

# Rapid Assessment of Ensilability of *Vigna unguiculata* and *Canavalia brasiliensis* as an Option for Alternative Pig Feeding



Siriwan Martens, Patricia Avila, Luis H. Franco, Michael Peters

Centro Internacional de Agricultura Tropical (CIAT), A.A. 6713, Cali, Colombia  
s.martens@cgiar.org



S. Martens

## 1. INTRODUCTION

- In view of increasing prices for grain based concentrates, alternative feeds are sought to improve competitiveness of smallholder pig production in the tropics.
- Ensiled forage legumes are seen as an option.
- The "Rostocker Fermentation Test" allowed a quick evaluation of the ensilability of forage legumes per se and its possible improvement by additives.



1. Cutting



2. Chopping



3. Mincing



4. Incubation

Fig. 1: Processing

## 2. MATERIALS & METHODS

- Vigna unguiculata* and/or *Canavalia brasiliensis* resp. were harvested at 4 different ages, chopped and minced (Fig. 1).
- 50 g fresh material was weighed in a sterile glass beaker (600 ml) and 200 ml of distilled water were added.
- Four treatments applied in triplicates: control, control + 2% sucrose on FM base, control + *Pediococcus acidilactici* preparation ( $3.0 \times 10^5$  cfu g<sup>-1</sup> FM), control + *P. acidilactici* + 2% sucrose.
- The preparations were incubated at 35 °C for 2 days.
- The pH as indicator for the ongoing acidification was measured at 0, 22, 28, 52 and 58 hours.

## 3. RESULTS

- With *Vigna unguiculata* (Fig. 2), the pH of the control rose from the second day of fermentation until 10 weeks of age.
- The addition of the lactic acid bacteria preparation slightly improved the fermentation.
- Best results without additional sugar were achieved at 12 weeks age, the ripening beans probably providing additional carbohydrates (WSC), confirming with findings for lab scale silages.
- Silage cultures with *Canavalia brasiliensis* (Fig. 3) without sugar addition were not acceptable throughout the weeks 8–20 with final pH  $\geq 5.0$ .
- Addition of readily available carbohydrates in combination with selected lactic acid bacteria strains can improve the fermentation of the two tropical legumes considerably. This is important to inhibit excessive proteolysis and growth of enterobacteria.

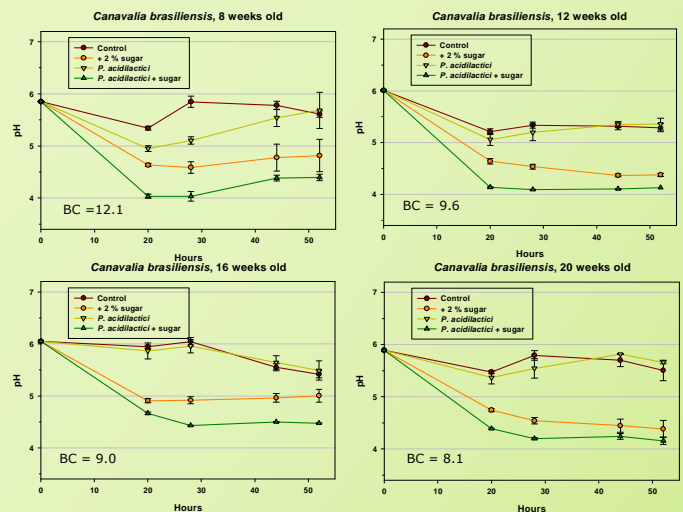


Fig.3: pH-development of the different treatments with *C. brasiliensis* during 2 days of incubation, BC = buffering capacity, error bars = standard deviation

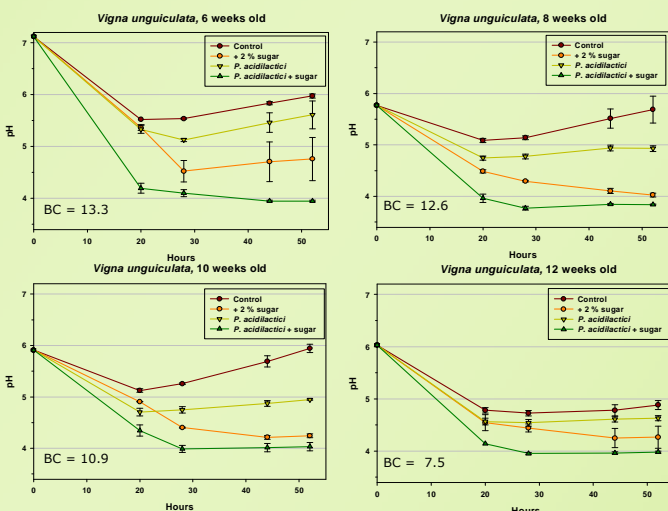


Fig.2: pH-development of the different treatments with *V. unguiculata* during 2 days of incubation, BC = buffering capacity, error bars = standard deviation

## 4. SUMMARY & CONCLUSIONS

- By this method it was revealed, that in general, the ensilability of *Vigna* was better than of *Canavalia*, probably due to a higher content of water soluble carbohydrates (to be determined yet) and a buffering capacity which was declining faster by growth in *Vigna*.
- The addition of a lactic acid bacteria preparation alone was not sufficient to improve the fermentation.
- Sugar as energy source accelerated the desired pH decline.

### RECOMMENDATION

Tropical legumes should be pre-wilted prior to ensiling to concentrate the energy content. An additional source of carbohydrates such as molasses or starchy roots or tubers would be of advantage. To ensure good ensiling results the plant material should be combined with an effective lactic acid bacteria strain as starter.