

Radiant Inc., Technology

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Fermentation

Fermentation in Cave

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Plant stem cell

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Spray dry

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Fermentation

- Solid State Fermentation – Solid state fermentation (SSF) is a biomolecule manufacturing process used in the food, pharmaceutical, cosmetic field. These biomolecules are mostly metabolites generated by microorganisms grown on a solid support selected for this purpose.
- Submerged Fermentation - **Submerged fermentation(SF)** is the cultivation of microorganisms in liquid nutrient broth. Industrial enzymes can be produced using this process. As the microorganisms break down the nutrients, they release the desired enzymes into solution.
- Special fermentation : Cave Fermentation, Fermentation in Bamboo tube

No	Product name	INCI Name	Fermentation Category
1	RADICAN-S20	Beta-glucan	Submerged Fermentation
2	Resverad	Saccharomyces/Caragana Sinica Root Ferment extract	Solid State Fermentation
3	Cave secret – Vitality	Saccharomyces/Cordyceps Sinensis Ferment filtrate Saccharomyces/Angelica Dahurica Root ferment extract Saccharomyces/Lycium chinense fruit ferment extract filtrate Saccharomyces/Camellia sinensis extract ferment filtrate Saccharomyces/Artemisia princeps leaf ferment filtrate Saccharomyces/Coix lacryma-Jobi Ma-yuen seed ferment filtrate	Cave fermentation
4	Cave secret - Purity	Lactobacillus/Nelumbo Nucifera Seed ferment filtrate	Cave fermentation

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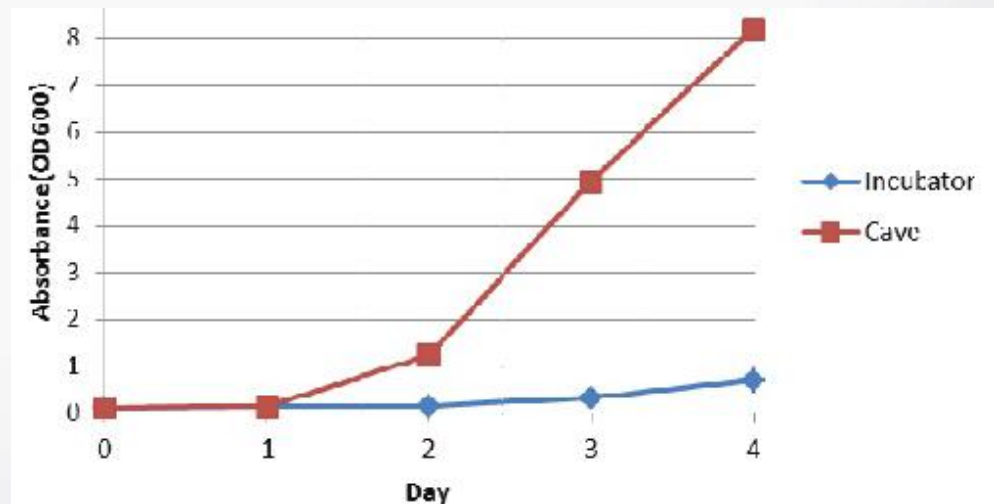
1

Fermentation – Cave fermentation



- Our research center checked growth rate of microorganism both cave and incubator.
- As a result, we found that Cave is more suitable than incubator for growth of micro-organism.

- Hwa-am cave which located in Jung-sun gun, Gangwon province is a natural underground space large enough for a human to enter. And also this cave was mined gold until 1945.
- Cave maintains a constant temperature throughout the year. Inside temperature is maintained about 15 °C. This property of cave can provide best environment for natural fermentation.



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Plant stem cell

- Radiant have plant cell culture technology, we call plant stem cell(callus) culture technology. Plant stem cell can differentiate into a whole plant, we can get concentrated ingredient. Of course it can overcomes seasonal restrictions.

[Plant stem cell series]

No	Product name	INCI Name
1	RASTEM	Ipomoea Hederacea Callus extract
2	Cucumber stem cell	Cucumis Sativus (Cucumber)Callus extract
3	Chia stem cell	Salvia Hispanica seed extract
4	Carrot stem cell	Daucus Carota sativa (Carrot)Callus culture extract
5	Red bean stem cell	Phaseolus Vulgaris (Kidney) extract
6	Buckwheat stem cell	Polygonum Fagopyrum (Buckwheat) Callus Culture Extract
7	Zinnia stem cell	Zinnia Elegans Callus Culture extract



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Supercritical fluid extraction

Radiant can do Supercritical fluid extraction method for providing below property.

