Glutathionone’s New Data
(L-Glutathionone Reduced)
Oral Absorption, Skin Beauty
1. General Introduction
Corporate Profile

- Establishment: 1937
- Employees: 217
- A group of Mitsubishi Corporation
- Manufacturing food ingredients, APIs, feed, chemicals, and etc.
- Specialized in **Fermentation**
- Products:

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
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<tbody>
<tr>
<td>GLUTATHIONE</td>
<td>Pharmaceutical and health food (improving liver function, detoxification, anti oxidation, and beauty)</td>
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<tr>
<td>HITHION YH</td>
<td>Glutathione containing Torula yeast extract</td>
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<tr>
<td>Savory Products</td>
<td>Yeast extracts with special features</td>
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</table>

Tokyo Headquarters

Saiki Factory
KOHJIN

- WORLD NO.1 market share
- Totally NATURAL process -- Fermentation product by U.S. FDA Approved Yeast
- U.S. FDA GRAS Certified
  - GRN No. 000293
- GMP Certified Factory (Japanese Gov.)
- KOSHER Certified
  - KC#3721936-1
- HALAL Certified (MUI/JAKIM)
  - MUI: No. 00310028570304
  - JAKIM: No. 0100-01-147707
Torula Yeast (*Candida Utilis*)

- First described by Persoon in 1794.
- Cosmopolitan in nature and commonly found on dead herbaceous stems, grasses, leaves, sugar beet roots, ground nuts, oats, soils etc.
- Approved by US FDA as safe supplement. (FDA Code of Federal Regulation 172.896.)
- In Germany approved as food in 1920.
L-Glutathione Reduced (GSH)

- Tri-peptide of Glutamic acid, Cysteine and Glycine.
- Predominant Non-protein “thiol” among living substances.

- Endogenous GSH Plays various important roles.
- It is essential for the survival of all living organisms... meaning your **ability to be alive!**
Glutathione is NOT Infinite...

- As we age, there is a precipitous drop in GSH levels.

- Lower Glutathione levels are implicated in many diseases associated with aging...

*Journal of Clinical Epidemiology 47: 1021-28 1994*
Glutathione is “AID” of Life

- **Antioxidant**
  - Reduce oxidation stress
  - Enhance lipid metabolism

- **Detoxifier**
  - Alcohol detoxification and liver health
  - Excretion of hazardous substances

- **Beauty**
  - Beautiful skin
  - Skin brightness
  - Prevent skin aging
2. Bio Availability of Glutathione
Oral Absorption & New Efficacy

- Injection of glutathione has been applied as medicine to improve liver function and detoxification.

- On the other hand, glutathione or glutathione-containing foods have been used aiming to skin whitening and improvement of liver and mental health etc...

- **Is glutathione absorbed into human body?**

  *Papers published in 1990s concluded that glutathione could NOT be absorbed by oral ingestion (measured with HPLC method).*
Detection Method (Oral Absorption)

Blood (After oral ingestion)

Plasma

added with 3 vol. of ethanol

Precipitate
(Protein Fr.)

Supernatant
(Deproteinized Fr.)

extracted with
5% TCA-2-mer.

Sup. Sup

→LC-MS/MS (MRM) Analysis
Protein Fraction of Plasma in Human trial

Contents of Glutathione (GSH) in the ethanol-precipitate fraction of plasma after oral ingestion of GSH. “*” and “**” indicate significant difference from baseline, $P < 5\%$ and $P < 1\%$ respectively, as calculated using Scheffé's method post hoc.

Oral Absorption (ACS Journal Published)

Increase in the Protein-Bound Form of Glutathione in Human Blood after the Oral Administration of Glutathione

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ABSTRACT: The present study examined the impact of the supplementation of glutathione (GSH), γ-glutamyl-l-cysteinylglycine, on human blood GSH levels. Healthy human volunteers were orally supplemented with GSH (50 mg/kg body weight). Venous blood was collected from the cubital vein before and after ingestion. Plasma was mixed with 3 volumes of ethanol. The supernatant and precipitate were used for the deproteinized and protein fractions of plasma, respectively. Blood cell and plasma fractions were pretreated with 5% trichloroacetic acid–2% 3-mercaptoethanol to reduce the oxidized form of GSH and liberate protein-bound GSH. The 2-mercaptoethanol-pretreated GSH was determined by precolumn derivatization with 6-aminquinolyl-N-hydroxy succinimidyl carbamate and liquid chromatography–tandem mass spectrometry. There was no significant difference in GSH contents in the deproteinized fraction of plasma and blood cell fraction after GSH ingestion. However, the GSH contents in the protein-bound fraction of plasma significantly (P < 0.01) increased from 60 to 120 min after GSH supplementation.

