

As a by-product of ethanol production, Pannonia Bio produces DDGS, i.e. Distillers Dried Grains with Solubles, which it sells to domestic and international feed producers under the Pannonia Gold brand. Rich in protein, vegetable fats and phosphorus, this feed ingredient has been shown to help livestock gain weight and increase milk yield. It can partially replace the use of soybean meal, one of the most expensive elements in animal feed, mainly imported from the US, but it is also an excellent alternative to sunflower and rapeseed meal in formulations.

# Pannonia GOLD



The feed corn processed by Pannonia Bio is mainly grown in local farms, adhering strictly to European sustainability criteria.



HARVESTING

All corn shipments are lab-tested before arriving at the plant.



TESTING

The husk of the corn kernel is broken to access the starch. Following grinding, the fiber is separated and is used in other processes at the biorefinery.



GRINDING AND SEPARATION

Starch is converted to sugars through the addition of enzymes.



COOKING

Fermentation takes place with the help of enzymes and yeasts at a gentle temperature over a period of 75 hours.



FERMENTATION

TRANSPORTATION



DDGS is loaded into trucks, wagons and barges via a conveyor belt system, using a weighbridge and telescopic handler.

STORAGE OF DDGS



The high quality finished product is stored onsite.

DRYING



WDGS are placed in a rotating drum and dried with hot air. This is how Pannonia Gold DDGS reaches its final form.

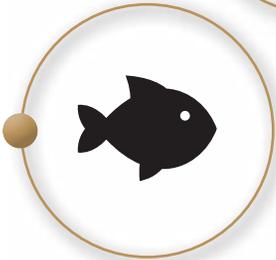
SEPARATION



During separation, the solid fraction is removed and sent to the dryers. The wet fraction is used for bioethanol production.

## RECOMMENDED APPLICATIONS

Pannonia Gold can be used in both small and large scale beef cattle, dairy cattle, pig and poultry farms. It is also an economical and reliable source of protein in aquaculture and pet food.



## PRODUCT SPECIFICATION

<b>Crude protein</b>	>35,0%
<b>Digestible protein</b>	83%
<b>Crude fat</b>	>9,0%
<b>Crude fiber</b>	>4%
<b>Ash</b>	4,0-6,0%
<b>Starch</b>	>3,0%

Parameters are based on dry matter and are provided for information only.



[pannoniagold.com](http://pannoniagold.com)



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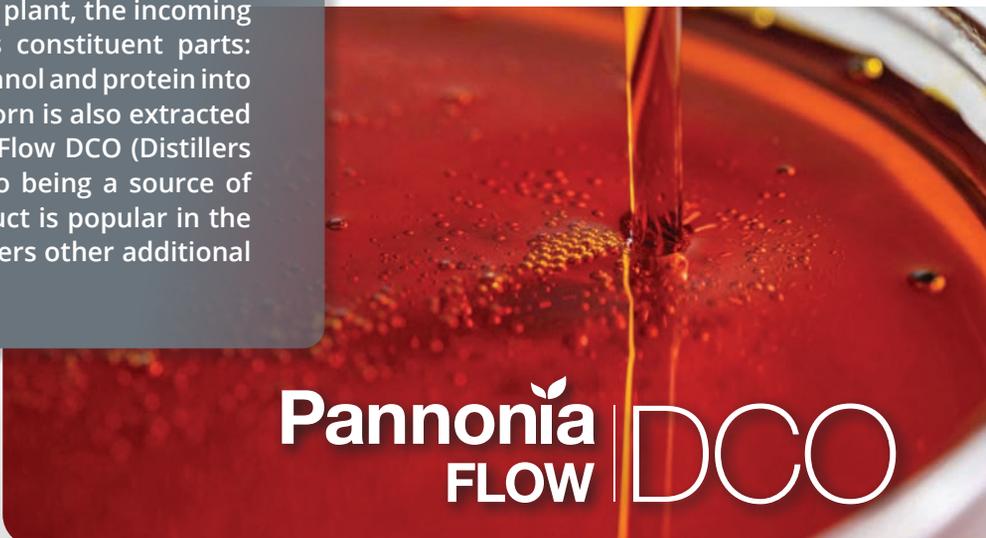