- 1) Non-toxic solvents leave no harmful residue
- 2) High boiling components are extracted at relatively low temperatures
- 3) Thermally labile compounds can be extracted with minimal damage as low temperatures can be employed by the extraction

No	Product name	INCI Name
1	Planoxia-CL-SCF	Curcuma longa(Turmeric)Root oil

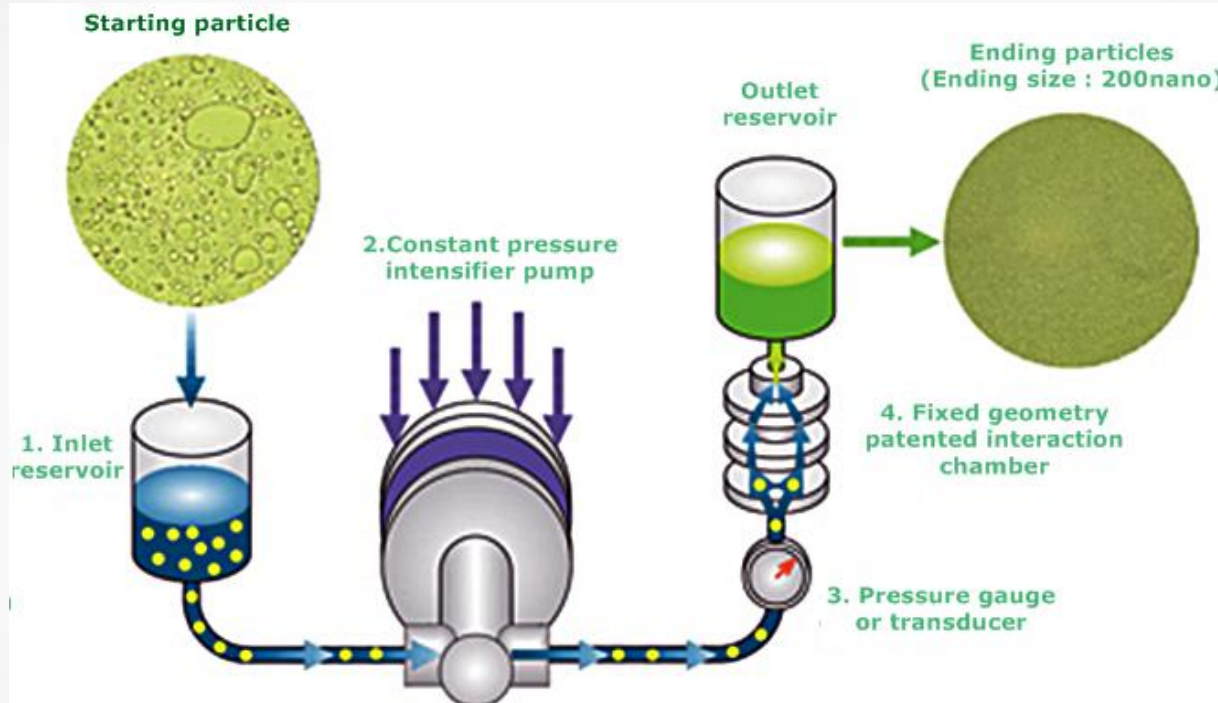
* Other common plant extract can apply SCF method.



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Microfluidizer



- Microfluidizer is indicated to manipulate small quantities of liquids or fluids usually through channels with at least one dimension smaller than 1 mm, for emulsion formation, mixing and dispersion.
- By controlling particle size reduction to the best level with a uniform distribution, It help provide customers with competitive differentiation for the products with enhanced quality.

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Microfluidizer

No	Product name	INCI Name
1	Goat Milk Liposome	Water / Phenyl Trimethicone / Lecithin/Vitis Vinifera (Grape) Seed Oil / Lecithin Triceteareth-4 Phosphate / Butylene Glycol /Propylene Glycol / Goat Milk Extract
2	Elder berry Liposome	Water / Butylene Glycol /Propylene Glycol / Phenyl Trimethicone /Lecithin / VLecithin/Vitis Vinifera (Grape) Seed Oil / Triceteareth-4 Phosphate/ Sambucus Nigra Fruit Extract
3	GreenT Liposome	Water / Butylene Glycol / Propylene Glycol / Phenyl Trimethicone /Lecithin/ Vitis Vinifera (Grape) Seed Oil / Triceteareth-4 Phosphate / Panax Ginseng Root Extract / Ganoderma Lucidum Stem Extract / Morus Alba Bark Extract / Acanthopanax Senticosus (Eleuthero) Root Extract) / Lycium chinense Fruit Extract /Camellia Sinensis Seed Oil
4	Thyme Liposome	Water / Butylene Glycol /Propylene Glycol / Phenyl Trimethicone / Lecithin / Vitis Vinifera (Grape) Seed Oil / Triceteareth-4 Phosphate/ Thymus Quinquecostatus Extract

- We use Microfluidizer for providing more stable and can capsule more active materials. Liposome have become important as potential vehicles for controlling the delivery of natural ingredient for optimizing the disposition of active ingredients in particular skin layers and for their good stability and moisturizing effect.

