



# PerPFN II

High Digestibility, Strong Food  
Attraction, and Immunity

PRODUCT  
SPECIFICATION

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PerPFN II is a high-quality functional protein ingredient made by deep-sea fish and gluten to go through the treatments of yeast fermentation, enzymolysis and cell wall-broken according to the nutritional requirements and physiological features of young animals, produced by Hunan perfly Biotech Co., Ltd. to use fermentation technology, enzyme engineering technology and small peptide research results.

### 1. Main ingredient composition and nutrient determined value

1 ) Main ingredient composition and nutrient determined value

PerPFN II is made from deep-sea fish and gluten to go through yeast fermentation, enzymolysis and cell wall-broken.

2 ) Nutrient determined value

Table 1. Nutritional Ingredients of PerPFN II

Composition	PerPFN II	Hydrolyzed Wheat Protein	yeast hydrolysate	DPS	NRC(2012)
Crude protein %	60.28	75.34	47	72.13	
Acid soluble protein %	35	35	40	1.53	
Crude fat %	1.74	0.2	1.14	1.87	
Crude fiber %	0.81	0.5	0.1	0.21	
Crude ash %	9.77	5.86	7	13.12	
Moisture %	6.45	6.75	6	9.23	
Calcium %	1.32	0.75	0.94	0.14	0.8
Total phosphorus %	0.58	0.9	1.25	1.98	0.65
Sodium chloride %	2.69	0.3	1	5.96	0.74
ME kcal/kg	3450	3420	3180	3950	3400
Arginin %	3.24	1.75	2.46	3.89	0.68
Histidine %	1.47	1.66	0.84	3.80	0.53
Isoleucine %	2.55	2.7	2.38	1.38	0.79
Leucine %	4.07	6.51	3.65	8.25	1.54
Lysine %	4.4	1.38	3.86	6.90	1.53
Methionine + Cystine %	2.0	1.99	0.77	0.66	0.44
Phenylalanine + Tyrosine %	4.41	6.3	3.77	4.52	0.91
Threonine %	2.64	1.95	2.43	2.12	0.95
Tryptophane %	0.49	0.7	0.66	1.20	0.25
Valine%	3.11	3.27	2.86	5.48	1
Glutamic acid%	10.52	29	5.98	10.02	

