

Fisugarpeptide Biology Engineering Co., LTD

Usage method of Five Acid Peptide

WLT people believe that: Enzymatic hydrolysis fermented feed must be "Tastable Acid, Effective Acid", and will become a small proportion of feed ingredients, which is the trend of The Times and history. "Five Acid Peptide" adopts corn, broken rice, soybean meal, vegetable oil and corn protein powder (Peru steam dried fishmeal/alfalfa meal) five feedstuffs asynchronous enzymatic hydrolysis, vegetable oil & sugar-based homogeneous emulsion and synchronous fermentation acidification of mixed bacteria and high sugar medium, original taste and flavor, sour and sweet, has good smell and fragrance, good anti-stress effect and excellent attractants, is a kind of high-acid enzymatic hydrolysis fermented feed that truly realizes the "Tastable Acid, Effective Acid". Eight functions: liking drinking, anti-diarrhea, heavy-milking, growing fast, treating enterovirus syndrome, producing more eggs, resisting stress and purify intestines and water. FAP (short for "Five Acid Peptide") is rich in Citric Acid, Lactic Acid, Acetic Acid, Propanoic Acid, Butyric Acid, Emulsified Fat, active small peptide (including antibacterial peptide), Probiotics, high sweet Oligose, Yeast Protein, Biological Enzyme, Vitamin, Organic Acid Calcium Leaven fragrant & sweet element and the unnamed growth factor, can substitute acidifier, micro-ecology, antibiotics, emulsified fat powder, whey powder, plasma protein, glucose and fermented soybean meal and other biological ingredients. In a sense, it skillfully makes organic acid, probiotics, enzymatic hydrolysis fermented feed and emulsified fat etched and coated, perfectly realize the mutual improvement among them. See table 1, 2 and 3 for the basic nutrition of FAP in detail.

There are great differences between FAP and some "common enzymatic hydrolysis fermented feed" in effective components, cost performance and actual feeding effect. In short, it is "One coated, Three differences".

"One coated": The organic acids contained in FAP are etched and infiltrated into the cell wall of the feed during the fermentation process, and are etched and coated naturally in emulsified vegetable oil spray, which will not stimulate and damage the mucosa of the digestive tract and is easy to "go through the stomach and into the intestine". However, the organic acids contained in part of the "common enzymatic hydrolysis fermented feed" on the market are not etched and coated by emulsified fat, which will stimulate and damage the mucosa of the digestive tract and make it difficult to "go through the stomach and into the intestine".

"First difference": acidification process of FAP. The strains have ultra-high sugar-resistance, acid-resistance and permeation-resistance. The fermentation produces ultra-high acid, and the total acid content is more than 50%. However, the fermentation of all "common enzymatic hydrolysis fermented feed" on the market produces low acid, and the total acid content less than 5% and the total acid content only about 3% in general.

"Second difference": probiotics process of FAP, its probiotic content up to 10^7 cfu/g or more, but the probiotic content of some "common enzymatic hydrolysis fermented feed" on the market is low, with viable bacteria content less than 10^4 cfu/g.

"Third difference": oil process of FAP, its emulsified fat content up to more than 6%, but all "common enzymatic hydrolysis fermented feed" on the market does not contain emulsified fat.

Therefore, FAP is rich in organic acids and viable bacteria, high energy, good palatability, large intake, can not only "go through the stomach into the intestinal" to acidify the intestines of livestock and poultry, but also can supplement probiotics and emulsified oil, it can be said to "kill many birds with one stone". The "common enzymatic hydrolysis fermented feed" on the market is low in organic acids and viable bacteria, does not contain emulsified fat, low energy, poor palatability and small intake.

FAP's nutritional composition can be simply concluded as "Five kinds of acid, Two kinds of bacteria, 12% protein and 6% fat". In terms of energy and protein nutrition, adding 10kg of FAP is equivalent to adding 1kg of vegetable oil, 1kg of fermented soybean meal and 8kg of fermented corn.

