

Characterization of *Kluyveromyces marxianus* as a potential feed additive for ruminants

ABSTRACT

Aim: The aim of this study was to find suitable yeast isolates as potential microbial feed additives for ruminants. **Methods and Results:** Yeast isolates from traditional fermented food (tapai) and home-made wine were selected based on their tolerance to volatile fatty acids (VFA) mixture of acetic, propionic and butyric acids and to pH and temperature according to the rumen condition. The ability to grow in and produce ethanol was determined in yeast extract peptone glucose broth supplemented with a VFA mixture (VFA-YEPG medium). Fifty-five isolates showed OD_{660nm} values between 0.35–0.6, and 27 isolates showed ethanol production in the range of 0.17–0.30% (v/v). All selected isolates were identified as *Kluyveromyces marxianus* based on biochemical tests (BioLog kit; Biolog Inc., Hayward, CA) and molecular techniques. The best isolate in terms of ethanol production (*K. marxianus* WJ1) significantly ($P < 0.01$) improved in vitro apparent dry matter (DM) digestibility of alfalfa (*Medicago sativa*), guinea grass (*Panicum maximum*) and timothy (*Phleum pratense*) hay by rumen microbes. **Conclusion:** Yeast isolates from tapai and wine were able to grow in VFA-YEPG medium, and *K. marxianus* WJ1 improved in vitro DM digestibility of plant substrates. **Significance and Impact of the Study:** This study indicated the possibility of using *K. marxianus* as a microbial feed additive.

Keyword: Ethanol production; In vitro digestibility; *Kluyveromyces marxianus*; Microbial feed additive; Tolerance to VFA; Yeast culture