

CELLULOSE DIGESTION

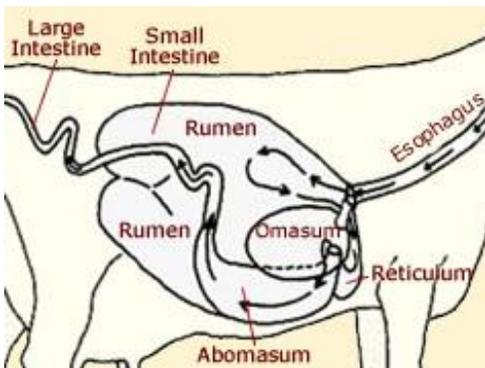
Cellulose make up the plant cell wall.

Animals which depend on material e.g. leaves, wood have to digest cellulose in order to release the cell contents required for the nutrition of the animals. The enzyme which digest cellulose is called cellulase and it is not produced by most animals. Some micro organisms take bacteria and protozoans can produce cellulase. However animals which digest cellulose contain micro organisms in their gut which produce cellulase enzyme. This is a symbiotic relationship.

CELLULOSE DIGESTION IN RUMINANTS

Ruminants are animals which chew the cud. Cud is un chewed grass taken into the rumen which is returned to the mouth for chewing (regurgitation). Examples include Goats, Sheep, Cattle, Antelopes and Buffalos. They have a complicated stomach consisting of four chambers.

Diagram showing the stomach and movement of food



Mouth. There is no enzyme secretion in the mouth so only mastication and Softening of food occurs. Movement of food in the oesophagus is by Peristalsis.

Rumen. This is the largest component of the stomach where food is stored temporarily before returning to the mouth for chewing. The food is return to the mouth by anti peristalsis. The ruminant then lies down quietly and chews the cud. When the food is sufficiently chewed it is swallowed and passed into the reticulum.

Reticulum. Bacteria action continues.

It also separates finely ground material from course ones and then retains and hard pieces of wood.

Omasum. Consists of parallel leaf like compartments with rough surfaces. The food is ground finely.

Absorption of water takes place at this region

Abomasum. Also called the true stomach.

Enzymatic action of proteins takes place here.

Beyond this point digestion takes place like in man.

DIFFERENCE BETWEEN RUMINANTS AND NON RUMINANTS.

RUMINANTS	NONRUMINANTS
1) Have a four chambered stomach	1) Have a single stomach
2) Chew cud	2) Do not chew cud
3) Ptyalin is absent in the saliva	3) Ptyalin is present in saliva
4) Most digestion and absorption takes place in the stomach	4) Most digestion and absorption takes place in the ileum
5) Can digest cellulose with the help of cellulose from bacteria	5) Cannot digest cellulose

Other animals like termites eat wood, dry leaves etc which also contain cellulose. The digestion of cellulose in termites is also done by cellulase enzyme produced by protozoans which live symbiotically with the termites. The products of cellulose digestion may be glucose or acetic acid in other animals.