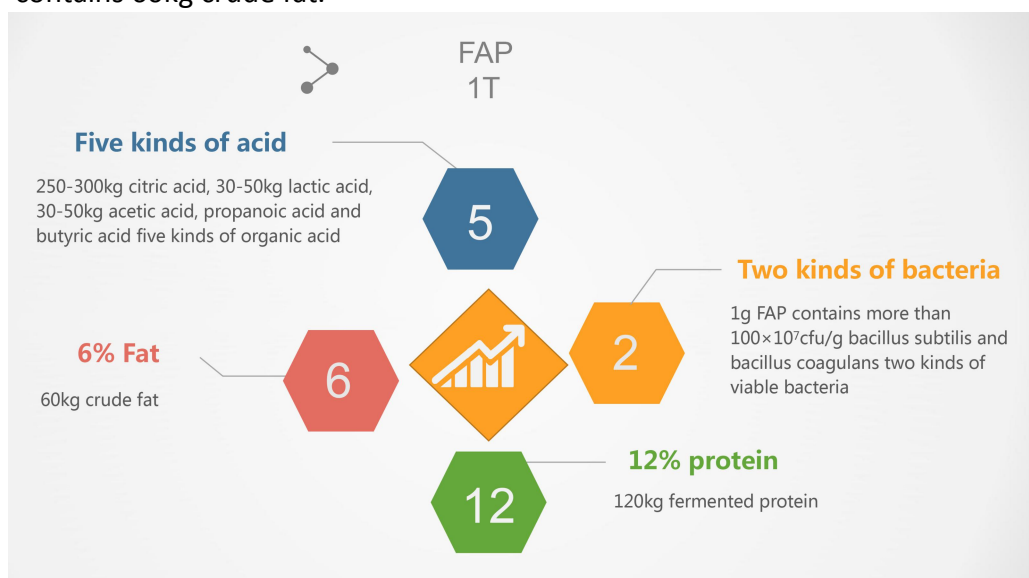
Among them, the detailed explanation and brief diagram are as follows:

"Five kinds of acid": one ton FAP rich in 250-300kg citric acid, 30-50kg lactic acid, 30-50kg acetic acid, propanoic acid and butyric acid five kinds of organic acids.

"Two kinds of bacteria": 1 gram of FAP is rich in more than 100×10^7 cfu/g of bacillus subtilis and bacillus coagulatus two kinds of viable bacteria.

"12% protein": one ton of FAP contains more than 12% fermented protein, that is to say, one ton of FAP contains 120kg fermented protein.

"6% fat": one ton of FAP contains more than 6% crude fat, that is to say, one ton of FAP contains 60kg crude fat.



Among them, the specific explanation of "natural etching coated": the cell walls of plants will be etched and damaged after the feed is crushed, soaked, enzymatic hydrolyzed and fermented. When the liquid organic acid is mixed with the enzymatic hydrolysis fermented feed, in the process of frying and drying, the liquid organic acid will enter the enzymatic hydrolysis fermented feed cells through the etched damaged plant cell wall, and then through the emulsification fat to block the "etching entrance", thus naturally cause the "etching coated". Figuratively speaking, "natural etching coated" is: just like when oil fry with rice, oil will permeate into the rice.

Tab. 1 Main nutritional ingredients of FAP

Item	Index	Item	Index	Item	Index
Moisture/%	≤10.0	Acetic acid/%	≥1.0	Soluble saccharides/%	≥1.50
Crude protein/%	≥12.0	Propanoic acid/%	≥0.5	Lysine/%	≥0.21
Small peptides and dissociated Amino acids/%	≥0.50	Butyric acid/%	≥0.5	Methionine/%	≥0.15
Crude fat/%	≥3.0	Crude fiber/%	≤8.0	Threonine/%	≥0.19
Total acid (in the case of lactic acid)/%	≥50.0	Crude ash/%	≤12.0	Tryptophan/%	≥0.06
Citric acid/%	≥25.0	Calcium/%	≤3.0	Total probiotics cfu/g	≥10×10 ⁷
Lactic acid/%	≥3.0	Total phosphorus/%	≤3.0	Small molecular nutrition content/%	≥40.0

