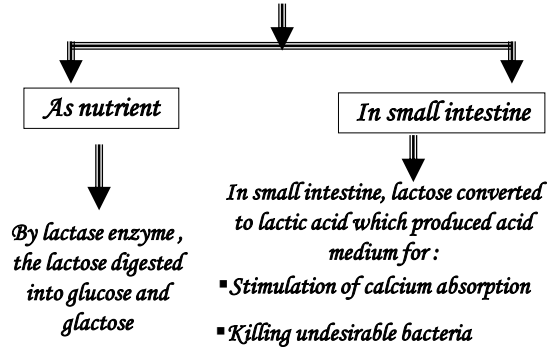
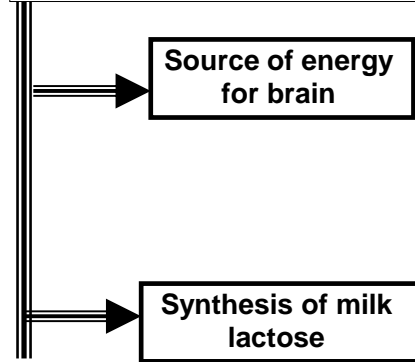


Lactose function



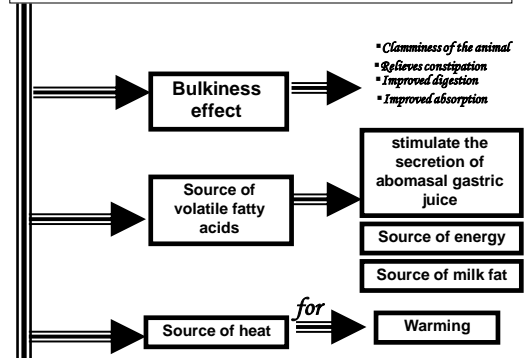
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Function of glucose in ruminants

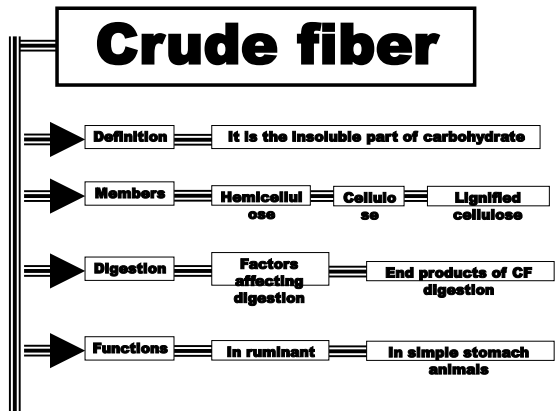


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Function of crude fiber in ruminants



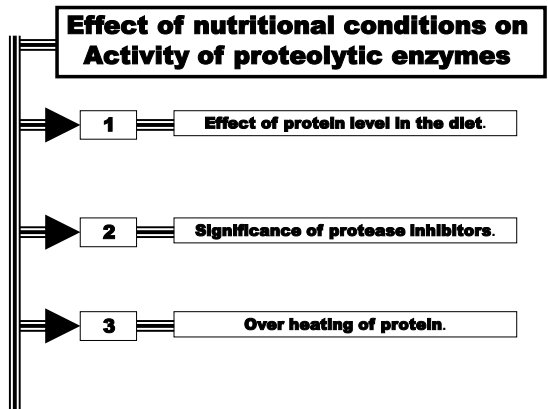
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Enzyme	Site of production	Splits peptide bonds adjacent to	pH of optimal activity
<i>Pepsin</i>	Mucosa of stomach	Tryptophan Phenylalanine Tyrosine Methionine Leucine	1.8-2
<i>Trypsin</i>	Pancreas	Arginine Lysine	8.0
<i>Chymotrypsin</i>	Pancreas	Aromatic amino acids Methionine	8.0
<i>Elastase</i>	Pancreas	Aliphatic amino acids	8.0
<i>Carboxy-Peptidase A</i>	Pancreas	Aromatic amino acids	7.2
<i>Carboxy Peptidase B</i>	Pancreas	Arginine Lysine	8.0
<i>Aminopeptidase</i>	Mucosa of intestine	Amino acids with free NH ₂ groups	7.4

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Effect of protein level in the diet.

