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COCONUT WATER AS A MEDIUM FOR BIOMASS PRODUCTION BY *Lactobacillus plantarum*

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1. INTRODUCTION

Demand for non-dairy products with probiotics has increased for health or lifestyle reasons. The market is very promising and companies from different sectors of the food industry have sought applications of probiotics in plant products. However, the need to adapt cultures to processing steps and to the intrinsic characteristics of plant matrices has limited these applications. The availability of probiotic cultures of national origin with these attributes and lower cost can favor the production and, therefore, the consumption of functional foods, beneficial to the health of the consumer. Embrapa counts the strain *L. plantarum* B12 selected and characterized in previous projects based on properties associated with probiotic functionality. Probiotics are living microorganisms that, when administered in adequate quantities, provide health benefits to the host (FAO/WHO, 2001). In this work, the mentioned strain was produced in a medium containing coconut water supplemented or not with other sources of nitrogen.

2. MATERIAL AND METHODS

The strain *Lacbtobacillus plantarum* B12 was cultivated in standard MRS medium or in medium with coconut water. Different sources of nitrogen (6% w/v of yeast extract, peptone, sorghum flour or soy molasses) were evaluated in the production of *Lactobacillus*. The selected strain was activated in MRS broth at 37 °C for 20 hours. The inoculum used (5% v/v) was added to 250 mL Erlemeyers containing 100 mL of the different culture media and incubated at 37 °C and 100 rpm for 24 hours. The variables pH, reducing sugar concentration and biomass concentration (enumeration on plate after deep seeding in MRS agar and incubation at 37°C for 72 hours, with results expressed in log CFU/mL) were monitored at the beginning and end of fermentation (Mesquita et al., 2020).

3. RESULTS AND DISCUSSION

When comparing the culture of lactobacilli carried out in MRS broth and in medium containing only coconut water, it was found that coconut water has practically twice the reducing sugar when compared to the MRS medium (43.45 and 19.93 g/L). Despite this, the use of pure coconut water resulted in lower cell growth when compared to MRS medium (8.15 and 8.92 log CFU/mL). For this reason, different sources of nitrogen (yeast extract, peptone, sorghum flour or soy molasses) were evaluated in the production of *Lactobacillus*.

The addition of yeast extract, peptone and soy molasses resulted in an increase of initial pH from 4.86 to 5.64, 5.67 and 5.24 respectively. In all media evaluated the final pH decrease (3.7 and 4.2) probably due to lactic acid formed during the fermentation. When the pH was already lower than 4.0, the physiology of the microorganism is affected, reaching the stationary phase. The media containing coconut water with yeast extract or soy molasses were the best for the biomass

production, reaching 10.32 and 10.28 log CFU/mL (24 hours), almost 1.5 log CFU/mL higher than the MRS medium (8.92 log CFU/mL).

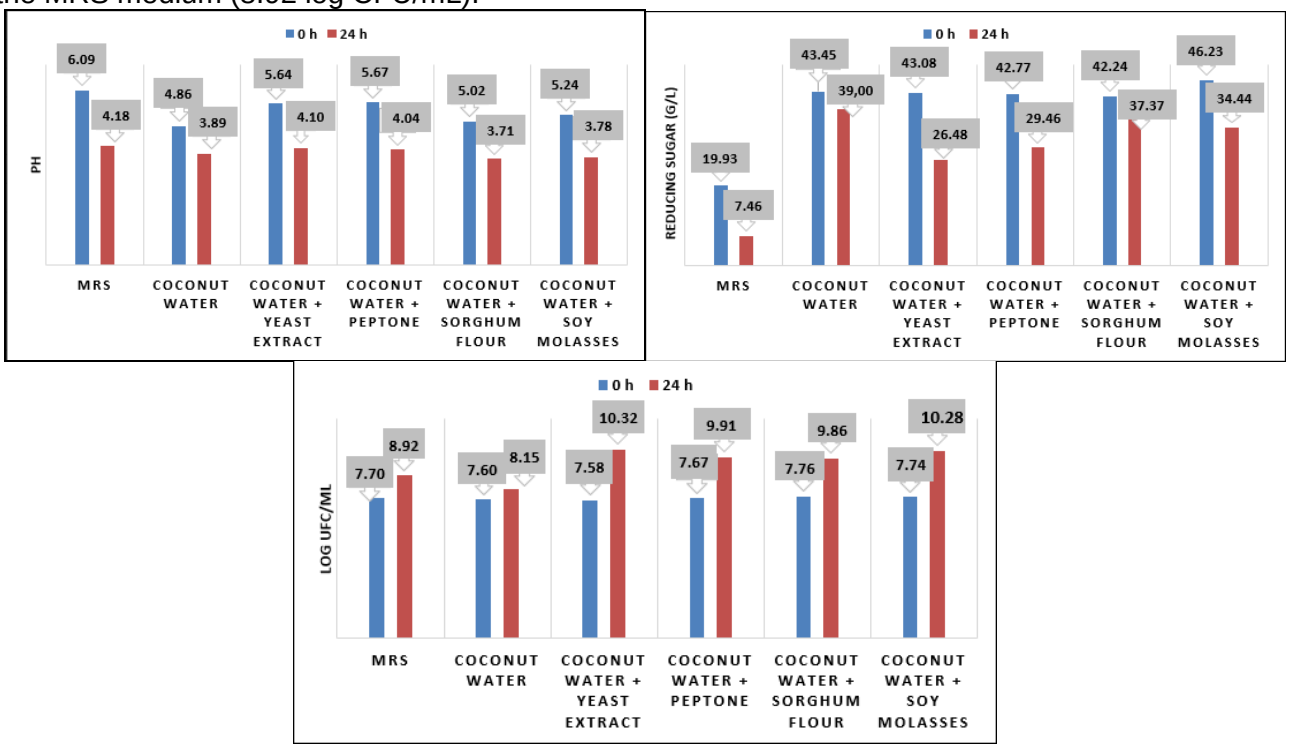

Figure 1: Results of pH, reducing sugar (g/L) and biomass expressed in log CFU/mL, in the beginning and after 24 hours of fermentation of *L. plantarum* B12 in different coconut media.

The results found are in agreement with the study carried out by Mesquita et al. (2020) where it was evaluated the fermentability of a beverage made with coconut and chickpea with *L. paracasei*, with final count of 8.6 log CFU/mL. In another work, the use of coconut water supplemented with soyabean protein for fermentation by *L. plantarum* resulted in production of a natural non-dairy functional beverage that could be consumed by people with allergies to milk and lactose intolerance (Goveas et al., 2021). In this work, it was showed the addition of a nitrogen source could increase the biomass production of *L. plantarum* using coconut water as a carbon source.

5. REFERENCES

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