Tab. 2 Contents of main nutrients of FAP (mean measured value)

Item	Unit	Content	Item	Unit	Content
DE	kcal/kg	3800-3970	Crude ash	%	8.57-9.82
ME	kcal/kg	3580-3690	Calcium	%	0.85-1.02
Moisture	%	4.5-8.9	Total phosphorus	%	1.25-1.62
Total acid (in the case of lactic acid)	%	52.2-55.6	Soluble saccharides	%	2.25-3.82
Citric acid	%	28.8-30.5	Lysine	%	0.65-0.75
Lactic acid	%	5.2-7.5	Methionine	%	0.27-0.35
Acetic acid	%	1.4-1.9	Threonine	%	0.48-0.62
Propanoic acid	%	0.7-0.9	Tryptophan	%	0.19-0.23
Butyric acid	%	0.6-0.8	Total probiotics	10 ⁵ cfu/g	1.70-1.85
Crude protein	%	12.8-13.7	Total bacillus subtilis	10 ⁵ cfu/g	0.60-1.06
Small peptides and dissociated Amino acids	%	2.83-3.57	Total bacillus licheniformis	10 ⁵ cfu/g	0.35-0.72
Crude fat	%	4.5-5.2	Total lactic acid bacillus coagulans	10 ⁵ cfu/g	0.95-1.22
Crude fiber	%	4.5-5.2	Soluble small molecular nutrition content	%	52.1-55.6

Tab. 3 digestible amino acid content of FAP (mean measured value of piglets)

Item	Unit	Content	Item	Unit	Content
Lysine	%	0.55-0.67	Histidine	%	0.36-0.42
Methionine	%	0.21-0.27	Isoleucine	%	0.60-0.67
Cystine	%	0.25-0.29	Leucine	%	1.39-1.48
Threonine	%	0.41-0.52	PHE	%	0.74-0.82
Tryptophan	%	0.15-0.17	Tyrosine	%	0.50-0.54
Arginine	%	0.91-1.03	Valine	%	0.73-0.81

Looking into the future, energy conservation, environmental protection and food safety are the trend of history. On December 15, 2017, the ministry of agriculture of the People's Republic of China (MOA) issued Notice no. 2625 for the "Standard for safe use of feed additives". The ministry of agriculture of the People's Republic of China (MOA) issued Notice no. 2625, which explicitly limits the amount of mineral elements to be added, especially Zinc, Copper and Silicon. Among them, the maximum amount of Silica (SiO₂) in the full-price compound feed is 20g/kg or 20kg/T. Looking into the future, the carrier Silica (SiO₂) in "acidifier", "micro-ecology", "antibiotics", will definitely become the technical burden of feed formulators. FAP can substitute "acidifier", "micro-ecology", "antibiotics", will definitely become the best raw material and preferred product for feed formulators to prepare low-silicon feed.

In terms of the palatability of the feed, the pigs have developed a good sense of smell and taste, and they will chew when feeding. The feed needs to be clean and free of impurities. Mr. Chen Jiazhao of Fengze, Fujian Province found in many experiments that: "Silica", "talc powder" and "bentonite" and other feed carriers can inhibit the intake of livestock and poultry. Traditional "mixed acidifier," all take "Silica" as the simple adsorption carrier, all of them are not roasted and dried, mostly are not coated, or poor coated, it will have bad taste, inhibit feed intake, damage oral cavity and digestive tract after enter to the mouth, and injury the gastrointestinal mucosal after enter to the stomach, quickly release imbalance, few enter into the back of intestines. At present, the traditional "mixed acidifier" has not seen "natural etching coated" products. Studies have shown that phosphoric acid in phosphoric acid acidifier is released quickly in the stomach, which is difficult to enter the intestine or little in the intestine. To some extent, it burns the oral mucosa and gastric mucosa of piglets, inhibits the secretion of gastric acid, causes imbalance of intestinal flora, damages intestinal health, and reduces the intake of pigs. On the contrary, FAP is a kind of natural "etching coated" organic acid product, its organic acid is released slowly and little in the stomach, and can "go through the stomach to the intestine", which really plays the role of acidifying the intestinal tract. It is not surprising that the actual feeding effect is better.

