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**Study on cassava peels as by-product to feed cattle**

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Cassava is considered as the 3<sup>rd</sup> rank of food crops in Vietnam. The total cultivated area and productivity of cassava have significantly increased up to now. Fresh cassava root production roughly obtained 9 million tones annually. Average cassava productivity gained 16 t/ha including 3.36 t of its root peels (RPs) as its by-products. They could be dried and stored to converse into cattle food stuff after tuber processing. However, they were used to be thrown as fertilizer or garbage. Cyanic acid (HCN) toxicity in RPs possibly cause a poison for ruminants.

Accordingly, a survey in 2006 was carried out to assess the current situation in Binh Phuoc and Dong Nai provinces to deal with suitable solutions.

Further experiments were conducted during 2006-2008 with following treatments as (i) Effect of drying and preserving on HCN level of cassava RPs; (ii) Effect of silage with different molasses ratios and preserved times on HCN level of cassava RPs; (iii) Effect of dried cassava RPs on the rumen environment; (iv) Effect of dried cassava RPs on the hematological parameters, animal health; and (v) Study on utilization of cassava RPs to properly replace the fatten ratio components of crossbreed Holstein male.

The results indicated that RP production was highly potential. The dry matter possibly yielded 1.55 tones/ha. If the RP by-product could be used to feed beef cattle, beef meat would be obtained 7,819 tones per year. Only 30% of the total RPs were used to feed the ruminant because HCN toxin level was often higher than the critical dose. It ranged from 698 to 859 mg/kg of fresh RPs.

Thank are due to sun-drying technique, HCN content in the RPs significantly reduced from 2,750.5 mg/kg DM down to 334.1 mg/kg DM ( $P < 0.05$ ). Four-month storage treatment of the RPs addressed the reduced HCN level of 10.2 mg/kg DM. It meanted that the HCN level in RPs quickly reduced during the first two days under sun-drying practice and within 90-day storage. The processing was slowly declined in both treatments with the relative nonlinear equation was  $Y = 5324.11e^{-0.77x}$  ( $R = -0.94$ ). The RP's ensilage method combined to 3% molasses also enhanced the HCN decreasing from 1,129.9 mg/kg DM down to 451.3 mg/kg DM and 323.7 mg/kg DM after 21 and 120 days of preservation, respectively. The nonlinear equation obtained  $Y = 492.75e^{-0.003x}$ .

Supplying RPs at 0.00; 0.25; 0.50; 0.75 kg DM/100 kg BW decreased the amount of protozoa from  $1.865 \times 10^8$ /ml down to  $1.443 \times 10^8$ /ml and increased the amount of bacteria from  $1.342 \times 10^5$ /ml to  $2.672 \times 10^5$ /ml on an average dose dependent manner. However, no significant difference among treatments was observed. The ruminal pH and  $\text{NH}_3\text{-N}$  concentrations were not affected by adding RPs at 0.75 kg DM/100 kg BW. Under condition of in-sacco, DOM of natural grasses in the treatment added 0.75 kg RPs/100 kg BW exhibited 54.83% as compared to control as 63.22% after 72 hrs of incubation. In addition, there was no significant difference of DDM of natural grasses when increasing the RPs among treatments at 48, 72 hrs post-incubation.

Increasing the RPs in the ration significantly addressed the decrease of physiological parameters as red blood cells, erythrocyte, hemoglobin (Hb) and hematocrit (Hct). However, these parameters were still acceptable in a normal physiological range, except erythrocyte. There is possibly an increasing trend of mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC) and methemoglobin (MetHb). They were recommended as the indicators of cattle anemia. Beside this, increasing of RPs in the rations enhanced the change of white blood cell amount and formula. This change was still in a normal physiological range of cattle.

This study revealed that replacement of RPs's ensilage practice with 3% molasses until 36.9% of concentrates in the fatten ration, the average daily gains obtained 972 g/head/day. Accordingly, no adverse effects were observed after three months of fattened period. It reduced 8.5% production cost as compared to using other concentrates.

Supplementing cassava RPs up to 0.75 kg DM/100 kg BW in the beef cattle ration did not affect to the rumen environment, animal health in terms of fattening cattle.