Carbohydrates

Crude Fiber is a type of **_Carbohydrate_** found in **_plant cell walls_**

Ash is a measure of **_mineral content_**

Limitations of Proximate Analysis

1) **Don't know fiber type**
2) **Don't know if the carbohydrate is Structural or Non-Structural**

What method overcomes the limitations of CF ?

- **Detergent System or Van Soest Method**

What 2 fractions are defined in this method?

1) **Neutral Detergent Fiber (NDF)**
2) **Acid detergent fiber (ADF)**

NDF = Cellulose and Hemicellulose

- **Major constituent of plant cell walls**
- **Close approximation of total fiber**

ADF = Cellulose and Lignin

- **Approximates the less digestible fractions of fiber**
- **Good predictor of the digestibility of a forage**

If ADF is High, What happens to digestibility?
Digestibility decreases

Which is stronger: Alpha bonds or Beta bonds?
Beta bonds

What can break this bond?
Cellulase

What is the 5 carbon sugar found inside the cell ?
Ribose

What is the 6 sugar carbon not found in the cell?
Fructose
Glucose
Galactose

What bond has the OH pointing down in glucose? Alpha

What bond has the OH pointing up in glucose? Beta

What nonstructural carbohydrate is for plant energy storage ?
Amylose

What percent of starch does Amylose account for?
15-30%

What type of linkage does Amylose have?
Alpha 1,4 linkage - straight chain

What non-structural carbohydrate is more highly branched plant energy storage ?
Amylopectin

What percent of starch does Amylopectin account for?
70-85%

What type of linkage does Amylopectin have ?
Alpha 1,4 linkage with Alpha 1,6 linkage at branch points

What type of bond and linkage does cellulose have?
Beta Glucose with 1,4 linkage in straight chain

What is the purest form of cellulose? Cotton

What structural Non-Carbohydrate encases the cellulose and hemicellulose to enhance rigidity of plant cells ?
Lignin

Who can digest it? No animals or anaerobic microbial enzyme can break it, Some fungi and aerobic microbes can digest it

What structural non-carbohydrate physically encrusts plant fibers in some straws and native grass?
Silica

What can happen when ruminants consume high silica plant material? Water belly

Amylase breaks down = Starch