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RESEARCH ARTICLE

Comparative analysis of processing methods in Robusta coffee in Uganda

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ABSTRACT

Quality is a big factor in the retail structure at the international coffee stage. And, optimum postharvest handling, cherry processing inclusive, is vital in ensuring the desired bean physical quality out. Here, Robusta cherries derived from different processing methods (naturals, pulped naturals and fully washed coffees) were appraised for bean physical quality. The result in this trial indicates that complete wet processing method (fully washed Robustas) had the highest moisture content retention, least bean borer infestation besides, least labour intensive at drying to 12% moisture and with the least projections in US$ losses per 60kg bag of green bean.

Keywords: Coffee, Robusta, Processing, Uganda

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INTRODUCTION

Coffee represents one of the most important economic crops of Uganda and its sales depend on bean and cup quality profiles, thus much attention is paid on constant quality improvement, postharvest inclusive. To establish the most suitable postharvest handling option for Robusta coffees in Uganda, an experiment was set up at the National Coffee Research Institute (NaCORI) to evaluate different processing methods on bean physical qualities.

The trial was evolutionary important and premised on earlier studies elsewhere that mode of processing plays a big role in the quality of the resultant green bean (Knopp et al., 2006). Thus, this study was aimed at understanding the influence of processing methods on the bean physical qualities and tracing the best bet postharvest handling option in the Robusta coffee value chain in Uganda.

MATERIALS AND METHODS

A fresh cherry Robusta composite sample was subjected to buoyancy in water in order to sort the floaters and fully consolidated filled beans without insect infestation. The consolidated part of the sample was portioned into three sub-samples and three processing methods (treatments) thus, natural, pulped natural and fully washed superimposed and replicated thrice. The sample was dried on raised meshed trays to 12% moisture and stored for six months in plastic buckets until they were hulled. A record of bean drying time to 12% moisture of sample was scored. The sample was hulled and green bean physical qualities (Insect Borer damage and Fresh per cent bean moisture content) determined. Bean borer damage was determined in 100 bean count by gravimetry and fresh per cent moisture content was determined using a calibrated moisture meter (Sinar

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AP6060 moisture analyzer) based on Specialty Coffee Association of America protocols (2009). Cherry drying time was determined by count in days to achieve 12% cherry moisture content in the three treatments. US$ loss per 60Kg bag was predicted retrospectively, basing on the % insect damage per 100 bean count. Statistical data management was conducted using Minitab software version 16.2.

Plate 1: Naturals

Plate 2: Pulped naturals

Plate 3: Fully washed

RESULTS AND DISCUSSION

Bean insect damage negatively correlated with moisture content drop in the bean (r2 = -0.99, p-Value = 0.002). Moisture content in the bean deteriorated differentially at various levels of processing and was statistically significant (p-value =0.001). The bean insect insurgence was equally variant at different levels of processing and statistically significant (p-Value =0.043). However, severe insect damage was noted in Robusta coffees naturally processed (Table. 1).

Table 1: Green bean physical quality profile under different processing methods.

Treatment	% Moisture content	% insect damage per 100 bean count	Drying time to 12% Moisture Count in days	$ loss per 60kg bag
Natural	10.6	62	21	81.84
Pulped natural	11.3	38	8	50.16
Fully washed	11.5	31	5	40.92

The trend in moisture content, insect bean damage, drying time and US$ loss per 60kg bag of coffee under different processing methods, intriguingly followed a clear distinct pattern. The bean moisture drop was highest in the naturals and this could have been associated with the extent of postharvest oxidative reactions (Miallard reactions) as reviewed by Selmar et al. (2008). Highest insect activity in the natural Robustas could still be explained by the bean postharvest chemistry where higher carbohydrates are broken down into lower subunits that are responsive to their nourishment and survival compared to other grades.

Comparatively, fully washed Robustas involved less labour required in drying beans to 12% moisture content in five days verses other grades. This also implied that its only fully washed Robusta coffees that could beat the best price at a given time following the volatility of the coffee prices just because it dries in real time. Retrospectively, inter-conversions projected losses in green bean due to insect invasion within the natural Robustas to an estimated 37.2Kg per 60Kg bag, accounting for US$81.84 loss either in local retail structure or exports. Meanwhile, the 62% bean insect damage in Robusta lots nationally within the natural grades was projected to an estimated 4.73 million 60Kg bags worth US$387,232,343 in jeopardy; implying, Uganda would be bagging up to US$808.2 million in exports.

CONCLUSION

Moisture is a vital part of miallard reactions during roasting that eventually leads to unleashing aromas and flavor in different coffees. Thus, moisture content is a very important aspect considered at the international coffee trade in addition to bean insect infestation which is a critical biosafety issue. Fully washed coffees were quite tolerant to moisture loss, bean insect infestation and in addition, less labour intensive. Thus, wet processing method is a very efficient and prospective postharvest technology for Robusta value chain handling and worth recommending for policy reorientation.

Therefore, Uganda would be bagging up to US$808.2 million in coffee exports had 4.73 million 60Kg bags not been lost in insect damaging thus; scenario will seem to persist if the policy on postharvest handling in the Robusta value chain is not refocused.

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