

Results from beanline 02.440

Antoine Wojdyla*,
 Center for X-ray Optics, Lawrence Berkeley National Laboratory,
 1, Cyclotron Road, Berkeley, CA 94720, USA
 * E-mail: awojdyla@lbl.gov

Abstract

We analyze both quantitatively and qualitatively the results of adding an espresso machine in a crowd of caffeine-addict researchers. We show that the consequence are good according to all the metrics considered and validate the usefulness of such implementation.

Introduction

According to popular studies, caffeine is the main driver in science jobs [1]. Countries having a strong culture of sharing coffee, such as Finland [2], also show increase productivity [3] attributed to both the effect of enhanced collaboration and tiredness mitigation. To investigate the effects of coffee at the Center for X-Ray Optics, we needed devise a qualitative and a quantitative study.

Materials and Methods

For the experiments, we used a BIALETTI *Caffe Concerto* two-cups, 15-bar pump semi-automatic espresso machine. The choice for the bean source, PEET'S COFFEE AND TEA, was easy to make since it is sourced locally, to guarantee the freshness of the roast (Fig. 1). The beans were chosen based on availability, priority was given featured seasonal roast. Been were, although not consistently, ground using PEET'S COFFEE AND TEA in-house burr mill set on caliber 2, and sealed in a hermetic glass jar. The water was generally taken from the tap, thanks to good general quality of tap water in the Bay Area. The tastings



Figure 1. Experimental bench. A picture of the bean source.

were performed on $N = 2$ participants, and to further ensure consistency in the results the coffee was brewed for two-cups servings.

Results

Results of the tasting are displayed in Table 1.

beans	availability	samples	rating	comments
Peet's coffee				
Anniversary blend	March '13	2 lbs	*****	strong chocolate taste good with a croissant
Holiday blend	Oct '13	1 lb	****.	
Blend 101	year round	3 lbs	***	
Columbia Nabusimake	July '13	1 lb	***	
Brasil Peaberry	Oct '13	1 lb	**.	
Panama Rainforest Preserve	Sept '13	1 lb	**.	
Mocha-Java	year round	1 lb	**.	
French Roast	year round	1 lb	**.	
Usuri	year round	1 lb	**.	
Major Dickason	year round	1 lb	**.	
Espresso Forte	year round	1 lb	**.	
Guatemala San Sebastian	year round	2 lbs	**.	
Fair Trade	year round	1 lb	**	
Gaia	year round	1 lb	**	
India Peaberry	Aug '13	1 lb	**.	
Blue bottle coffee				
Three Africans	year round	.5 lb	**	light roasted
Hayes Valley Espresso	year round	.5 lb	**	light roasted
Roman Espresso	year round	.5 lb	*.	light roasted
Giant Steps	year round	.5 lb	*.	light roasted

Table 1. Results of the tastings. Tasting performed by $N=2$ participants.

Even the sample is low and various factors such as the grinder coarseness and coffee aging are overlooked, these results are thought to be rather unbiased. There is no clear trend concerning the sourcing (origin) of the beans, even though it seems that PEET'S COFFEE AND TEA house blends are particularly appreciated.

Light roasted coffee from BLUE BOTTLE COFFEE tend to be less appreciated on overall (their *shelf* life, or life on the shelf is longer). This is probably due to very fruity notes that are in general more suited for drip coffee, since this technique captures different flavors of the coffees.

1 Coffee consumption

The (first) espresso Machine was installed on January 8th, 2013. Since then, the weekly coffee consumption started to rise from one pound a month to more than one pound a week. The evolution of coffee consumption during year 2013 is shown on Fig. 2.

A clear during week 25-32 (June 17th-August 11th) is attributed to the increased number of holiday leaves during the summer. No clear pattern emerge relating the coffee quality and consumption, probably associated to the fact that average coffee quality was essentially kept constant during the whole period. The evolution is expected to reach a plateau around 1 lbs/week, according to a preliminary *Coffee Club* subscription studies.