## BENEFITS

- Excellent source of energy, easily digestible protein, and phosphorus
- Guaranteed GMO and antibiotic free
- Stable quality, consistent nutrient composition
- Made with gentle heat treatment technology, making it easy to digest
- Its dried yeast cell content is prebiotic; aids digestion
- Controlled by a market-leading toxin testing system
- Available by road, rail and river transport
- Economical feed: can replace soybean meal and other protein sources, making livestock production more profitable

# PANNONIA FLOW DCO

At Pannonia Bio's Dunaföldvár plant, the incoming corn is broken down into its constituent parts: starch is converted into bioethanol and protein into DDGS. The oil content of the corn is also extracted and sold under the Pannonia Flow DCO (Distillers Corn Oil) brand. In addition to being a source of energy, this high quality product is popular in the poultry and pig sector, and offers other additional benefits.



**Pannonia**  
**FLOW** | **DCO**

The feed corn processed by Pannonia Bio is mainly grown in local farms, adhering strictly to European sustainability criteria.



HARVESTING

All corn shipments are lab-tested before arriving at the plant.



TESTING

The husk of the corn kernel is broken to access the starch. Following grinding, the fiber is separated and is used in other processes at the biorefinery.



GRINDING AND SEPARATION

Starch is converted to sugars through the addition of enzymes.



COOKING

TRANSPORTATION



The high quality finished product, Pannonia Flow DCO corn oil, is delivered by truck to feed blending plants.

SEPARATION



During separation, the suspension is divided into wet and solid fractions. The wet fraction is used for bioethanol production, and is also centrifuged to extract the oil content of the corn, which is sold under the Pannonia Flow DCO brand.

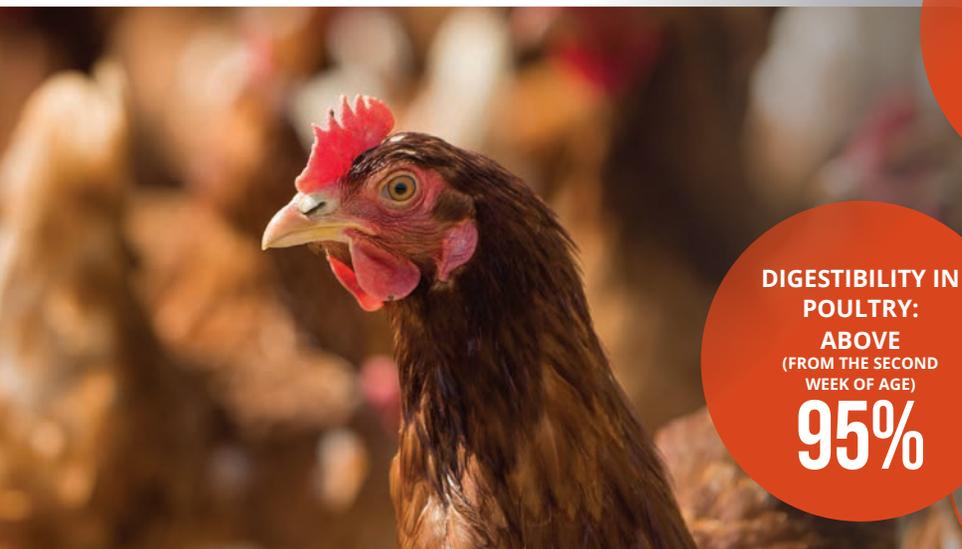
FERMENTATION



Fermentation takes place with the help of enzymes and yeasts at a gentle temperature over a period of roughly 75 hours.

## RECOMMENDED APPLICATIONS

Pannonia Flow DCO has a proven track record of efficiency, economy and reliability in large-scale poultry and pig production.