Note: Red indicates excellent, yellow indicates defective

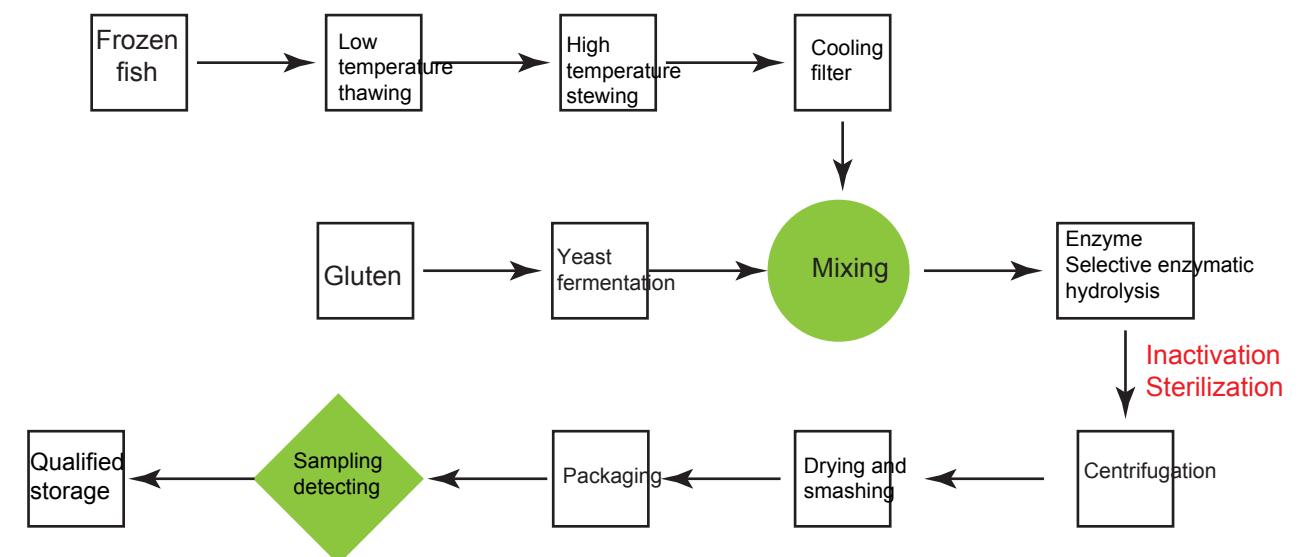
### 2. Product Standard

Table 2. Product Standard of PerPFN II

Sensory Indexes		Physicochemical Indexes	
Appearance	Yellow powder	Moisture	≤ 8%
Odor	Fishy odor	Crude protein	≥ 60%
Taste	Slight salted	Crude ash	≤ 12%
Fineness	95% through 40 mesh sieve, without clump	Calcium	0.2-2.0%
Pollution	None	Total phosphorus	0.3-3.0%
Foreign Matter	None	Sodium chloride	≤ 3.0%
		Lysine	≥ 3.5%
		Acid soluble protein	≥ 34%
		AV	≤ 5mgKOH/g
		POV	≤ 3mmol/kg
		VBN	≤ 100mg/100g

### 3. Production Process

Figure 1 Process flow chart of PerPFN II



## 4. Features

### 4.1 No biological safety hazard

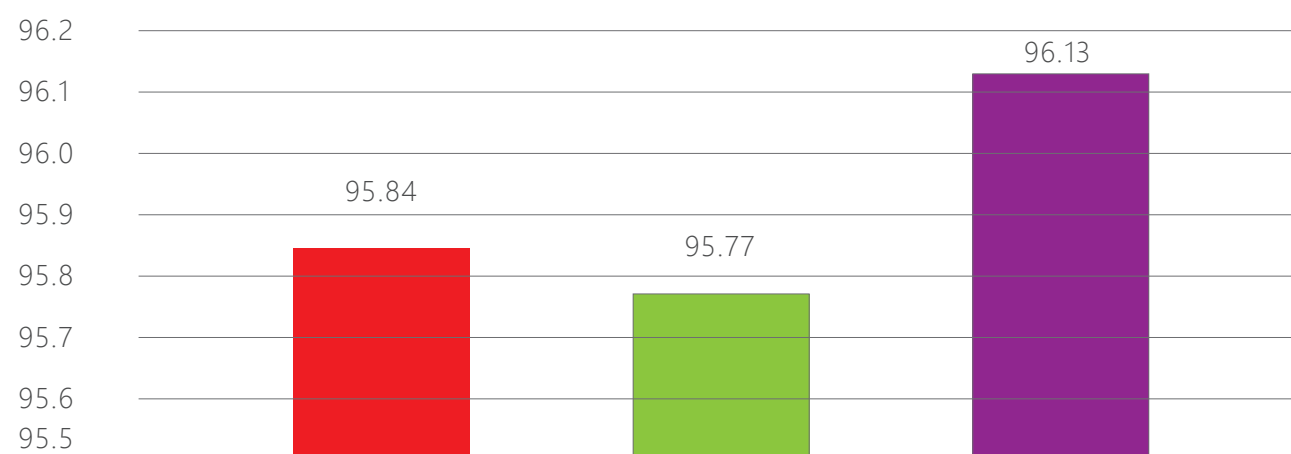
The biological safety problem of animal source feed has been concerned by all over the world. Although plasma protein is good, the biological safety hazard still exist. Some viruses have unique bacterial capsule, only high pressure can break the structure completely. Nowadays, most of domestic plasma protein producers use centrifugal spray drying technology, so viruses in plasma can not be inactivated thoroughly, maybe there are also some active viruses. Even if the viruses are inactive, if only their DNA can not be damaged completely, the viruses can revive by utilizing the copy system of bacteria or viruses in animals, causing potential harm to animals.

PerPFN is animal protein ingredient that is not homologous to swine, so it is quite safe.

### 4.2 High nutritive value and digestibility

There is no antigen in PerPFN, whose crude protein is above 60%, acid soluble protein is above 35%(much higher than plasma protein), amino acid composition is reasonable (see table 1) and digestibility is high(above 95%), fermentable protein in hind-gut is extremely low.