- ➔ **1** **Secretion of proteolytic enzymes by the pancreas appears to be regulated by the presence of protein in intestinal lumen.**
- ➔ **2** **The dietary proteins probably act by binding the enzymes in the gut content. With increase of protein intake, the amount of free enzyme present in the intestinal lumen will drop, thus enhancing the synthesis and secretion of pancreatic enzymes.**

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Significance of protease inhibitors.

- ➔ **1** **Protease inhibitors present in soybeans and other leguminous seeds.**
- ➔ **2** **protease inhibitors are heat sensitive.**
- ➔ **3** **Unheated soybeans or of isolated soybeans trypsin inhibitors cause increased secretion of pancreatic enzymes and hypertrophy of the pancreas.**
- ➔ **4** **Growth depression caused by feeding the trypsin inhibitor may be attributed to :**
 - 1.The loss of amino acids present in enzymes being secreted by a hyperactive pancreas and finally excreted in the feces.**
 - 2.The resistance of native soybean protein to digestion by trypsin unless first denatured by heat.**

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Over heating of protein

- ➔ **1** **Protease inhibitors present in soybeans and other leguminous seeds.**
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 - 1.The loss of amino acids present in enzymes being secreted by a hyperactive pancreas and finally excreted in the feces.**
 - 2.The resistance of native soybean protein to digestion by trypsin unless first denatured by heat.**

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Factors affecting protein digestibility :

- ➔ 1 The nature of protein.
- ➔ 2 Level of dietary proteins.
- ➔ 3 Fiber content.
- ➔ 4 Heat treatment.
- ➔ 5 Age and species of the animal.
- ➔ 6 Ration composition.

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Level of dietary protein.

➔ 1 The apparent digestibility of crude protein is particularly dependent upon the proportion of protein in the food.

Why?

The reason for this is that the metabolic fecal nitrogen (MFN) represents a constant value. In ruminants a constant, the output of metabolic fecal nitrogen is equivalent to 3 gm of crude protein/100 gm of food DM eaten.

If the food contains 6% crude protein, the apparent digestibility of this protein = $\frac{6-3}{9} \times 100 = 33\%$

If the food contains 12% cp, the effect of the MFN is relatively smaller and the maximum possible apparent digestibility of the food protein rises to 78%.

$\frac{12-3}{12} \times 100 = 75\%$ $\frac{9}{12} \times 100 = 75\%$

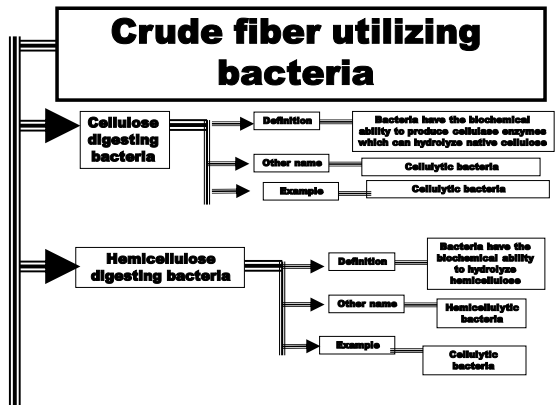
Foods containing less than 3 gm protein % such as cereal straws, may have negative digestibility coefficients for protein. .

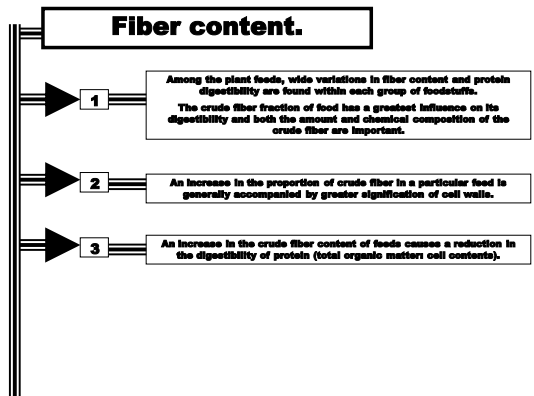
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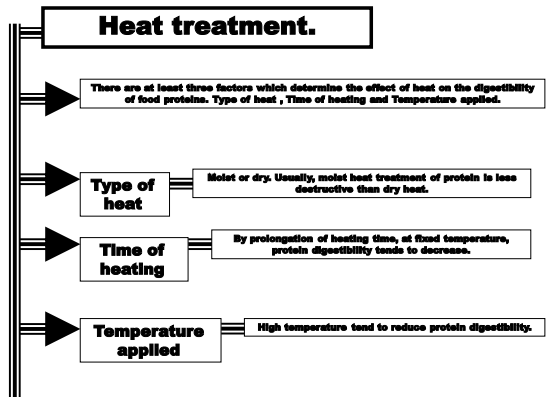
The nature of protein.