DIGESTIBILITY  
IN PIGS:

ABOVE  
**94%**



DIGESTIBILITY IN  
POULTRY:

ABOVE  
(FROM THE SECOND  
WEEK OF AGE)

**95%**



## PRODUCT SPECIFICATION

<b>Wetness</b>	min. 0,6%
<b>Phosphor</b>	<100 mg/kg
<b>Iodine number (WIJS)</b>	110 g iodine / 100g
<b>Nutrient composition</b>	
<b>C16:0</b>	10-12%
<b>C18:0</b>	1,5-4%
<b>C18:1</b>	25-35%
<b>C18:2</b>	45-55%
<b>C18:3</b>	<3%

Parameters are based on dry matter and are provided for information only.

## BENEFITS

- Rich in unsaturated fats, improves digestibility and absorption.
- Rich in lutein, zeaxanthin and xanthophyll, which contribute to the natural color of the egg yolk.
- At large farms it reduces the dusting of middlings, making feeding more cost effective.
- Improves the taste of the feed. It is also an excellent source of energy.



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Pannonia Bio has expanded its product portfolio with a plant-based organic fertilizer, which is sold under the brand name Pannonia Grow. The new innovative product is another proven example, that Pannonia Bio is taking a leading role to support circular economy. The new byproduct is generated during biogas production can be used in both ecological and traditional farming systems. Pannonia Grow is an excellent choice for optimising soil nutrient levels in a sustainable and environmentally friendly way, it contains micro- and macronutrients (NPK) essential for organic farming. The effectiveness of Pannonia Grow is proven by product trials.

# Pannonia GROW

The grain processed by Pannonia Bio is mainly cultivated in local farms, adhering strictly to European sustainability criteria.



HARVESTING

Every corn shipment undergoes laboratory testing before it arrives at the plant.



TESTING

The husk of the corn kernel is broken to separate its components. After grinding, the fibre is separated in a pneumatic particle classification system.



GRINDING AND SEPARATION

PELLETIZING



Following drying, the product undergoes pelletizing to achieve its final form, which is sold in big-bags.

SLUDGE TREATMENT & DRYING



At the end of the process, the remaining nutrient-rich biogas sludge is sent to the drying facility.

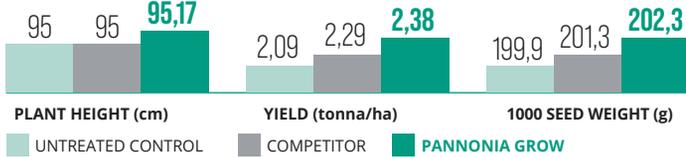
BIOGAS PRODUCTION



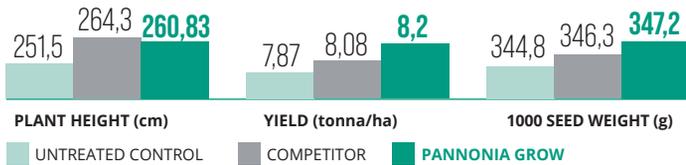
The fibre is directed to the biogas plant, where an anaerobic fermentation process takes place with the addition of enzymes, resulting in the production of biogas suitable for replacing natural gas.

## PROVEN RESULTS

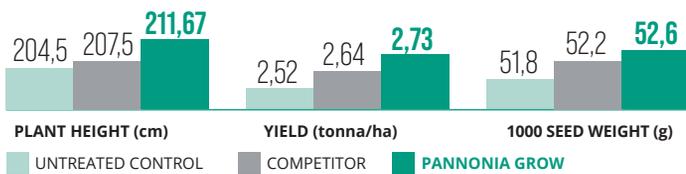
### SOY



### CORN



### SUNFLOWER



## PRODUCT SPECIFICATION

<b>Moisture</b>	max. 5,6%
<b>pH (in a 10% aqueous suspension)</b>	5,2-6,2%
<b>Organic components</b>	>85,4 m/m%
<b>Nitrogen</b>	>7 m/m%
<b>P<sub>2</sub>O<sub>5</sub></b>	>1,3 m/m%
<b>K<sub>2</sub>O</b>	>1,3 m/m%

The parameters were determined based on dry matter and are provided for informational purposes.



