

What's your favourite fungus?

The One That Digests Grass for Cows

Many animals including cows, sheep, goats, deer, and even giraffes, are known as ruminants. This is because they have a specialised four-chambered stomach needed for the digestion of their exclusively vegetarian diet. The first chamber the food enters is called the rumen, hence the name ruminant. The ruminant discussed here is the cow. Cows spend most of their time eating mainly grass and hay.

Plant cells walls contain cellulose, which is an excellent source of fibre in the diet of most animals. Fibre is important as it provides roughage which keeps the egestion of waste products regular. However cows themselves do not produce enzymes capable of digesting cellulose. The cow overcomes this problem by having special fungi in the rumen called chytrids; or more generally called rumen fungi. These fungi are anaerobic, meaning they are able to survive without oxygen. Even without oxygen, chytrids are able to digest plant cell walls by making specific enzymes called **cellulases**. The rumen acts like a large fermenter because the grass is stored there whilst the fungal enzymes from the chytrids break down the cellulose.

After the plant material is processed in the rumen, it is brought back up into the mouth of the cow. This material is now called 'cud' and the cow chews it up again to break it down further. When it is swallowed for the second time it passes through the next three chambers of the stomach. The chytrids are thought to pass from one animal to the next by being transferred in saliva, but they also occur in large number in cow dung. From the dung the fungi get attached onto surrounding grass. When another cow comes along and eats the grass, the fungi carry on their work in the new host.

The relationship between chytrids and ruminants is said to be symbiotic. This means that both the fungi and the cow benefit from having the other present. In this case the cow benefits because plant material the animal can't degrade is digested and turned into nutrients the cow can absorb. In return, the fungi live off some of the nutrients obtained from the cow's food, and live out their lives in the cow's rumen.

