

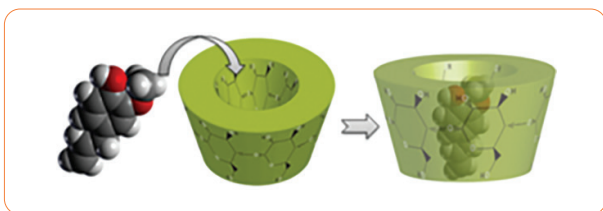
NEOLIGO<sup>®</sup> is Isomaltooligosaccharide including Cyclodextrin well known for inclusion function, which is a material that masks the bitter taste unique to raw materials for health functional foods including red ginseng as well as suppressing reduction of flavor and savor by acid treatment and improving powder stability. It is a food material that can be applied to various types of food as a stable syrup type without cloudiness and crystallization which overcomes the limit of cyclodextrin with low solubility.

### NEOLIGO<sup>®</sup> as Isomaltooligosaccharide

NEOLIGO<sup>®</sup> is a product rich in Isomaltooligosaccharide, which is included in oligosaccharides of Food Code. Isomaltooligosaccharide (isomaltose, panose, isomaltotetraose, isomaltopentaose) is Prebiotics acting as growth factors such as Bifidobacterium, Lactobacillus, etc. NEOLIGO<sup>®</sup> is an innovative material

### NEOLIGO<sup>®</sup> including Cyclodextrin

Cyclodextrin present in NEOLIGO<sup>®</sup> applies in various food fields because it has a cylindrical structure of hydrophobic inside and hydrophilic outside. It is classified into  $\alpha$  type (C=6) and  $\beta$  type (C=7), and  $\gamma$  type (C=8) depending on the number of carbon atoms constituting the cyclodextrin, and the inclusion function of cyclodextrin using these structural features (picture 1) has the following advantages.



Picture 1. Inclusion Mechanism of Cyclodextrin

- \* Inclusion of indigestible soluble fiber ( $\alpha$  type)
- \* High stability against temperature and pH
- \* Prevention and stabilization of herbs and spices
- \* Prevention of oxidation and photodecomposition of natural pigments, fluid vitamins
- \* Masking of food raw materials own bitter, which are coffee, chocolate, cucumber,
- \* Improvement of emulsification & foaming and stabilization of tissue
- \* Improvement of powder stability with powdered substrate
- \* Masking of unique bitter taste of red ginseng products ( $\gamma$  type)
- \* Solubilization of fat-soluble vitamins ( $\gamma$  type)
- \* Stabilization of natural pigments (anthocyanin, lycopene, astaxanthin) ( $\gamma$  type)

### Features of NEOLIGO<sup>®</sup> Series

#### • Stable syrup without white cast and crystallization —

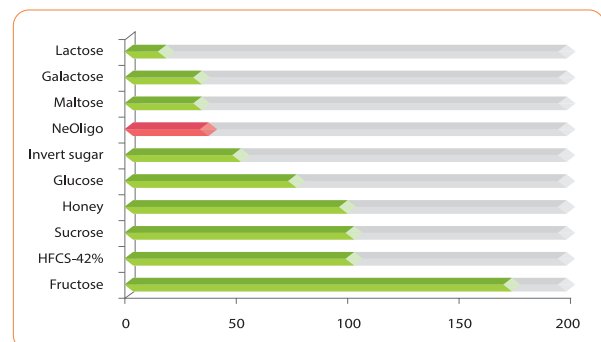
Cyclodextrin known as conventionally has been used as powders due to disadvantages of very low solubility, and its liquid product which is relatively easy to use has a problem of low commercial value. NEOLIGO<sup>®</sup> includes liquid cyclodextrin without white cast & crystallization as overcoming these shortcomings of existing products.

(Patent No. 10-1340970, Process for Preparing Liquid Cyclodextrin, NEO CREMAR Co., Ltd., 2013)

#### • Soft Sweetness

NEOLIGO<sup>®</sup> has a low sweetness of 35 degrees when the sweetness of sugar is 100. (Picture 2)

In addition, if NEOLIGO<sup>®</sup> is applied to a liquid product, the cylindrical structure of cyclodextrin with both hydrophilic and hydrophobic groups gives a smooth and uniform texture stably maintaining the dispersed state of the particles.



Picture 2. Comparison of NEOLIGO<sup>®</sup>'s Sweetness

### Product Composition of NEOLIGO<sup>®</sup> Series

NEOLIGO<sup>®</sup> Series is divided into two product families according to the function and application method. (Table 1)

NeOLIGO <sup>®</sup>	Stabilization and Prevention of Flavor and Savor Components
NeOLIGO <sup>®</sup> -G	Masking of Improper Tastes such as bitter taste, fishy taste, etc. of raw material

Table 1. Product Composition of NEOLIGO<sup>®</sup> Series



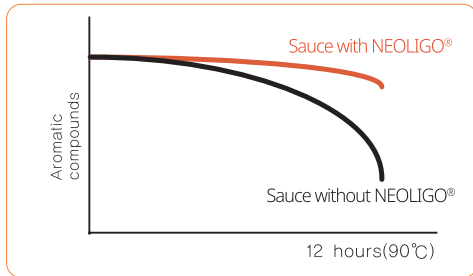


**NeOLIGO<sup>®</sup>**

**NEOLIGO<sup>®</sup>, Flavor & Savor-Sustaining Material**

• **Improvement of Flavor & Savor Sustaining**

NEOLIGO<sup>®</sup> as a material to sustain flavor and savor has excellent thermal stability characteristics, which improves the reduction of flavor and savor that can be generated by heat treatment and acid treatment during food processing. The structural features of cyclodextrin help improve stability with including fragrance, flavor ingredient. (Picture 3)



