

# **INDUSTRIAL BYPRODUCTS**

- **1. Milling byproducts**
  - Flour industry byproducts
  - Starch industry byproducts
- **2. Sugar industry byproducts**
- **3. Fermentation industry byproducts**
  - Beer Industry
  - Alcohol Industry
  - Wine Industry
  - Bakers Yeast Industry
- **4. Fruit Juice Industry Byproducts**
- **5. Oilseed Industry Byproducts**
- **6. Biofuel Industry Byproducts**

# MILLING INDUSTRY BYPRODUCTS

- Cereal grains and legume seeds are processed in mills
- After separating flour, breakfast cereals and starch
- **Obtained milling byproducts**
  - Used as animal feeds.

# **MILLING INDUSTRY BYPRODUCTS**

- **1. FLOUR MILLING BYPRODUCTS(Dry milling)**
  - **Wheat Flour Industry Byproducts**
  - **Corn Flour Byproducts**
  - **Others**
- 
- **2. STARCH INDUSTRY BYPRODUCTS(Wet milling)**
  - **Corn Starch Industry**
  - **Potato Starch Industry**

# **Wheat Flour Industry Byproducts**

**BUĞDAY**



Separatör



Aspiratör



Yıkama



Öğütme



Eleme

Embriyo



Embriyo  
Unu



Embriyo  
Yağı



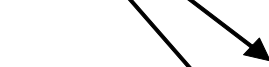
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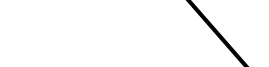
Yemlik Un



Bonkalit



Razmol



Buğday  
Kepeği

# WHEAT BRAN

Protein, minerals, oil and fibre are mainly found in the outer layers of the wheat grain, therefore wheat bran is richer in these nutrients than the whole grain

One ton wheat → 140-160 kg bran

Bran depending on particle size

- coarse, medium coarse and fine bran

Coarse bran has more hull than fine bran

- Crude fibre ↑
- crude protein ↓

Digestibility of organic matter

- ruminants %70-75
- Poultry low digestibility

# WHEAT BRAN

- Crude protein = 14-17 %
- Lysine ↑ than wheat grain
- Ether extract = 4-5 %
- Crude fibre = 10-17 %
- NDF = 42 %, ADF=12 %
- Crude ash 4-6%      Minerals ↑
- Calcium 0.13%
- Phosphorus 1.3% 90% of phosphorus are phytate
- B group vitamins ↑ (Niacin ↑ , Thiamin ↑)
- Riboflavin two times higher than that of grain

- Starch: 15-28%
- ME (poultry) = 1350 - 1650 kcal/kg  
(average 1500 kcal/kg)
- ME (ruminant) = 2500 kcal/kg
- Pelleting with steam
  - enerji level increases 10%,
  - available phosphorus level increases 20%



# Antinutrient factors

- NSP, Pentosans
- Wheat bran contains pentosans, antinutritional activities in poultry,
- result in reduced nutrient utilization and poor growth
- Phytate

# Wheat bran

- \*a bulky feed that can be used to lighten dense, heavy feed mixtures
  - Increase palatability,
  - Increase digestibility
- \*Slightly Laxative effect
- \*P ↑ (90 % phytate) ⇒
  - P sources in ruminants
- Fibre ↑, Energy ↓ ⇒
  - It is not used in high energy poultry diets
- In poultry diets
  - Not used in chickens
  - %% in mature birds