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Spray dry

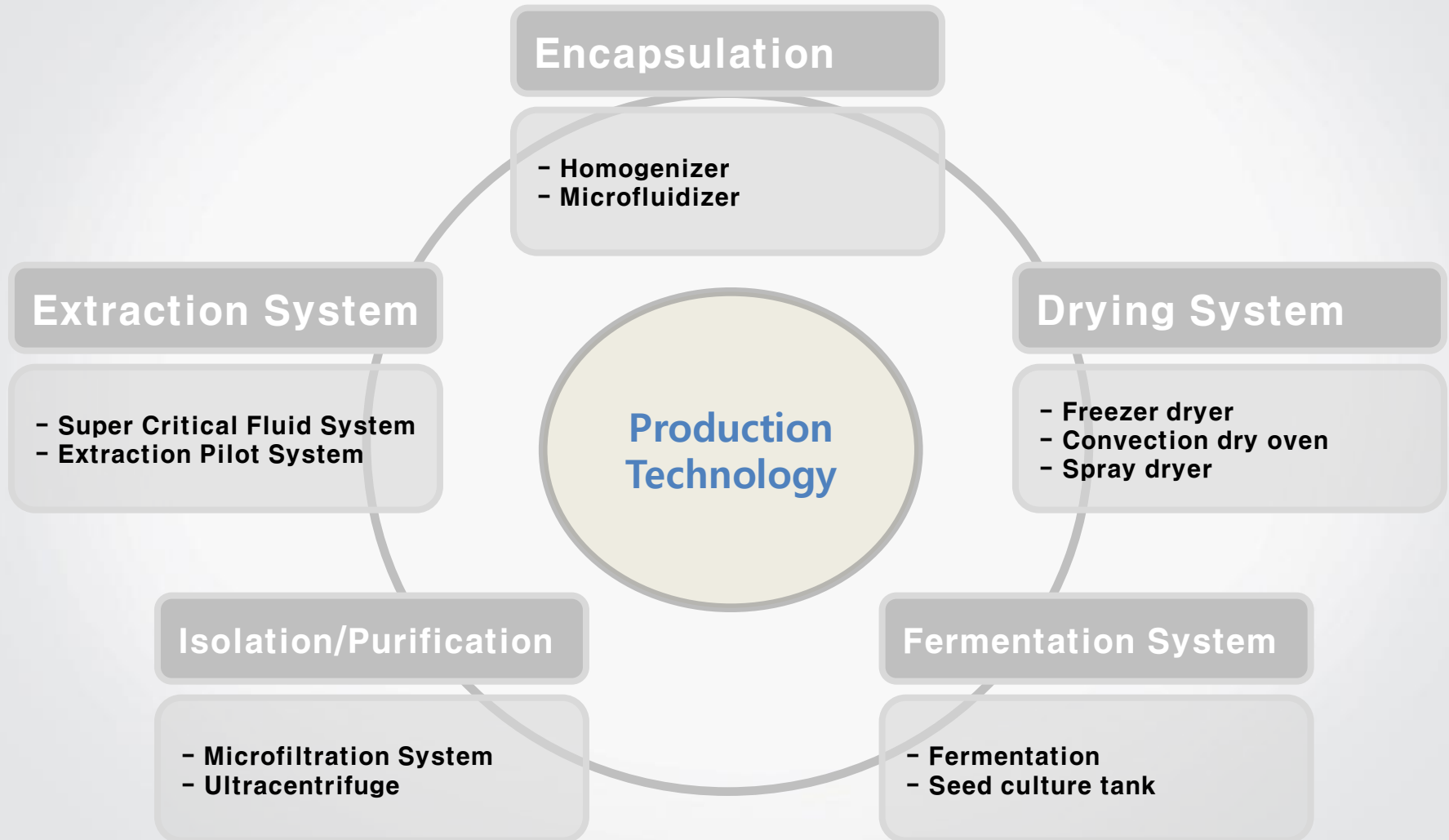


- We provide some specific ingredient as a powder foam include food ingredient. It have handling and storage characteristics not found with liquid ingredient. Using this method considerably reduces shipping, storage and handling costs without sacrificing product activity.