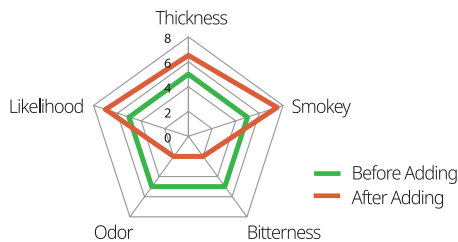
Picture 3. Flavor-sustaining effect when using NEOLIGO<sup>®</sup> in sauces

• **Applications**

- **Charcoal-flavored Seasoning Sauce**

- **Product Type:** Sauce/Composite Seasoning Food

- **Main Ingredients:** Soy Sauce, Refined Sugar, Starch Syrup, Edible Oil & Fat, Garlic Powder, Onion Powder, Purified Water, Gum, Dextrin, Yeast Extract, Egg Shell Calcium, NEOLIGO<sup>®</sup>



**NEOLIGO<sup>®</sup>-G, Masking Material**

• **Masking of Odor, Strange Taste in Food Material**

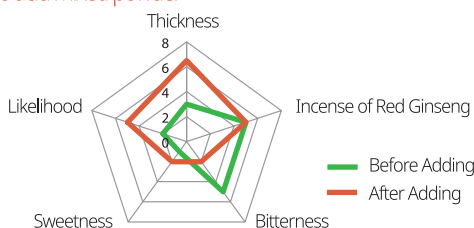
NEOLIGO<sup>®</sup>-G enhances  $\gamma$ -cyclodextrin with 8 carbon atoms, which is isomaltooligosaccharide specialized for masking.  $\gamma$ -cyclodextrin is applied to various products including red ginseng.

• **Applications**

- **Red Ginseng Products - Product Type:** Health functional foods

- **Main Ingredients:** Red ginseng concentrate, Fermented red ginseng concentrate

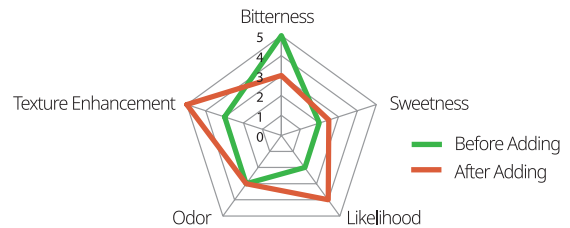
- **Mixing Ratio:** 4.5% of Fermented red ginseng concentrate, Plant mixture extract(Korean angelica root, Cnidium, Rehmannia glutinosa, Astragalus membranaceus Bunge var. membranaceus, Pachyma, White atractylis, Paeonia, Lyquorice root (licorice root)), Powder extracted from antler, 5% of NEOLIGO<sup>®</sup>-G, Purified Water, Fructooligosaccharide, Amino acid mixed powder



- **Hovenia Drink - Product Type:** Liquid Tea / Mixed Drink

- **Main Ingredients:** Concentrate extracted from Hovenia dulcis or its berry

- **Mixing Ratio:** 8% of Angelica Utilis Makino mixture concentrate, 2% of Angelica Utilis Makino concentrate, 3.1% of concentrate extracted from Hovenia dulcis, 1% of NEOLIGO<sup>®</sup>-G, Purified Water, Arrowroot Juice, Fructooligosaccharide, Jujube mixed mix, Indigestible maltodextrin, Plum juice concentrate

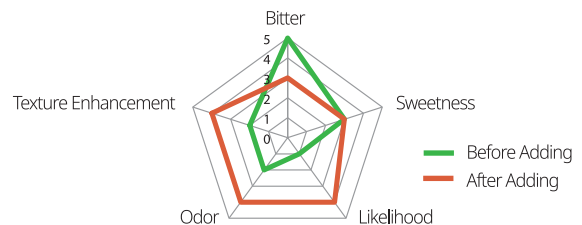


- **Over-the-Counter Drugs of Medicinal Herbs**

- **Product Type:** Over-the-counter drugs

- **Main Ingredients:** Medicinal Herbs such as Paeonia, Pueraria, Ginger, Jujube, etc.

- **Mixing Ratio:** Paeonia, Rehmannia glutinosa, Astragalus membranaceus Bunge var. membranaceus, Korean angelica root, Cnidium, Cassia Bark, Lyquorice root (licorice root), Ginger, Jujube, Sodium benzoate, 1% of NEOLIGO<sup>®</sup>-G



**Product Information**

Item	NEOLIGO <sup>®</sup>	NEOLIGO <sup>®</sup> -G
Appearance	Liquid phase of transparent point composition without strange taste, odor	Liquid phase of transparent point composition without strange taste, odor
Solid Content(brix)	≥ 75.0	≥ 75.0
Moisture (%)	≤ 25.0	≤ 25.0
Total Isomaltooligosaccharide(DB%)	≥ 15%	≥ 15%
$\gamma$ -cyclodextrin	-	≥ 3.5%
pH(30% solution)	4.0 – 7.0	4.0 – 7.0
Arsenic(ppm)	≤ 1.0	≤ 1.0
Lead(ppm)	≤ 1.0	≤ 1.0
Packing Unit	24kg(Tin can)	24kg(Tin can)