Digestibility of pepsin



At the same time, PerPFN is rich in nutrients and active substances necessary for young animals and pets, such as small peptides, nucleotides, and unknown growth factors. Compared with the absorption of free amino acids, the absorption of small peptides has the advantages of fast absorption, low energy consumption, and carriers hard to be saturated, so it can avoid competition with amino acid absorption. Daniel et al. (1994) believed that the absorption capacity of small peptide carriers might be higher than the sum of the absorption capacities of various amino acid carriers.

### 4.3 The product has a strong fishy smell and is rich in flavor amino acids and nucleic acids, and its palatability is comparable to that of plasma

Small peptides, amino acids and nucleic acids, nucleotides are flavor systems (equivalent to monosodium glutamate-sodium glutamate, chicken powder-sodium inosinate, and sodium guanylate), which can improve the feed attraction.

At present, protein ingredients that are flavor and attractive include plasma protein powder and yeast hydrolysate.

The palatability of plasma protein powder should be recognized by everyone in the industry, which mainly relies on the peptides, amino acids and bloody smell in it, but it has been banned due to the influence of African Swine Fever homology. The attractive of yeast hydrolysate mainly depends on the nucleic acid and nucleotide.

At present, there are many yeast-like products on the market, and it is difficult to distinguish between true and false. Fake products are flooding the market. The true yeast hydrolysate is the hydrolysate of *Saccharomyces cerevisiae* cultivated purely, not the hydrolysate of beer and alcohol yeast. Both are industrial by-products with impure and poor palatability.

Amino acids (such as glutamic acid) and nucleic acids (I+G) have the effect of multiplying flavor. PerPFN II makes full use of the two major flavor systems of amino acid and nucleic acid, and the nucleic acid is derived from a nucleic acid released by the enzymolysis to break the wall of yeast that is purely cultivated by gluten. Therefore, PerPFN II is a very good food attractant, which is comparable to plasma!

### 4.4 Enriched with immune nutrients improve animal non-specific immunity

Non-specific immunity is the basis of specific immunity and the basic condition for artificial immunity. Therefore, enhancing non-specific immunity is the main way to improve the body's overall immunity. When an epidemic (such as African Swine Fever) comes, why are some animals infected with the same amount of virus, some are not infected, some are only mild and some are severe, the main difference is that the immunity is different!

PerPFN II is rich in nucleic acids and yeast cell wall polysaccharides. Nucleic acid first attracted people's attention because it was observed that babies who were breastfed grow healthier and faster than those who were fed with artificial milk(such as milk). Later it is found that the content of nucleic acid in breast milk was many times higher than that in milk by analysis of breast milk and milk components. Therefore, it is believed that nucleic acid may be one of the reasons why breast milk is superior to artificial milk. In 2005, National Health Service recognized nucleic acid products for enhancing human immune function and officially issued a document recommending that they can be added into infant milk powder.

Recent studies have found that when animals are in a period of rapid growth and development (piglets, broilers, high-yield lactating animals, chicks, etc.), or animals are under stress challenges (Kulkarni et al., 1994; Rudolph et al. 1990), liver damage (Ogoshi et al., 1997), when there are some diseases, there is a great demand for nucleic acids, and exogenous nucleic acids need to be supplemented (Tan Yonggang et al., 2002; Ho et al., 1979; Kulkarni, 1994; Leonardi, 2003). When the body is exposed to external stimuli or stress, the amount of nucleotides required increases sharply. The addition of exogenous nucleotides can increase synthesis pathways, save a lot of ATP and amino acids, etc., stabilize the body's energy and material metabolism, and enhance the body's resistance to external stimuli and stress, thus exhibiting a protective effect on the body (Li Shiyang et al., 2006). After the piglets are weaned, the rich source of nucleic acid in the milk is cut off and can only be provided by the diet, while the ordinary corn-soybean meal type diet contains extremely low nucleic acid content, which affects the growth and health of the piglets.

In addition, nucleic acid can increase the number of beneficial bacteria (such as *Bifidobacteria* and *Lactobacillus*) and reduce the number of harmful bacteria (such as *E. coli*) in the intestines of weaned piglets, improving the structure of the intestinal flora of weaned piglets (Pan Shude, 2008). Additional nucleotide supplementation can also significantly improve the intestinal morphology of piglets, reduce the incidence of diarrhea (Martinez-Puig et al., 2007), and alleviate weaning stress by reducing the cortisol hormone level after weaning.