- ➔ 1 There are differences in digestibility between plant and animal proteins as well as between proteins of different plant or animal species.
- ➔ 2 The protein (Keratin) of hair, feathers, hoof, horns, is relatively indigestible.

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Age and species of the animal.

- ➔ **1** = Digestibility of protein differs according to the age of the animal.
- ➔ **2** = Young animals shows lower digestibility than adult animal of the same species.
- ➔ **3** = The differences in digestibility of protein among different animal species depend upon the fiber content of the ration.
- ➔ **4** = Food low in fiber is equally well digested by ruminants and non ruminants.
- ➔ **5** = More fibrous food is better digested by ruminants. Generally ruminant animals digested protein some what more efficient than single-stomached animals.

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Ration composition .

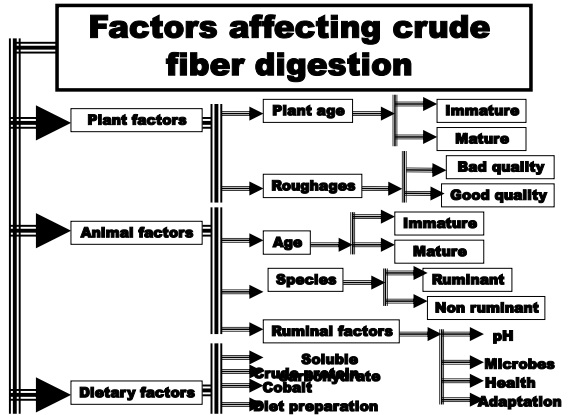
Energy rich rations stimulate microbial growth and multiplication in the rumen, thus increase protein utilization by microflora and digestion.

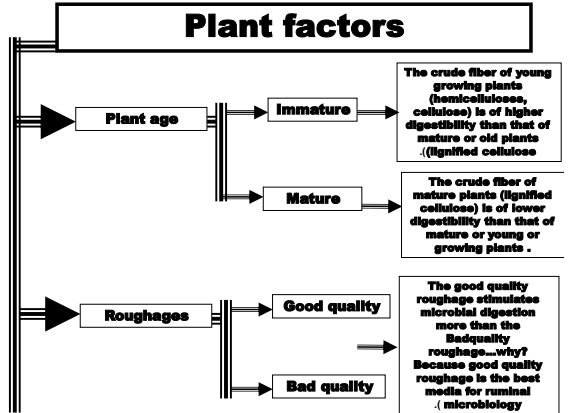
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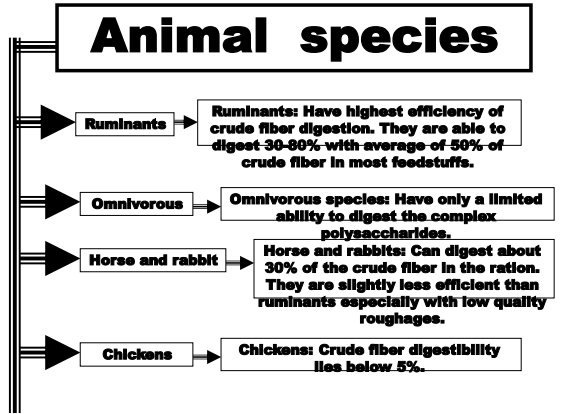
Crude fiber digestion

- ➔ **Mechanism** = It occurs in two steps
- ➔ **Frist step** = All Crud fibers must be first fermented to pyruvate
- ➔ **Second step** = The pyruvate fermented or metabolized into volatile fatty acids , gasses and heat
- ➔ **Requirements** = Microbial digestion