The total coffee consumption during the 43 weeks of the study has been 27 lbs. The yield of a pound of coffee has been calibrated in the first few weeks to be about 60 cups/lbs, single-cup servings averaging

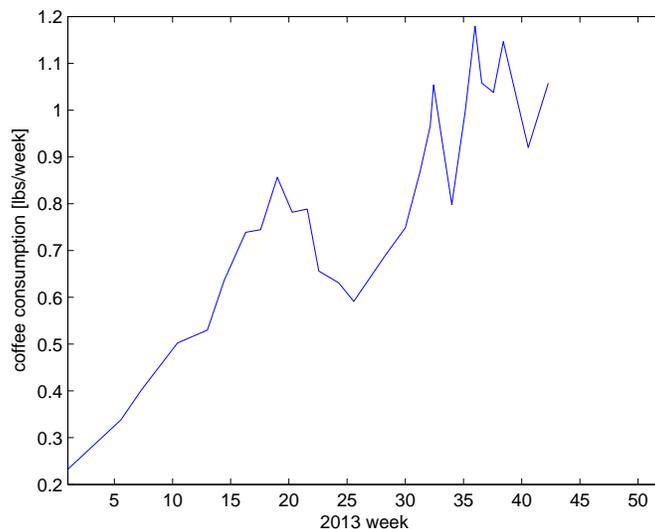


Figure 2. Evolution of weekly coffee consumption. A 5-point moving average have been applied to account for week-to-week coffee availability.

out double-cup servings. Based on this figure, we believe that more than 1500 cups of coffee has been served, or the equivalent of 100 g of pure caffeine (70 mg/cup, *vs.* 180 mg for a 8 oz (small) brewed coffee [4]).

2 Economic considerations

The economic impact of the coffee machine is three-fold.

The first aspect is the direct monetary aspect : considering that espresso are available at the PEET'S COFFEE AND TEA stand located in the Bay View Caf (commonly referred to as *Cafeteria*) for a unit price of \$1.75, coffee sold in the coffee room of CXRO (room 02.440) for unit price of \$0.25, the net aggregated saving is $1.5 \times 1500 = \$2250$. This figure underestimates the true saving, since some espresso machine users are prone to augment their gustatory experience by adding milk and/or cocoa, leading to what is referred as *caffè latte* or *mocha*, having a much higher retail value. Some other aspects such as the cost of sugar or the environmental effect of use of ceramic cups instead of disposable cups have not been assessed.

The second aspect is employee productivity due to the consumption of coffee. We believe that no effect can be observed on that matter, because of the prior availability of coffee in the coffee room.

The final aspect is the societal aspect. Considering that the espresso machine and the brewing process gather researchers from different fields in the same room for extended period of time, it is highly likely that the general knowledge and the scientific production is increased, thanks to underlying mechanisms. This is however hard to quantify, and scientific policies have relentlessly tried to find a good metrics for that. We leave them the burden, since it is not listed in the goals of this article.

Discussion

This study discussed the impact of adding an espresso machine in a workplace populated by researchers, and discussed the quality of the coffee. It has been shown that the influence is positive according to most accepted metrics, and we believe it provides a good guide selection for anyone interested by having good coffee at home. The coffee machine also leverages an important aspect of the lab locations : the view from the terrace, what has, most probably, very beneficial effects on worker's well-being, hence reducing sick leaves and empowering collaborations.

Acknowledgments

The author would like to thank Eric Gullikson, the members of the coffee club and all the coffee enthusiasts who dared to try the espresso machine, Sonia Dominguez and formerly Su-Jane Lai for their help in accounting, Jake Koralek for his advices on the choice of coffee beans and grinding volunteer, Markus Benk for the fruitful discussion on the validity of the results and Arnaud Allezy for continuous support.

3 Conflict of interest / Ethics

The author declares no conflict of interest with the coffee retailer (no NASDAQ:PEET share). No humans have been harm during the experiments, even though unreported hot coffee spill-over might have occurred.

References

1. New Dunkin' Donuts & CareerBuilder, *Survey Reveals Which Profession Need Coffee the Most.* (2011)
2. ChartsBin.com, *Current Worldwide Annual Coffee Consumption per capita.* (2009)
3. The Conference Board, *Total Economy Database : GDP per Hour Worked.*(2013)
4. Energyfiend, *The Complete Guide to Starbucks Caffeine.* (2013)