Yeast cell wall polysaccharides can improve immunity mainly from the following aspects: 1) Yeast cell wall polysaccharides ( $\beta$ -glucan, mannose oligosaccharides) can adsorb mycotoxins to reduce the harm to the body; 2) Mannan oligosaccharides can adsorb pathogenic bacteria, causing the pathogenic bacteria adhered to the intestinal mucosal epithelial cells to fall off and to excrete in feces; 3) Yeast cell wall polysaccharides bind to special receptors in blood cells to stimulate T lymphocytes and B lymphocytes, thereby enhancing specificity Immune response to improve the body's resistance; 4)  $\beta$ -glucan can stimulate the body's reticuloendothelial system (RES) to produce a large number of macrophages, thereby enhancing non-specific immune response.

### 4.5 The product is rich in DHA and ARA, it can be used in pets to promote brain development and to increase IQ; at the same time, it can also improve the fur and improve the body's immunity

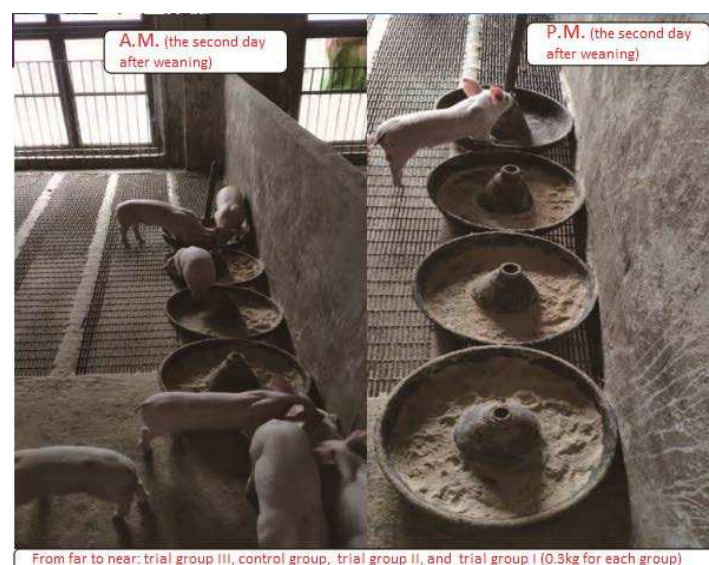
## 5 Trial reports ( 2019. 3-4 )

### 5.1 For creep feed I

120 Duroc × Landrace × Yorkshire crossbred piglets(25-day-old) were selected for this trial. They were randomly divided into four groups according to similar body weight and sexual ratio, each group had 20 piglets. The control group was fed with 4% plasma protein, the trial groups I and II were fed with 4% other attractant protein ingredients, and the trial group III was fed with 4% PerPFN II. Trial period was from weaning and has lasted for seven days (2019.3.6-3.12, diarrhea was prevalent in pig farms on the 5th day). In addition, a food calling trial was carried out, and 4 troughs were placed at the same time, and the same weight of the above 4 kinds of creep feeds were added respectively.

Table 3. Feed intake during early four days

	Average initial weight kg	Average feed intake g/d	Difference g/d
Control ( 4%plasma )	5.45	137.82	
Trial group I	5.55	113.21	-24.61
Trial group II	5.47	133.68	-4.14
Trial group III ( 4% PerPFN II )	5.50	147.34	+9.52 ( +6.91% )