[pannoniabiio.com](http://pannoniabiio.com)

## SELLING THE PRODUCT

### MEAL

Pannonia Bio Grow, in its meal form, is used as a high Nitrogen ingredient in built fertilizers and composts. Its favourable pH and relatively low phosphorus and potassium levels make it an easy-to-use ingredient in any formulation.

### PELLETS

Pannonia Bio Grow, in its pellet form, has been directly applied to arable land as an organic fertilizer. It has also been trialed against competitors in the market and out-performed them in both yield and crop height.

## BENEFITS OF USING THE PRODUCT

- Promotes humus formation
- Higher plant growth
- Increased yields
- Improved quality parameters
- Favourable pH value
- Initial start-up effect is rapid, with long-lasting effects
- Effective even at low temperatures

**Ideal for organic farming!**



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# PANNONIA PLUS BAR65

The protein concentrate produced at the new barley processing plant of Pannonia Bio is a real novelty on the European market. This revolutionary technology has been successfully applied on an industrial scale for the first time in the world, allowing this Hungarian company on the Danube to launch a barley-based feed ingredient with a 65% protein content. The protein concentrate, sold under the brand name Pannonia Plus Bar 65, can be used widely. It can be an economical, locally produced and safe alternative to concentrated protein sources (such as corn gluten, wheat gluten, potato protein, soy concentrate), some of which are imported, for feeding ruminants, pigs and poultry. The guaranteed non-GMO feed ingredient also has significant potential in the aquaculture and hobby animal segments.

Pannonia  
PLUS | Bar65



The processed barley is grown on local farms in strict compliance with European sustainability criteria.



HARVESTING

All shipments of barley are inspected and tested before storage.



TESTING

The unloaded barley undergoes a pre-cleaning process: the barley grains are cleaned of awn and other impurities.



STORAGE

The barley grain is separated from the husk and then milled in three stages. Husk, fiber and bran are collected separately and sold as Barley Husk for animal feed after further processing.



CLEANING, GRINDING

TRANSPORTATION



The finished product is sold in 1-ton big bags.

DRYING



After drying and pelleting, a premium feed ingredient with 65% protein content is obtained.

SEPARATION



Centrifuges are used to separate the glucose-rich wet fraction from the protein-rich dry fraction, and to separate the barley fiber, which is sold for animal feed or used to produce biogas.

COOKING



The starch content of the barley is converted into sugars at high temperatures using water and amylase enzymes. The sugars are later converted into ethanol.

## RECOMMENDED APPLICATIONS

Pannonia Plus Bar 65 can be used in both small and large scale beef cattle, dairy cattle, pig and poultry farms. It is also an economical and reliable source of protein in aquaculture and pet food.



## BENEFITS

- Highly digestible, concentrated protein
- Guaranteed GMO-free product
- Can replace soybean meal
- Safe and secure, because it is made in a domestic supply chain
- Neutral flavor, well mixable
- Easy to store and mix with other ingredients
- Controlled by a market-leading toxin testing system

## PRODUCT SPECIFICATION

<b>Crude protein</b>	≥60,0%
<b>Crude fat</b>	≥6,0%
<b>Crude fiber</b>	≤3,5%
<b>Ash</b>	≤2,0%
<b>Starch</b>	≤1,2%

Parameters are based on dry matter and are provided for information only.



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# PANNONIA BARLEY HUSK

With the launch of its new, world-class barley processing plant, Pannonia Bio raised its role in the domestic and international agricultural market to a new level. The company has added a high-fiber, economical bran product to its portfolio, marketed under the Barley Husk brand.

