





Educational material



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FermenGIN[®] is for everyone.

Like we have different look, all individuals have a different intestinal microbiome. The difference of intestinal microbiome makes a difference in the efficacy of ginseng intake. Fermentation is the answer we found to standardize efficacy regardless of the intestinal microbiome.

We wish everyone gets the efficacies of red ginseng with FermenGIN®, the most advanced ginseng science.



What is FermenGIN[®]?





FermenGIN[®] is made from Korean ginseng

Thorough regulation



- Korean ginseng is thoroughly managed for the best quality
- Separate law for ginseng (Ginseng Industry Act) is in place
- Cultivation area is designated and managed by law
- Cultivation is prohibited in case of violation of regulations

Residual pesticide inspection



- Korean ginseng is safe
- Residual pesticide standard for ginseng is in place
- State of the art pesticide analysis method is used



Reliability

B1

- Korean ginseng is reliable
- Only registered farmers can cultivate ginseng
- Unfulfilled farmers can be deprived of cultivation right

What BTC inspects



Strict raw material management



1 Documents

- Confirmation of cultivated year
- Harvest history of cultivation area
- Residual pesticide test report
- Manufacturing record history
- Heavy metal test report
- Plasticizer analysis report

② Visual inspection

- Packing status
- Raw material status
- Foreign substance status

③ Post receipt inspection

Certificate of analysis issuance





- Strictly selected ginseng(*Panax ginseng* C.A Meyer) is processed into red ginseng
- Steaming and drying not only increase preservability, but also produce a unique saponins that white ginseng doesn't have.



White ginseng





Red ginseng

What is ginsenoside?



- Active component of ginseng is Ginsenoside (Ginseng + Glycoside)
- A total of 32 ginsenosides were found in ginseng.
- Compound K and F2 are compounds at the end of ginsenoside metabolic pathway.

Classification	Example	Characteristics
Carbon Backbone		 Hydrophobic Can pass through the cellular membrane because the membrane consists of lipid layer Has high permeability in the intestinal lipid membrane
Sugar molecule	CH ₂ OH OH OH OH OH OH OH OH OH	HydrophilicGalactose, Arabinose etc.
High molecular glycoside	Rb1	 Hydrophilic characteristic Has low permeability in the intestinal lipid membrane since the incorporation of hydrophilic sugar molecule Poorly absorbed
Low molecular glycoside	Compound K	 Hydrophobic characteristic Has high permeability in the intestinal lipid membrane because of detaching the hydrophilic sugar molecule Absorption rate is excellent

Metabolic pathway of ginsenoside





Ginseng is not for everyone

- BTC
- Intestinal transformation activity after ingestion of ginseng was significantly different amongst individuals
- This is because all individuals have a different intestinal microbiome condition
- What makes difference of intestinal microbiome condition?

1) Innate factor: Genetic background

2) Acquired factor: Dietary habits, antibiotic abuse, stress, etc



Source: Spor A, Koren O, Ley R. Unravelling the effects of the environment and host genotype on the gut microbiome. Nat Rev Microbiol 2011; 9:279-290

Ginseng is not for everyone



- Ginsenosides are transformed by gut microbiota then, absorbed through intestinal membrane.
- It is hard to transform ginsenosides for people who lack the number or function of gut microbiota
- Components not absorbed through the intestinal membrane are excreted through the digestive system.

No efficacies !!



L. M: Low molecule H. M: High molecule

Ginseng is not for everyone



Scatter diagram of the activities transforming Rb1 to Compound K



Study	In-vitro
Purpose	To measure the ginsenoside transforming activity of human in testinal microbial flora
X axis	Left: Ginsenoside Rb1 treatment Right: Ginseng extract treatment
Y axis	ginsenoside transforming activity of microbial flora

* Ginsenoside transforming activity of intestinal microbial flora differs between individuals.

Plasma concentration-time curve of Compound K following oral administration of ginseng



Study	Clinical pharmacokinetics	
Purpose	To measure the intestinal absorption of ginseng extract	
X axis	Blood sampling time	
Y axis	Plasma concentration of compound K (analytical marker of the final metabolite of ginsenoside)	

* The absorption rate of compound K differs between individuals due to individual differences in intestinal microbial flora,

Source: J Ethnopharmacol. 2009 Feb 25;122(1):143-8

Standardization of efficacy



Fermentation technology









Stage 1. Blending red ginseng with microorganismsStage 2. Fermentation ProcessStage 3. Transformation of bioactive ginsenosides

Name of patent:

Microorganisms for fermentation of red ginseng and food composition containing fermented red Ginseng







Patented method, Proven quality

There are various fermented ginseng on the market. But the technology applied to FermenGIN[®] is special. BTC has developed fermented red ginseng of different grade through **bioconversion technology**.

FermenGIN[®] is a scientifically proven fermented red ginseng ingredient using patented microbiome.



Rich in bioavailable ginsenoside



Source: BTC Laboratory Before Rb1 Rg3(s) Compound K F2 fermentation 15 Rg1 Not detected 10 Not detected 20 40 50 60 70 80 After fermentation 15-10 Poorly bioavailable ginsenosides Highly bioavailable ginsenosides

Most ginsenosides are transformed to smaller molecular ginsenosides by BTC's fermentation technology

F2 and Compound K



- What is Compound K?
- Ginsenoside Compound K is the final form of ginsenoside Rb1.
- Ginsenoside Compound K is not found in ginseng and red ginseng.
- Presence of ginsenoside Compound K is evidence of high-quality fermentation.
- What is F2?
- F2 is intermediate between ginsenoside Rb1 and ginsenoside Compound K.
- Presence of F2 with compound K is a trace of fermentation through microorganisms.



