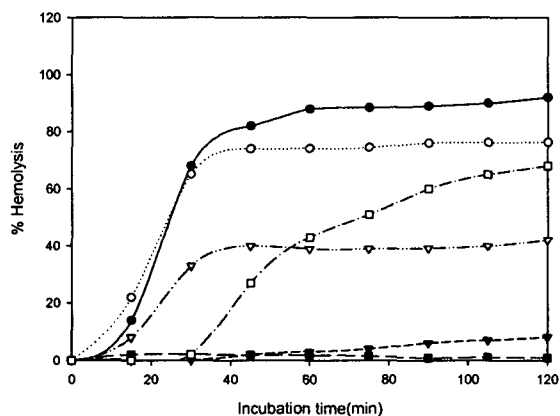




Dandelion Extract

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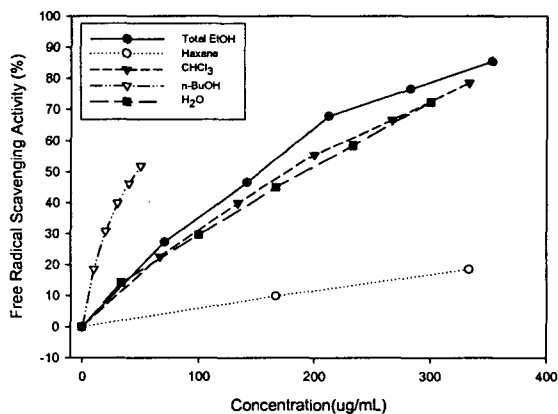
Dose effect of each extract fraction from Mongolian dandelion on the Rose Bengal-sensitized photohemolysis of human erythrocytes.
Control, ●; total ethanol, ○; hexane, ▼; chloroform, ▽; n-butanol, ■; water, □.



Dandelion Extract

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Free radical scavenging activities of solvent fractions from Mogolian dandelion using DPPH method



천연물을 이용한 소재 개발 가능성

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- 동물성 소재 이용의 한계(광우병/구제역/SARS 등)로 식물소재로의 전환
- 천연 식물은 다양하고 풍부한 소재의 보고이나 이를 이용한 기능성 원료 개발은 아직 미미



- 분리/ 분석장비의 발달로 인해 성분/구조분석 용이
- 객관적이고 과학적인 효능 검증 시스템 확립 연구



원료 개발의 무한한 가능성