KEYWORDS: glutathione, GSH, blood, supplementation, oral administration, human trial
3. Efficacy for Skin Beauty
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
Mechanism of Skin Beauty

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

- Glutathione promotes Pheomelanin synthesis

Skin Brightness

Dark Complexion
Inhibition of Tyrosinase (1)

- Glutathione showed the strongest effect to inhibit Tyrosinase activity

![Bar chart showing Tyrosinase inhibition (%)](chart)

- Glutathione 0.01mM
- Cystein (free) 0.01mM
- Cystein (chloride) 0.01mM
- Kojic acid 0.01mM
Glutathione has the most effectiveness on Tyrosinase inhibition.
Effect of Melanin Inhibition

- Glutathione can inhibit the melanin production concentration-dependently.

* : $p<0.05$, ** : $p<0.01$ v.s. 0 µg/mL
Synergy of Glutathione and Anti-oxidants

- DPPH radical scavenging activity

- By Adding a small amount of Glutathione, the amount of anti-oxidants can be reduced.

  (ex) DPPH radical scavenging activity of mixture (VC 125µg/ml : GSH 6.2µg/ml) has the same effect with VC 250µg/ml.
Glutathione can enhance the collagen production concentration-dependently.
Synergistic effect of Glutathione and Collagen

By adding a small portion of Glutathione, collagen production by collagen peptide can be enhanced.

** : p<0.01 v.s. Collagen Peptide
Clinical Study on Skin Beauty (1)

- 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, Erysma, L-value(brightness), Questionnaires

*Intake sample
Start 4th week
Apply UVs to skin
8th week
4 weeks later after apply UVs (8th week), we checked the moisturizing and recovery rate of erythema (reddish) increases.

Moisturizing effect (Left cheek)

Recovery from erythema formation from UV radiation (Elbow)

*YH-15 = KOHJIN Glutathione
L-Value Changes with Time

4 weeks later after apply Uvs (8th week), we checked the L-Values as brightness.

*YH-15 = KOHJIN Glutathione
Questionnaire Survey

Questionnaire survey after 4 weeks and 8 weeks of intake of KOHJIN Glutathione (50mg/day).

Survey after 4 weeks of test period

Survey after 8 weeks of test period

Konishi T, Food processing and ingredients, Vol.47, No.8 (2012)
Clinical Study on Skin Beauty (2)

ORIGINAL ARTICLE

Glutathione as an oral whitening agent: A randomized, double-blind, placebo-controlled study

NUTTHAVUTH ARJINPATHANA & PRAVIT ASAWANONDA

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Combination glutathione and anthocyanins as an alternative for skin care during external-beam radiation

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Figure 1. Changes in melanin indices (negative numbers denote decrease in melanin indices).
Clinical Study on Skin Beauty (3)

- Clinical study for “topical use” has been just completed in Indonesia.
- Term: 8 weeks
- Subjects: 72 women, age 18 to 40
- Application:
  - Facial wash, Day cream, and Night cream
  - Glutathione 0.1%, 0.5%, or Placebo
- Protocol: Randomized, Double Blind Test

<table>
<thead>
<tr>
<th>2 week</th>
<th>8 weeks</th>
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<tbody>
<tr>
<td>🔄Start</td>
<td>🔄8th week</td>
</tr>
<tr>
<td>🔄2nd week</td>
<td>🔄4th week</td>
</tr>
</tbody>
</table>

*topical application: twice daily (morning / night)

Measured L-Value, Melanin Index, RRT, and etc.
Positive result of reducing skin pigmentation and improving elasticity
Good for anti-aging?
Paper will be prepared soon...
Thank you!!!

Manufactured by:

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