L-GLUTATHIONE (For Health Food)

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Glutathione, Resistance for Digestion

- Resistance Study with Artificial Digestive Juices

We checked the resistance of Glutathione (GSH) against digestive juices with artificial digestive juices. We used...

- Pepsin(1:50) for 1hr
- SIF(1:250) for 2hr
- Amino peptidase(200mU/mg) for 2hr

Then we measured GSH by HPLC (Data not shown for confidential).

We expected that the Glycine of GSH would be digested, but unexpectedly, no Glycine had digested.

For oral intake, intact GSH will reach to small intestine.
Absorption Study (Oral Intake)

☐ Experimental Design

Trans well:

1mM GSH

Apical chamber

Basolateral chamber

Caco-2 monolayer

Using Chamber:

Analyze by GSH assay and LC/MS

☐ Intact Glutathione pass through the Caco-2 monolayer.

(Data not shown for confidential)
Skin Health & Glutathione

- Function of Glutathione & Benefits…
  - Whitens the skin
  - Dark spot remover
  - Prevent and/or remove pimples and pimple marks
  - Anti-aging and anti-wrinkles
  - Makes skin smooth, fresh and radiant
  - Enhance healing of wounds

- Melanin Inhibition
- Antioxidant
Mechanism of Skin Beauty

- Glutathione inhibits Tyrosinase activity and Eumelanin synthesis and increases the ratio of Pheomelanin.

- L-Tyrosine
  - L-Dopaquinone
  - Tyrosinase
  - Eumelanin
  - Dark Complexion

- Glutathione promotes Pheomelanin synthesis and increases Skin Brightness.
Clinical Study on Skin Beauty

- Terms of the study: May to July, 2010
- Subjects of the study: Thirty (30) women, age 20s to 40s
- Study groups: Placebo group & Glutathione group
- Sample Glutathione: 50mg, once a day, before sleep
- Study protocol: DBT / Parallel Group Comparison

Apply UVs to skin on 4th week, and check following items; Moisturizing, Erythema, L-value (brightness), Questionnaires

*Intake sample

Start 4th week 8th week

Apply UVs to skin
Moisturizing & Erysma Recovery

4 weeks later after apply UVs (8th week), we checked the moisturizing and recovery rate of erythema (reddish) increases.

*YH-15 = KOHJIN Glutathione
4 weeks later after apply Uvs (8th week), we checked the L-Values as brightness.

*YH-15 = KOHJIN Glutathione
Questionnaires on Skin Beauty

- Questionnaire survey after 4 weeks and 8 weeks of the test period.

Survey after 4 weeks of test period

Survey after 8 weeks of test period

*YH-15 = KOHJIN Glutathione
Detoxifier Effect

- Detoxification mechanism of Glutathione.

**Detoxification Process:**

1. **Toxins (Heavy Metal, Alcohol)** enter the body.
2. In a **Normal Liver**, toxins are not efficiently handled due to low Glutathione ($GSH$) levels.
3. **Glutathione Supplementation!!** increases $GSH$ levels, enhancing detoxification.
4. In an **Activated Liver**, $GSH$ effectively binds with toxins, facilitating their excretion.
5. **Toxin Excretion** occurs through the kidneys.

$GSH$: L-Glutathione
In-House Human Study (Alcohol)

Sample:
Placebo (Dextrin), Curcumin (30mg) and L-Glutathione (100mg)

Subjects: N=20 (Men and Women)

Alcohol intake: 1.25mL X Body Weight (kg)

Measure the alcohol concentration in breath on 20min, 60min, 120min and 180min and Questionnaires.

<table>
<thead>
<tr>
<th>Intake alcohol</th>
<th>Intake samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>-60</td>
<td>0</td>
</tr>
<tr>
<td>Measure Alc.</td>
<td>O</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>O</td>
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</tbody>
</table>
Glutathione reduced the alcohol concentration in breath immediately.

After drinking (1.25mL alcohol × kg BW).

$p<0.01$ (a-a, b-b), $p<0.05$ (c-c, d-d)
In-House Human Study (Alcohol)

- Glutathione improved the Physical Feeling of Alcoholic Sobered Up.

- Alcoholic Sobered Score; Improvement score of sobering up, sleepiness, headache, heavy stomach, swelling, glow and dizzy (Average).
In-House Human Study (Liver Health)

- Sample:
  - Placebo (Dextrin) and L-Glutathione (50mg/day)

- Subjects; Total N=26 (Men and Women)

- Term; 8 weeks

- Collect the blood and measure the AST, ALT and γ-GTP on 0 week and 8th week.

*Intake sample (50mg/day)  
Start  
4th week  
8th week  
↑Collect blood  
↑Collect blood  
↑Collect blood
In-House Human Study (Liver Health)

- Glutathione reduced AST level significantly.
- Glutathione also reduced ALT level significantly.

![Graphs showing change rates of AST and ALT](image)
In-House Human Study (Liver Health)

- Glutathione has a tendency to improve γ-GTP level.

- Glutathione improve liver function significantly!!
Kohjin’s L-Glutathione is…
- US FDA GRAS Notice (#GRN 000293)
- KOSHER Certified by “OK”
- HALAL Certified by “MUI” (for Muslims such as Indonesia, Malaysia, Middle Easts…)
- Non-GMO Product
- Fermented from FDA Approved Yeast (Torula Yeast)
- No Adverse Report on Drug Compatibility

Kohjin is…
- Leading Manufacture of Glutathione since 1968
- ISO Certified / GMP approved
The consumer awareness of Glutathione is very high in South East Asia as a whitening ingredient, and also in Japan, Korea, China as a Detoxifier/Anti Hung-over/Liver Health.