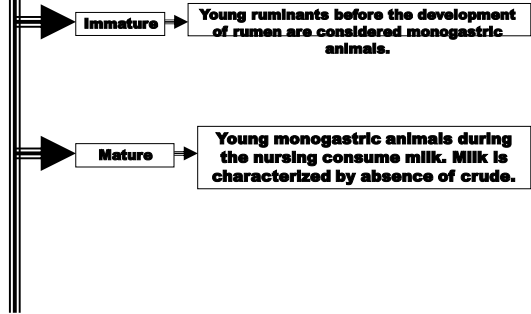
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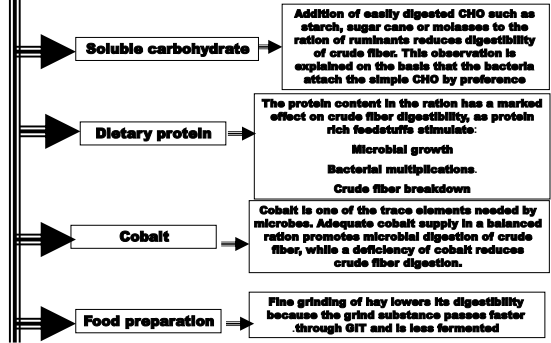


Animal age



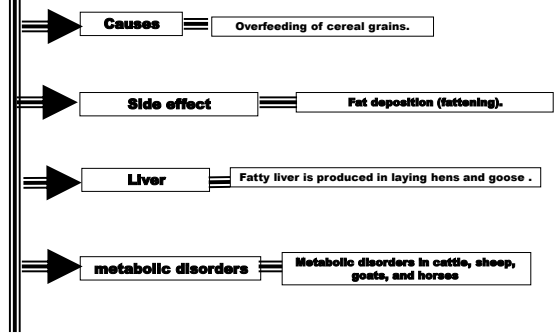
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Dietary factors

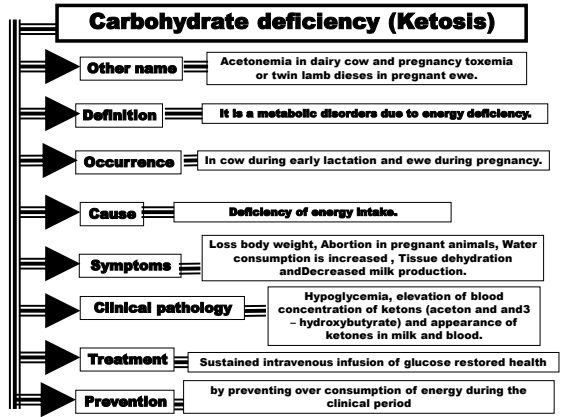


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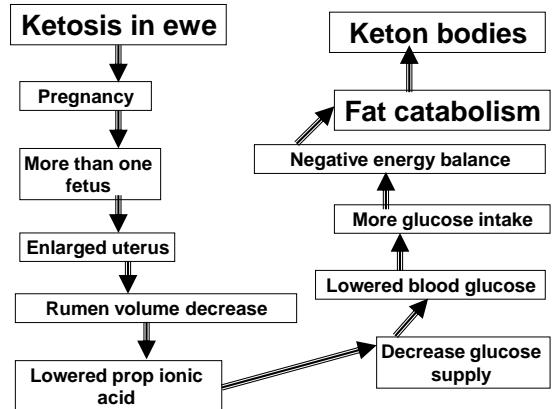
Excess of carbohydrate



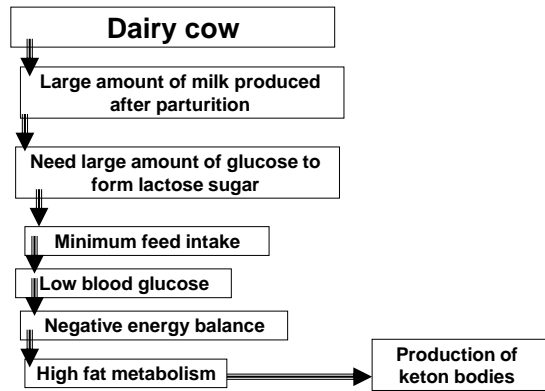
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