No	Product name	INCI Name
1	BERRIANT(PD)	Rubus Coreanus Fruit extract
2	HI-CLERA(PD)	Vincetoxicum atratum root extract
3	RADVON(PD)	Glycine Max(Soybean) Sprout extract
4	RESVERAD(PD)	Saccharomyces/Caragana sinica root ferment extract
5	PUREWHITE(PD)	Morus Alba root extract

Production Facilities

Production technology



Overall View of Factory



Product Facilities



Ultra pure water



Raw material warehouse



Insect catcher by



Warehouse for finish product (200kg drum)



Warehouse for finish product



Clean booth for packaging



Quality control



Sterilizer for clothes

Product Facilities

1. Extraction facilities



7ton - Tank



2ton - Tank



Extract device



**Supercritical fluid
extract device**

Product Facilities

2. Concentration facilities



Vacuum Evaporator



Rotary Vacuum Evaporator

Product Facilities

3. Isolation and Purification facility



Centrifugal separator

Product packing unit

1. Various packing unit : 200kg, 20kg, 10kg, 5kg



Packing unit : 200kg



Packing unit : 20kg(left), 10kg(middle), 5kg(right)

Quality control

1. Quality control equipments

IQC

(Incoming Quality Control)

LQC (Line Quality Control)

OQC

(Outgoing Quality Control)

		수입검사 성적서		제		제		제	
원자재명				원산지					
투입일				투입처					
자재 고유번호				판리/수량					
발행번호				도판					
수입 검사 항목									
NO	검사항목	SKIP	SPED	검사 일자			판리		
1	표장상세		핵심이 없음				합격/불합격		
2	외관		이물질, 곰팡이				합격/불합격		
3	수분함량	익상품/생황료	10% 이하				합격/불합격		
4	냄새	모든원료	특이취				합격/불합격		
5	과외원리문	이온화되지 사용되는 원	불완전				합격/불합격		
검사일		검사자		종합 판정		<input type="checkbox"/> 합격 <input type="checkbox"/> 불합격			
부									
관									
NO	항목	내					중		비고
1	적 조 일								
2	유출 기한								
3	보관 장소								
4	기타 사항								
*특기 사항									

[illegible]

RADIANTE		출하 검사 기록서		작 성		검 토		승 인	
모 율 명				고려사					
운경번호(Lot NO)				검사일					
출고 Lot No				검사자					
NO	항목	SPEC(기준)		측정치		판결			
1	외관	규격 : 투석 액상				합격/불합격			
		온도 : 상온(OC실)							
2	냄새	규격 : 특무보통과물과 비교				합격/불합격			
		온도 : 상온(OC실)							
3	비중	규격 : 0.980~1.100				합격/불합격			
		온도 : 상온(비중계)							
4	pH	규격 : 4.60~6.60				합격/불합격			
		온도 : 상온(pH meter)							
6	미생물 -세균	규격 : 6 Colony 이하				합격/불합격			
		온도 : 30~35℃(incubator)							
		시간 : 48시간		월 일 시 분 ~ 월 일 시 분					
6	미생물 -곰팡이	규격 : 6 Colony 이하				합격/불합격			
		온도 : 20~25℃(incubator)							
		시간 : 120시간		월 일 시 분 ~ 월 일 시 분					
7	반부패 -계통수치비율	규격 : 계통수치에한들 0.45% (+/- 0.02%)				합격/불합격			
8	반부패 -파라핀	규격 : Methyl- 1ppm이하				합격/불합격			
		규격 : Ethyl- 1ppm이하				합격/불합격			
		규격 : Butyl- 1pm이하				합격/불합격			
		규격 : Propyl- 1ppm이하				합격/불합격			
		규격 : Isopropyl- 1ppm이하				합격/불합격			
		규격 : Isobutyl- 1ppm이하				합격/불합격			
9	중금속 -납	규격 : 20ppm 이하				SKIP			
		온도 : 상온							
10	중금속 -비스	규격 : 30ppm 이하				SKIP			
		온도 : 상온							
합 합 판 정			측 기 사 장						
			출고 일자		2012.12.04				
			출고 하위						

Quality control

2. Quality control equipments



Specific gravity balance



Turbidity meter



pH meter



UV Spectrophotometer



Refractometer



Viscometer



Color meter



Microfil3-place system

R&D Center

Overall View of Laboratory

1. Main laboratory



Laboratory

2. Animal cell culture room & main equipments



Fluorescent Microscope



ELISA reader

Laboratory

3. Microorganism culture room & main equipments



CO2 incubator

Laboratory

4. Instrumental analysis room & main equipments



HPLC
(high performance liquid chromatography)



GC
(gas chromatography)



MPLC
(medium-pressure liquid chromatography)

Laboratory

5. Product development room & main equipments



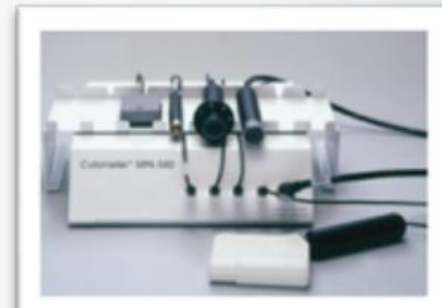
Rotary Evaporator



Overhead stirrer

Laboratory

6. Other equipment



Skin test (Cutometer MPA 580 & MPA 5, SV600, VC98)



Freezing dryer



Clean system

Thank you