

# **GRAINS**

Prof.Dr. Sakine YALÇIN

# Grains

- Most important in nutrition of all animals
- Obtained after vegetation at harvest time
- High in dry matter
- High in digestible nutrients
- Two groups
- **1. Cereal grains**
- **2. Legume grains**

# Cereal grains

- Easily soluble carbohydrate ↑↑↑
- Major component is starch
  
- Wheat
- Oat
- Rye
- Rice
  
- Barley
- Corn
- Sorghum
- Triticale

# Cereal grains

- Rich in energy
- Major components of cell wall is 70-95%  
NSP
  - Non starch polysaccharides
  - Poultry don't contain enzymes degrade NSP
  - NSP find as soluble and insoluble form

Water soluble NSP show antinutritional effect, increase viscosity in intestine, negative effect on nutrients, **sticky excreta**, management problems

– Beta-glucans, arabinoxylans, cellulose

- Barley and wheat: beta glucan
- Wheat, rye, triticale: mostly arabinoxylans, water soluble form
  - Proper enzyme supplementation

# Cereal grains

- Dry matter: 88-90%
  - (especially second harvest product corn DM: 83-85%)
  - Crude protein: 8-14% (Corn 8%, Wheat, barley, oat 12%)
- 85-90% of nitrogen is protein
- Poor in some essential amino acids (especially lysine, methionine)
- \* Oat contain more lysine than other cereal grains

# Cereal grains

- Ether extract : 2-6%
- Corn 4-6%
- Oat 6%
- Barley, wheat 2%
- Most of fat is in embryo of cereals
- Oat and corn fats are rich in unsaturated fatty acids sepecially linoleic and oleic acids

# Cereal grains

- Crude fibre

Corn, wheat 2%, barley 6%, oat 11%

- Fibre is found mainly in hull and husk.
- Dehulled and dehusked cereal grains are rich in nutrient digestibility
- Husk is separated from wheat and rye grains at harvest



# Cereal grains

- Crude ash: %2
- Ca ↓
- P, K, Mg ↑
- P → as phytin
- Not utilized in single stomach and poultry
- phytates → P, Ca, Mg, Zn utilization ↓

# Cereal grains

- Vitamin
- Yellow corn provitamin A ↑
- Cereal grains caroten, vitamin D ↓
- Vitamin E, B group vitamins ↑