In addition, studies in Europe and the United States have also found that some inorganic acid acidifiers may have obvious effects in a short term feeding, but due to damage to intestinal health and imbalance of flora, as the same situation of zinc

oxide and antibiotics, side effects are very large both in the late stage of short-term feeding and after long-term feeding, the growth of livestock and poultry will be significantly inhibited. As a result, feed companies and farms in Europe and the United States are almost all adding organic acids.

Should be mentioned: FAP is a significantly effective high-acid enzymatic hydrolysis fermented feed, rich in organic acids and probiotics, mainly used for young livestock, poultry and aquatic animal feed, especially for creep feed, conservation feed, milking sow feed, broiler feed and fish & shrimp feed, the application effect is very obvious.

FAP is divided into four types: 1) high-acid type, namely "FAP-GS"; 2) high-probiotics type, namely "FAP-GJ"; 3) high-sweet type, namely "FAP-GT"; 4) common type, namely "FAP-PT". The total organic acid content of FAP-GS is higher than other three types. The total probiotics content of FAP-GJ is higher than other three types. The total functional oligoses content of FAP-GT is higher than other three types.

Domestic pigs and ruminants are very sensitive to smell and taste, and prefer sweet and sour. Therefore, FAP-GS, FAP-GJ and FAP-GT are mainly used in the feed for domestic pigs and ruminants. Its functional oligoses have small molecular weight, high sweetness and it has high sweet taste.

Poultry and aquatic animals are relatively insensitive to smell and taste, sweet and sour. Therefore, FAP-GJ and FAP-PT are mainly used for poultry and aquatic animal feed. Its functional oligoses have relatively large molecular weight, general sweetness, relatively low sweetness.

FAP should not be added too much in the premix. Therefore, FAP-GS and FAP-GJ are mainly suitable for premix. Its total organic acid content is high, the dosage is relatively small.

Dosage of FAP:

- ✓ Anthony pig creep feed: 15-30 kg/ton;
- ✓ Piglet conservation feed: 10-20 kg/ton;
- ✓ Milking sow feed: 5-10 kg/ton;
- ✓ Calf & lamb feed: 10-20 kg/ton;
- ✓ Meat & egg-laying poultry feed: 5-10 kg/ton;
- ✓ Aquatic animal feed: 10-20 kg/ton

The following are some points need to paid attention in the use of FAP:

1. The addition of 15-30kg/ ton of FAP in creep feed can substitute: 10-20kg of organic acid acidifier, 2-3 kg of fish meal (fish solubles condensed), 3-5kg of whey powder and 5-8kg of fermented soybean meal, etc., and probiotics and oligoses can be reduced or discontinued. As long as the substitutions are well designed, the results are almost always good. This has been proven in many large enterprises. In

addition, if a large amount of stone powder and zinc oxide are added to the creep feed, the amount of FAP should be increased.

2. The addition of 10-20kg/ ton of FAP in conservation feed can substitute: 8-15kg of organic acid acidifier, 2-3 kg of fish meal (fish solubles condensed), 3-5 kg of whey powder and 6-10 kg of fermented soybean meal, etc., and probiotics and oligoses can be reduced or discontinued. As long as the substitutions are well designed, they are almost always effective in anti-diarrhea, promoting growth and improving feed intake. This has been proven in many large enterprises.

