jpht

Research Article

Journal of Postharvest Technology
04 (04): 072-074, Oct' 2016
www.jpht.info

Effect of Storage on Bean and Cup Qualities in Robusta Coffees under Different Processing Methods

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Received : 25 May 2016
Revised : 03 Sep 2016
Accepted : 16 Sep 2016

Keywords
Robust Coffee
Processing
Storage
Quality
Postharvest

Abstract

Quality is the most appreciated characteristic at the international coffee trade and consumers continue to demand for it. However, a number of production factors, including postharvest handling mainly processing methods and storage are implicated in determining the final bean and cup quality. Here, beans derived from different processing methods (naturals, pulped naturals and fully washed coffees) strictly under the same storage conditions, were appraised for bean and cup quality profiles. The outcome in this trial indicates that fully washed Robusta coffees had the best bean and cup quality profiles.

INTRODUCTION

Coffee represents one of the most important economic crops of Uganda and its sales depend on bean and cup profile, thus much attention is paid on constant quality improvement and maintenance. In an effort to establish the most ample postharvest handling status of Robusta coffees under storage in Uganda, an experiment was set up at the National Coffee Research Institute (NaCORI) to evaluate the effect of storage on the quality of green bean resulting from different processing methods.

Reports from earlier studies indicate that processing methods influence emerging flavors that characterize the differences in the cup profile of the resultant green beans (Knopp et al., 2006), bean physical qualities inclusive. It is also urged that prolonged storage of coffee beans leads to distinctive deterioration of the aroma potential in the beans (Selmar et al., 2008).

Therefore, this study was aimed at confirming the effect of storage on bean and cup qualities in Robusta green beans emerging from different processing methods.

MATERIALS AND METHODS

To 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 tray to 12% moisture content and stored for six months in plastic buckets until they were hulled. The sample was hulled and bean physical qualities (Borer damage and Fresh per cent bean moisture content) determined. The bean borer damage was determined in 100 bean count by gravimetry and fresh per cent moisture was determined using a calibrated moisture meter (Sinar AP6060 moisture analyzer) based on Specialty Coffee Association of America protocols (2009). The cup quality profile was determined using Specialty Coffee Association of America protocols (2009). Statistical data management was conducted using Minitab software version 16.2.

RESULTS AND DISCUSSION

Bean insect damage negatively correlated with moisture content drop in the bean (r = -0.99, p-Value =0.002). Moisture content in the bean deteriorated differently at various levels of processing and was statistically significant (p-value =0.001). The bean insect insurgence heightened during storage and at different levels of processing; and, statistically significant (p-Value =0.043). However, severe insect damage was recorded in Robusta coffees naturally processed (Table. 1).

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ISSN 2348-4330

Table 1: Variation in bean physical qualities under different processing methods

Treatment	% Moisture content	% Bean insect damage
Natural	**10.6**	**62**
Pulped natural	**11.3**	**38**
Fully washed	**11.5**	**31**

Table 2: Comparative cup quality profiles in Robusta green bean under different processing methods

Treatment	Preference rating							
	Aroma	Flavor	After taste	salt/acid	Bitter/sweet	Mouthfeel	Balance	Overall
Natural	6.75	6.5	6.25	6.75	6.25	6.25	6.25	6
Pulped natural	7	7	7	6.5	6	6.75	6.25	6.25
Fully washed	7.25	7	7	6.75	6.75	7.25	7.25	7.25

The trend in moisture content, insect bean damage and the resulting cup profile in green bean under different processing methods during storage specially followed a 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). The cup profile in the naturals had a weak and a remote robust taste and this could have resulted from the undesired oxidative changes in the biochemical compounds that govern unique aromas and flavors; such amino acids (Homma, 2001), sucrose (Geromel et al., 2006; CIRAD, 2006), lipid fractions (Kurzrock et al. (2005); Janicek and Pokorny (1970), during bean roasting. 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.

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 in the international coffee trade in addition to green bean insect infestation which is a critical biosafety issue. Fully washed coffees were quite tolerant to moisture loss in addition to bean insect infestation during storage. Thus, wet processing method could be the most efficient postharvest handling form to preserve the integrity of the green bean during storage for Robusta value chain and worthy recommending for policy reorientation.

The trial conclusions clearly indicate the impact storage bears on the quality of the green bean. However, in the current trial design, there was no special attention put on understanding the most efficient storage facility or containment that correlates with superior bean and cup quality. Therefore, there is need to profile a wide range of storage facilities in the bean quality. Furthermore, the conclusions of this trial were based only on bean physical and cup quality profiles, thus, in addition, there is a need to enhance the study backed with a biochemical profile.

ACKNOWLEDGEMENT

Thanks to the Uganda Coffee Development Authority for funding this trial study and the National Coffee Research Institute-NARO for the flagship.

Growing tribute goes to Bakomeza Fidel (UCDA), for leading the panel of cuppers during the cup profiling sessions.

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