



Sole agent in Egypt :

<sup>®</sup>  
**IPC**  
INTERPHARMA



## 01 L-METHIONINE

World's first L-methionine produced by an innovative fermentation process



## 02 L-LYSINE

BESTAMINO L-lysine produced by an innovative fermentation process  
We provide various forms such as powder, granule and liquid type  
to meet your specific needs



## 03 L-ARGININE

BESTAMINO L-arginine produced by an innovative fermentation process



## 04 L-VALINE

Global NO.1 L-valine produced by an innovative fermentation process

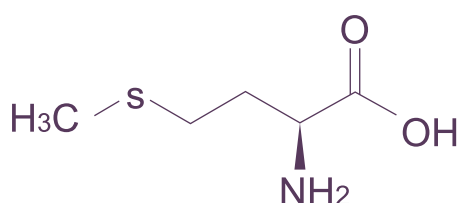


## 05 L-TRYPTOPHAN

Global NO.1 L-tryptophan produced by an innovative fermentation process

# L-METHIONINE

## Chemical structure of L-Methionine



An essential amino acid and, together with cysteine, the only sulfur containing proteinogenic amino acids, is the first limiting amino acid in poultry diets together with lysine, has an important donor of methyl groups in the metabolism.

**Appearance White and yellowish crystalline**



CJ BIO website QR code

## MAIN BENEFITS OF L-METHIONINE

01

Methionine is vital for optimum protein synthesis in growing animals and for feather development and laying performance.

02

**BestAmino<sup>TM</sup>**  
L-Met100 is the first pure L-methionine available for animal nutrition.

03

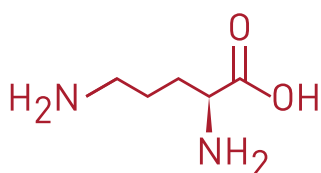
**BestAmino<sup>TMM</sup>**  
L-Met100 is produced by fermentation and fully available in its bioactive L-form with a purity of L-methionine of minimum 99 %.





# L-LYSINE

## CHEMICAL STRUCTURE OF L-LYSINE



L-Lysine is the reference amino acid in modern animal nutrition; it must be provided in all types of animal feed to ensure optimal performance.



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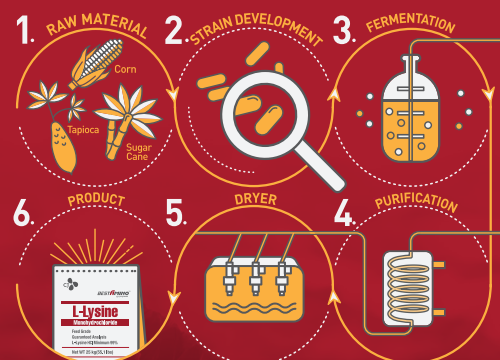
## UPGRADE YOUR DIET WITH CJ BIO

—A GLOBAL LEADER IN FEED GRADE AMINO ACIDS

### 01

#### Advanced fermentation technology

- CJ L-lysine is produced with an innovative fermentation processes using raw materials, thus combining sustainability and efficiency in animal nutrition.



### 02

#### Various products for customers

- BESTAMINO L-lysine in powder, granule and liquid forms to meet the specific needs of our customers around globe.

### 03

#### Stable supply of L-lysine

- With five production sites around the world, we ensure stable supply of L-lysine.

L-Lysine is an essential amino acid for monogastric animals. It must be supplied exogenously because monogastric animals cannot de novo synthesize it or cannot synthesize enough for their metabolic needs. L-lysine is considered the first limiting amino acid for swine feed and the second limiting amino acid in broiler feed (based on corn and soybean meal diets). For these reasons L-lysine was chosen as the reference amino acid for the "ideal protein" concept, which bases dietary amino acid concentrations on fixed ratios to lysine (Baker & Han, 1994).

BESTAMINO L-lysine is produced by the advanced fermentation processing using natural raw materials, and can be supplied with various specifications.

## VARIOUS PRODUCTS FOR CUSTOMERS

Each L-lysine product has its advantages, mainly depends on the feed type produced and available dosing equipment.

- **L-Lysine HCl**

Pasuruan (Indonesia), Piracicaba (Brazil), Fort Dodge (USA), Shenyang, Liaocheng (China)

- **Liquid**

Pasuruan (Indonesia), Piracicaba (Brazil), Fort Dodge (USA)

- **L-Lysine sulfate**

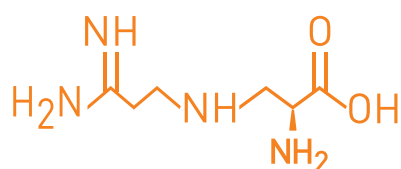
Pasuruan(Indonesia), Piracicaba(Brazil), Liacheng(China)

## STABILITY OF SUPPLEMENT: CJ BIO'S LYSINE PRODUCTION SITES



# L-ARGININE

## CHEMICAL STRUCTURE OF L-ARGININE



CJ L-arginine, a conditionally essential amino acid, is necessary for maintenance, growth, reproduction, and immunity. Poultry are not able to synthesize Arg themselves, and therefore depend on dietary Arg to meet their needs for protein synthesis and other functions.



