

**RESEARCH**

Shen, S.; Matthews, J.L.; Li, S.; van Munster, J.M. **Anaerobic fungi *Caecomyces communis*, *Neocallimastix frontalis* and *Piromyces edwardsiae* sp. nov. have distinct effects on plant fibres during digestion.** *Royal Society Open Science* 2026, 13, doi:10.1098/rsos.251684.

**Full text access:**

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**Abstract:** Anaerobic gut fungi are the first colonizers of plant material that enters the digestive system of ruminants. However, it is unclear how different fungal species contribute to the ability of the rumen microbiome to convert feed to nutrients. Here, we isolated three species of anaerobic fungi, including the novel *Piromyces edwardsiae*. We investigated if these species have distinct roles in the digestion of fibrous feed components, through assessment of changes caused to plant material itself. We found *Neocallimastix frontalis* isolate CoB3 and *P. edwardsiae* isolate SHC digested plant materials more effectively than *Caecomyces communis* isolate SHB. The three fungi had distinct effects on feed composition. *N. frontalis* CoB3 degraded hemicelluloses and cellulose to a similar extent, *P. edwardsiae* SHC preferentially degraded hemicellulose, while *C. communis* SHB preference depended on the substrate. From the panel of monosaccharides that may result from such degradative activity, all fungi consumed only glucose, suggesting involvement of mechanisms more complex than only fungal carbon source usage. Overall, this indicates that each of these fungal species has distinct roles in the degradation of plant material and different niches in the rumen. Exploring these roles creates a functional understanding of the rumen microbiome, critical for developing more sustainable agriculture.