Efficacies of Compound K







More bioavailable but, Less bitter taste

Even though fermentation makes a lot of bioactive ginsenoside, bioactive hydrophobic ginsenoside is poorly absorbed through gut membrane. Because its molecular properties makes aggregation of components.

Moreover, ginseng's characteristic bitter taste is not preferred by most people

Cyclodextrin technology is the key solution we found to solve the above problems.



Higher bioavailability



- Bioavailable ginsenosides are hydrophobic, and the hydrophobic molecules easily get lumpy
- Clumpy structure should be separated in order to be easily absorbed.
- BTC's proprietary encapsulation technology prevents it from getting lumpy
- Thanks to the technology, it increases absorption rate and bioavailability of ginsenosides.





Normal hydrophobic molecules

Encapsulated hydrophobic molecules



Study type	Human Pharmacokinetics
Participants	13 healthy males
Purpose	To analyze the difference in the content of Ginsenosides in blood after oral supplement of FermenGIN and red ginseng
Dosage	Group 1: 5g of fermented red ginseng extract powder (FermenGIN [®]) Group 2: 5g of non-fermented red ginseng extract powder
Dooign	Crossover (a week of washout period), double-blind
Design	Blood collection: 0.5, 1, 2, 4, 6, 8, 10, 12, 24 h after intake

Higher bioavailability - PK study





• Those results for ginsenoside Compound K show that FermenGIN[®] is superior to normal red ginseng extract.

- ✓ AUC_{24h} (Residual amount for 24 h) of ginsenoside Compound K: 12,94 fold increase
- ✓ Cmax (Maximum concentration in blood) of ginsenoside Compound K: 8,57 times increase
- ✓ Tmax (Time to reach maximum blood concentration): 2.62 times fast

Higher bioavailability - PK study



Conclusion

- 1. Ginsenosides from non-fermented red ginseng extract were hardly transformed in the body.
- 2. In contrast, plenty of ginsenoside metabolites from FermenGIN[®]–CK were absorbed into the body.
- 3. The study proved that BTC's bioconversion technology improves the bioavailability of ginsenosides of ginseng extract.

Less bitter taste





- The bitter taste of ginseng usually comes from insoluble(hydrophobic) part
- Cyclodextrin forms an inclusion complex with hydrophobic guest molecule
- Bitterness inducing molecule is not recognized by the bitter taste receptor

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Patent Number	₩ 10-0910176 E	anna -
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Application Number	20000 0010000 x	
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 Name Of Patent: Composition containing extract of ginseng of which bitterness is masked

Less bitter taste - scientific evidence





• The difference between groups in each above parameter was statistically significant. (p(0.05).

Where it is manufactured





- Established in 2017 with state-of-the art facilities.
- Factory optimized for plant-based ingredient
- Managed by advanced Al system
- ISO 22000, GMP, HACCP certified



How it is manufactured





Increase extraction efficiency by cyclone

circulation system

 Less bitter taste by indirect heating and 2 times of filtering



Vacuum drying method with low
 temperature minimizes destruction of
 bioactive and antioxidative compounds in
 the extract





Competition makes us stronger

Red ginseng market is the most highly competitive market in the Korean dietary supplement market. Despite the fierce competition, advanced science and technology made FermenGIN[®] a survivor of Korean red ginseng market



Winner of Korean ginseng market

BTC

- The share of red ginseng in Korean dietary supplement market is over 50%
- Technology applied to FermenGIN[®] is the driving force behind fierce competition



Source: Korea Health Supplement Association Unit: Hundred million KRW (approximately Million USD)







Name: Fermented Red Ginseng Kids

Type: drink

Recommended Intake: 1 Pack (15ml) a Day

Name: Fermented Red Ginseng Bottle

Type: Concentrated Drink

Recommended Intake: 1 bottle (20ml) a Day





Name: Fermented Red Ginseng Concentrate

Type : Concentrate

Recommended Intake: 1 Spoon a Day (Mix with Hot water)







Name: Fermented Red Ginseng Globule

Type: chewable pill

Recommended Intake: 1 globule (3.8g) a Day

Name: Fermented Red Ginseng Drink

Type : Concentrated Drink

Recommended Intake: 1 Pack a Day





Name: Fermented Red Ginseng Concentrate Type: Concentrate

Recommended Intake: 1 Pack a Day

New win cases – 3





Name: Fermented Red Ginseng bottle

Type: Concentrated Globule

Recommended Intake: 1 bottle (20ml) a Day

Name: Fermented Red Ginseng Globule

Type : chewable pill

Recommended Intake: 1 globule (3.8g) a Day









Name: Fermented Red Ginseng Drink

Type: Liquid

Recommended Intake: 1 Pack a Day

Name: Fermented Red Ginseng Bottle

Type: Concentrated Drink

Recommended Intake: 1 bottle a Day







Why we should choose FermenGIN®



- 1. Red ginseng has many health benefits, but not everyone can experience it. FermenGIN[®] shows standardized efficacy through fermentation.
- 2. Micro encapsulation technology gives the product various advantages with high bioavailability and less bitterness.
- 3. Manufactured in GMP-certified factory with state-of-the art facilities.
- 4. Made in Korea, the hometown of red ginseng



Thank you for your attention