EFFECT OF ASTRAGIN™ ON ENHANCING NUTRIENTS ABSORPTION INTESTINAL LUMEN

How AstraGin® Works In The Human Body

AstraGin® has demonstrated in NuLiv’s 12 in vitro and 8 in vivo studies to significantly increase the absorption of a wide range of nutrients in human intestinal cells and repair damaged intestinal wall in TNBS-induced colitis rats.

AstraGin® increases nutrient absorption by up-regulating the expression levels of absorption specific mRNA and transporter proteins, such as CAT1 and SGLT1, to increase the amount of amino acids, peptides, and glucose entering into intestinal cells that are transported to the liver via portal vein and distribute throughout the body.

The Critical Role Absorption Plays In Human Health

Absorption determines the amount of nutrients available for maintaining normal bodily functions and for repairing and rebuilding cells, tissues, and organs. The small intestine is the primary site for the absorption of fluids, electrolytes, macronutrients (proteins, carbohydrates, and fats), and micronutrients (vitamins, minerals, and trace elements).

The intestinal epithelium is lined by a single layer of mucosal epithelial cells, which selectively take up nutrients from the intestinal lumen across the brush border membrane (BBM). This is achieved by modulating the nutrient transporting proteins at the BBM to up-regulate nutrient absorption. The expression of nutrient transporters at the BBM is dynamic and controlled by the availability of transporter substrate.

SUPPORTS THE ABSORPTION OF ESSENTIAL & OTHER HEALTH PROMOTING NUTRIENTS IN HUMAN BODY
SUMMARY OF EFFICACY TESTS

**12 In vitro** in Caco-2 cell (mRNA, transporter, uptake assays)
**8 In vivo** (normal and TNBS-induced rats)
One ongoing **human clinical trial** on creatine (randomized single-blind, crossover, 3 month, 32 subjects) [1 - 6]

PRODUCTS WITH ASTRAGIN®

In over 200 functional foods, beverages, and supplements worldwide, such as N.O.-Xplode, Hyper-FX, ON Gold Standard Pre-Workout, Training Formula, L Arginine Plus, ArgiNext, ULIVJava. [7]

PATENT & REFERENCE

China patents CN200610090113.0, CN200610090114.5, CN200910178493.7, CN200910178492.2
Taiwan patents I271195, I317280

7. AstraGin® product reference

PRODUCT PROPERTIES

- **Composition**: a proprietary blend of highly purified and fractionated extracts from Astragalus membranaceus (CAS#94166-93-5; EC#303-391-9) and Panax notoginseng (CAS# 94279-78-4; EC#304-823-9) produced by a proprietary pharmaceutical extraction and fractionation process.
- **Marker compounds**: Total saponins≥1.5%
- **Solubility**: soluble in water
- **Color**: Light beige
- **Odor**: Characteristic
- **Taste**: slightly bitter
- **Appearance**: fine granular powder
- **pH**: 6.0-7.0 (1g in 100ml water)
- **Dose**: 50mg
- **Shelf life**: 36 months
- **Preservative**: none
- **Pesticide & herbicide residues**: NO more than detection limits

APPLICATIONS

- **PROTEIN POWDERS**
- **MEAL REPLACEMENTS**
- **SPORTS NUTRITION**
- **ENERGY BARS**
- **RTD (READY-TO-DRINK)**
- **FUNCTIONAL BEVERAGES**
- **SUPPLEMENTS (CAPSULE, LIQUID, POWDER, SOFTGEL, TABLET)**
- **MEDICAL FOODS**
- **PET FOODS & SUPPLEMENTS**

BENEFITS

**Enhances the absorption (In vitro) of:**
- Peptides and amino acids: ↑41% (AUC) (www.enxymessence.com)
- Arginine: ↑67%
- Citrulline: ↑45%
- Creatine: ↑33%
- Agmatine: ↑36%
- Beta-alanine: ↑26%
- Tryptophan: ↑53%
- Folate: ↑50%
- Omega-7 fatty acid (Palmitoleic acid): ↑39% (AUC) in 30min
- Curcumin-lecithin: ↑92% in 2 hours
- Glucosamine: ↑23% in 10min

**Increases the absorption (In vivo) (TNBS-induced colitis rats) of:**
- Lysine, arginine, and histidine: ↑38%, ↑31%, and ↑22%
- Jejunum and ileum CAT1 protein: ↑25% and ↑151%
- Jejunum and ileum mRNA: ↑22% and ↑8%

**Repairs damaged intestinal wall in TNBS-induced colitis rats where most absorption occurs by decreasing MPO (a surrogate marker of inflammation) by ↑73% (In vivo)**