3. The addition of 5-10kg/ ton of FAP in milking sow feed can substitute: 3-6kg of organic acid acidifier, 2-3 kg of fish meal (fish solubles condensed) and 3-5kg of fermented soybean meal, etc., and probiotics and oligoses can be reduced or discontinued. As long as the substitutions are well designed, the effect of promoting lactation and increasing feed intake is all good and there is no doubt about it. This has been proven in many large enterprises. Because lactating sows have a strong memory, postpartum feeding FAP, to promote lactation and improve the intake of food is often not satisfied. It is recommended that lactating sows start feeding FAP one week or three days before the antenatal, and the increase of feeding intake is very obvious.

4. The addition of 5-10kg/ ton of FAP in meat & egg-laying poultry feed can substitute: 3-6kg of organic acid acidifier, 2-3 kg of fish meal (fish solubles condensed) and 3-5kg of fermented soybean meal, etc., and probiotics and oligoses can be reduced or discontinued. As long as the substitutions are well designed, the effects of promoting growth and increasing feed intake are all good and there is no doubt about it. This has been proven in many large enterprises.

5. The addition of 10-20kg/ ton of FAP in aquatic animal feed can substitute: 8-15kg of organic acid acidifier, 3-5kg of fish meal (fish solubles condensed) and 6-10kg of fermented soybean meal, etc., and probiotics and oligoses can be reduced or discontinued. As long as the substitutions are well designed, the effects of disease resistance, growth promotion and dietary stimulation are almost always good. This has been proven in many large enterprises.

6. FAP is five feedstuffs asynchronous enzymatic hydrolysis and synchronous fermentation acidification of mixed bacteria and high sugar medium. It is well known that as long as it is a dried feed product, its color will vary slightly from batch to batch. The same is true for FAP. In general, FAP tastes obvious sour and sweet, presents fermentation fragrance, no mold, agglomeration, damaged by insects or odors, light yellow or brown yellow, color batch slightly different, but does not affect the quality of the product.

7. Description of mycotoxin, acid value, peroxide value and crude fat detection

methods

FAP is enzymatic hydrolysis fermented and emulsified product, without purification, the enzymatic hydrolysis fermentation of bacteria, lactic acid and other secondary metabolites and all sorts of small molecular nutrition product cause serious interference on the test results of FAP's crude fat, mycotoxins, acid value and peroxide value, especially the interference detection is particularly serious after the lactic acid is reduced the pH.

If mycotoxin is detected by ELISA, the pH value of FAP sample must be adjusted to be neutral. Otherwise, the error of detection result is very big, will be several times higher, even dozens of times. If the customers find it hard to believe, they can detect the mixed organic acid acidifiers on the market, and they will definitely find that the mycotoxin is very high. It can be confirmed that acidic pH value will seriously interfere with the detection of mycotoxin and other indicators in FAP.

In order to accurately detect mycotoxin in FAP, it is recommended that customers or testing agencies use "determination of aflatoxin in national standard feed by immunoaffinity column purification - high performance liquid chromatography (GB/T 30955-2014)" to detect the content of various mycotoxins in FAP. It has been proved that the national standard method can effectively eliminate the interfering substances in fermented products, and the detection results are very accurate.

In order to accurately detect the acid value of FAP, it is suggested that customers or testing agencies must adopt "national standard for food safety determination of acid value in food (GB5009.229-2016)" to detect the acid value of FAP.

In order to accurately detect the peroxide value of FAP, it is suggested that customers or testing agencies must adopt the "national standard for food safety determination of peroxide value in food (GB5009.227)" to detect the peroxide value of FAP.

In order to accurately detect crude fat in FAP, it is suggested that customers or testing agencies must adopt the B method in "determination method of crude fat in feed (GB/T 6433-2006)" to determine the crude fat content in FAP.

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