CJ BIO website QR code

## MAIN BENEFITS OF L-ARGININE

100% BIO AVAILABLE

### 01 Fermentation based

- CJ L-arginine is produced with an innovative fermentation processes using raw sugar, thus combining sustainability and efficiency in animal nutrition



### 02 Promote nitric oxide [NO] synthesis and enhance blood circulation

### 03 Suppress fatty acid synthase [FAS] and aid in reduction of abdominal fat

### 04 Induce growth hormone

### 05 Stimulate cell proliferation

### 06 Enhance antioxidant enzyme and decrease oxidative stress

# MAIN FUNCTIONS OF L-ARGININE IN LIVESTOCK



## Poultry

### Broilers

- Suppress hepatic fatty acid synthase (FAS)
- Enhance CPT1 and 3HADH which are enzymes related to transferring fat into energy

Abdominal Fat ↓

Carcass Yield ↑

Breast Meat Yield ↑

### Layers

- Increase **antioxidant capacity** and decrease oxidative stress which is caused by heat / cold stress
- **NO** induces vasodilation and better blood circulation improves reproductive organs

Stress ↓

Mortality Rate ↓

Egg Production ↑



## Aqua

### Salmon

- Promote lipid metabolism which reduces adipose mass

Farmed Salmon Fat Portion ↓

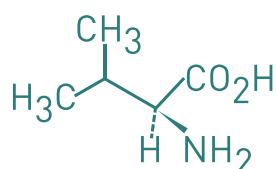
- Polyamine promotes embryo development

Reproduction Performance ↑



# L-VALINE

## CHEMICAL STRUCTURE OF L-VALINE



Produced by fermentation with approved safe microorganism and designed to meet the digestible valine requirements of high-yielding genetics



CJ BIO website QR code

## MAIN BENEFITS OF L-VALINE

### ESSENTIAL AMINO ACID FOR MUSCLE CELL METABOLISM

# 01

#### Broiler : Positive response

- L-Valine aids in maintaining growth performance by optimizing average daily gain (ADG), feed conversion ratio (FCR) and body protein synthesis

# 02

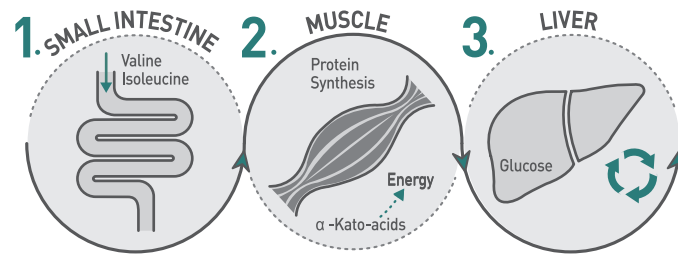
#### Layer : Increased productivity

- L-Valine supplementation aid in maintaining healthy body weight and optimal egg production.





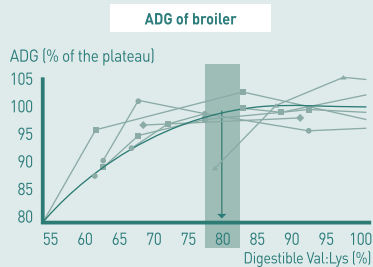
# HOW L-VALINE IS USED IN THE BODY?



## L-VALINE FOR POULTRY

### BROILER

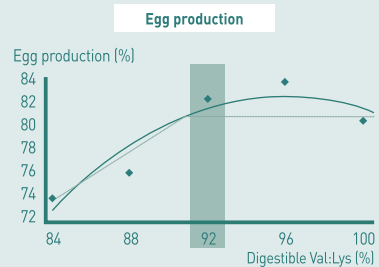
- **Recommendation: 80% VAL:LYS ratio**
- Improved performance (ADG, FCR)
- Body protein synthesis  $\uparrow$  & proteolysis  $\downarrow$



• REF. Meta-analysis, 2011, Lohmann

### LAYER

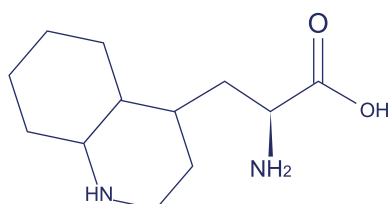
- **Recommendation: 92% VAL:LYS ratio**
- Improved productivity (FCR, egg production improvement)
- Decreases body loss



• REF. Lelis et al., 2014, J. Appl. Poult. Res.

# L-TRYPTOPHAN

## Chemical structure of L-Tryptophan



L-Tryptophan is a high quality feed grade amino acid produced by bacterial fermentation with tryptophan activity of minimum 98%.

**Appearance** White to slightly yellowish-white crystals or crystalline powder



CJ BIO website QR code

## MAIN BENEFITS OF L-TRYPTOPHAN

01

Its effect on protein synthesis, L-Tryptophan plays a specific role in other physiological processes.

02

**Also**

It increases the expression of ghrelin hormone, which has been linked to improving appetite.

03

**L-Tryptophan**

Is a key amino acid in maintaining optimal egg production efficiency as well.