## Pannonia BARLEY HUSK



The processed barley is grown on local farms in strict compliance with European sustainability criteria.



HARVESTING

All shipments of barley are inspected and tested before storage.



TESTING

The unloaded barley undergoes a pre-cleaning process: the barley grains are cleaned of awn and other impurities.



STORAGE

TRANSPORTATION



The affordable feed is sold in bulk by truck.

CLEANING, GRINDING



The barley grain is separated from the husk and then milled in three stages. Husk, fiber and bran are collected separately and sold as Barley Husk for animal feed after further processing and pelleting.

## RECOMMENDED APPLICATIONS

The high fiber content of the product makes it an excellent feed supplement for ruminants, pigs (sows and finishers) and rabbits.



## PRODUCT SPECIFICATION

<b>Crude protein</b>	≥10,0%
<b>Crude fat</b>	≥3,0%
<b>Crude fiber</b>	≤23,0%
<b>Ash</b>	≤6,0%
<b>Starch</b>	≥20,0%

Parameters are based on dry matter and are provided for information only.

## BENEFITS

- Easy to use, available in pellet form
- Economical source of fiber, protein and phosphorus
- Stable quality, consistent nutrient composition
- Guaranteed GMO and antibiotic free
- Controlled by a market-leading toxin testing system



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# PANNONIA PLUS C55

Pannonia Bio is not only adding value to Hungarian grain; it is revolutionizing agriculture. The company's new corn-based protein concentrate product, Pannonia Plus C55, is a real novelty on the market that can partially or even completely replace soybean meal when used with amino acid supplementation.



The processed feed corn is mainly grown in local farms, adhering strictly to European sustainability criteria.

All corn shipments are lab-tested before arriving at the plant.

The husk of the corn kernel is broken to access the starch. Following grinding, the fiber is separated and is used in other processes at the biorefinery.

Starch is converted to sugars through the addition of enzymes.

Fermentation takes place with the help of enzymes and yeasts at a gentle temperature over a period of roughly 75 hours.



HARVESTING



TESTING



GRINDING AND SEPARATION



COOKING



FERMENTATION

Pannonia PLUS C55

TRANSPORTATION



The finished product is sold in 1-ton big bags.

DRYING



After drying and pelleting, a premium feed ingredient with 55% protein content is obtained.

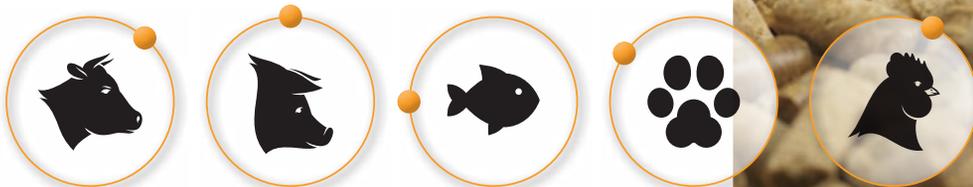
SEPARATION



During separation, the suspension is divided into wet and solid fractions. The wet fraction is used for bioethanol production, and as a source of a protein-rich raw material.

## RECOMMENDED APPLICATIONS

Pannonia Plus Bar 55 can be used in both small and large scale dairy cow, pig and poultry farms. It is also a reliable source of protein in aquaculture and pet food.



## BENEFITS

- Excellent source of energy, easily digestible protein, and phosphorus
- Guaranteed GMO and antibiotic free
- Neutral flavor, well mixable
- Its dried yeast cell content is prebiotic; aids digestion
- Made with gentle heat treatment technology, making it easy to digest
- Low crude fiber content, excellent feed conversion
- Controlled by a market-leading toxin testing system



## PRODUCT SPECIFICATION

<b>Crude protein</b>	≥50.0%
<b>Crude fat</b>	≥9.0%
<b>Crude fiber</b>	≤3.0%
<b>Ash</b>	≤4.0%
<b>Starch</b>	4.0-7.0%

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