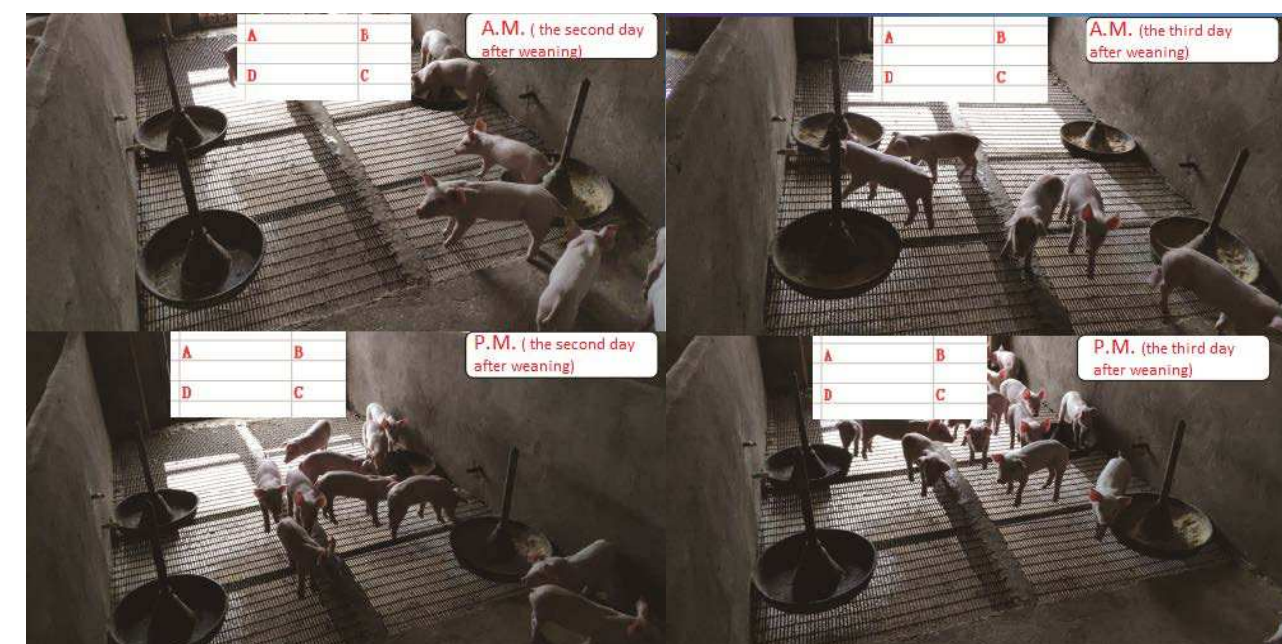
It can be seen from the figure above that the trial feed containing 4% PerPFN II in the afternoon of the second day after weaning has been eaten up (the amount of feed is the same), and the feeds in other three groups are still left. It can be seen that PerPFN II is a better attractant than the plasma.

### 5.2 For creep feeds II

180 Duroc × Landrace × Yorkshire crossbred piglets(23-day-old) were selected for this trial. They were randomly divided into four groups according to similar body weight and sexual ratio, each group had 45 piglets (three pens). The control group A was fed with 4% plasma protein, the trial groups B and C were fed with 4% other attractant protein ingredients, and the trial group D was fed with 4% PerPFN II. Trial period was from weaning and has lasted for seven days (2019.4.19-4.25). In addition, a food calling trial was carried out, and 4 troughs were placed at the same time, and the same weight of the above 4 kinds of creep feeds were added respectively.

Table 4. Production performance

Grouping	Average initial weight Kg	Average final weight Kg	ADFI g/d	ADG g/d	F/G	AFI during early 3d g/d
A ( 4% plasma )	5.98	7.43	255.63	207.14	1.23	128.83
B	6.12	6.99	189.71	124.29	1.53	113.2
C	5.95	6.98	206.64	147.15	1.40	109.8
D ( 4% PerPFN II )	5.91	7.39	257.86	211.43	1.21	131.5



It can be seen from the above figure that the trial feed group containing 4% PerPFN II and plasma group have been eaten up from the morning of the second day after weaning (the amount of feed is the same), and the feeds in other two groups are still left. It can be seen that feeding attraction activities of PerPFN II is comparable to that of the plasma group.

## 6. Usage&dosage

### 6.1 Dosage

It is recommended that dosage of PerPFN II in the creep feed is 3-5%, which replaces the use of high-end animal protein ingredients, such as pig plasma protein powder and intestinal membrane protein (pay attention to protein balance and lysine level). Balanced energy protein ratio and feed intake can make weight gain much better, and there is no risk of homologous disease transmission.

The use of PerPFN II can reduce the use of small peptide protein ingredients, such as fish meal.

PerPFN II is used in pets to attract food, promoting brain development and improving IQ; at the same time, it can also improve the fur and improve the body's immunity.

### 6.2 Packaging&storage

Packed in compound polyethylene bag, 20 kg/bag. Store in a dry and ventilated place. The shelf life is 6 months.