

## Production of Silage Inoculant using *Lactobacillus* Species

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Favorable lactic acid bacteria (LAB) inoculants are used to enhance forage ensiling. The present study attempted to produce freeze-dried LAB inoculants from *Lactobacillus plantarum*, *L. rhamnosus* and *L. oris* which were isolated from maize, sorghum and guinea grass silage, respectively. The LAB isolates were inoculated into skim milk broth (10 %) and incubated at 37° C. Their growth kinetics were studied. All species exceeded 10<sup>9</sup> CFU/mL by 24 h and reached 3.92 – 4.11 pH by 72 h. Therefore, skim milk (10 %) broth was chosen as lyophilization media for making freeze-dried LAB inoculants. The LAB isolates were inoculated separately into MRS broth, incubated at 37° C for 18 h and pelleted. The pellets were dissolved in skim milk broth (10 %) and the suspensions were freeze-dried in vials (LAB inoculant). The ensiling ability of LAB inoculants were compared by inoculating maize, sorghum and guinea grass forage at 3 inoculation rates (0, 10<sup>4</sup> and 10<sup>6</sup> CFU/g fresh forage) and ensiled them for 14 days. The experiment was conducted as a complete randomized design. The effect of forage, LAB species and inoculation rate was significant (P<0.05) on the pH and lactic acid, soluble carbohydrate and ammonia nitrogen contents of silage at 14 days ripening. All LAB inoculants recorded high (P<0.05) lactic acid contents in silage at 10<sup>6</sup> CFU/g inoculation rate. The pH of both maize and sorghum silage was the lowest (P<0.05) when fresh forage was inoculated with *L. rhamnosus* (3.43 and 3.48, respectively) or *L. oris* (3.41 and 3.45, respectively) at 10<sup>6</sup> CFU/g inoculation rate. However, the pH of guinea grass silage was the lowest (P<0.05) when the fresh forage was inoculated with *L. oris* (4.87) at 10<sup>4</sup> CFU/g inoculation rate. The study confirmed the ability of using the newly produced freeze-dried LAB inoculants in enhancing the quality of maize, sorghum and guinea grass silage.

**Keywords:** Inoculation, *Lactobacillus oris*, *L. plantarum*, *L. rhamnosus*

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