LILLA
No one else

Gazzette

Special Edition

All about Instant Coffee

edition 19 | July/August | 2015

WHAT DO LILLA AND INSTANT COFFEE HAVE IN COMMOM?

Roasters Technology
Lower Mass Loss = Better Extraction

Technical Article

Roasting coffee, control is the key, but what to control?

WHAT DO LILLA AND INSTANT COFFEE HAVE IN COMMOM?

This is a very exciting point to Lilla.

As being very used to Instant Coffee market in Brazil, Lilla has been able to constantly develop its roasters technology, throughout the years.

As this kind of industry works with high volume of production and low sales margins, the improvement in the yield that measures the conversion of green coffee to instant coffee is always a main target. This initial target should be divided into two others: extraction enhance and reduction of the roasting shrinkage (mass loss during roasting process).
So, the better lower mass results, the better for the Industry.

Based on that, Lilla started to develop its know-how in new roasting profiles, in order to meet this demand and all other requirements from its Brazilian clients. Later on, all the technology Lilla developed for the national Instant Coffee Industry became also very welcome by the International market.

So, the question is: Why do customers, who produce Instant Coffee, prefer Lilla's roasters?
Besides the company tradition, only Lilla´s drum roasters are able to give advantages, such as:
CONVECTION ROASTING SYSTEM (better roasting quality, and more homogeneousty), AUTO SELF CLEANING (fire risk free), BUILT IN AFTER BURNER (explosion risk free), our know-how also offers the exceptional Profile Concept called THERMAL ENERGY PROFILE.

The THERMAL ENERGY PROFILE enables to have total control of the roasting process, in a very accurate way.
Lilla roaster model 4G, has this feature.
This Generation of roaster is able to control the chemical reactions that happen in the coffee bean, using the bean temperature evolution along the roasting time.

This technology of profile control, allows the operator to reach same roasting results for the final roasting color and cupping even when there are variations in the raw material moisture.
Besides that, also changes in the batch size will still result in consistent process, with no need to recalibrate the profile recipe, which happens in roasters that do not have such technology.

In addition to all those points mentioned above, the main advantage we offer for Instant Coffee, is the low shrinkage and the best yield

Lilla roasters work on a semi fluidized bed system, which means it is a mix of fluidized bed (high air volume, inside the drum), allied with the mechanical movement of the drum. Therefore, this technology unites the best of both worlds (drum and fluidized bed). To work with these two roasting systems together, Lilla controls along the roasting the following parameters: HOT AIR TEMPERATURE, DRUM PRESSURE, AIR FLOW AND DRUM ROTATION. These controls are responsible for providing, a very accurate profile consistency, resulting in better yield.

Roasting shrinkage is not the only important point for Instant Coffee companies. Soluble extraction is also a goal, and our THERMAL ENERGY PROFILE can help to improve this figure.
Of course, extraction depends on the extraction tower, but our profile system, can help to improve it by making a proper recipe, targeting higher expansion of the beans.

Outthought is known in the market, that faster roasts will result in better extraction, what is most important is to get it still obtaining a good cupping quality and acidity, controlled under the desired limits. This is where the 4G (4th Generation roasting technology) comes in: besides giving a better shrinkage, can also provide better soluble extraction to our clients. Think about the financial impact: one percent of better soluble production yield can make in a year, working 24 hours/day, 365 days/year. If you want to know more about this technology, please do not hesitate in contacting us.

Lilla supplies major players in this Industry such as: UNILEVER, NESTLÉ, UNIVERSAL ROBINA, CCL, DANKAFFEE, CAFÉ IGUAÇU, PT ANEKA COFFEE, CAFESCA, CAFIVER, CATOEX, YERRA-KARN, DAMIN, EL CAFÉ, CAFÉ SOLUBLES, HACO, TATA COFFEE, OLAM, MOSCOW COFFEE HOUSE among others.

NCA ANNUAL CONVENTION

HELD IN CHARLESTON

ED LANE, USA SALES AGENT - AT LILLA´S BOOTH

This march, for the first time, Lilla participated as exhibitor at the NCA convention trade show. This is the first time, of many to come. The show was really good and important to LILLA, towards to the consolidation of the brand in the country.

Lilla has sold more than 20 Industrial Roasters in the country, and wants to continue to move this way, by giving good and quick technical support, and best roasters to the customers.

SCAA 2015

This April, Lilla exhibited again at SCAA 2015, by making daily cuppings, showing the amazing benefits the 4G technology can provide.

FERNANDO FERNANDES – DIRECTOR
POÇA D´AGUA – COFFEE SPECIALIST
JOÃO PAULO - ENGINEERING

This April, Lilla exhibited again at SCAA 2015, by making daily cuppings, showing the amazing benefits the 4G technology can provide.

For the cuppings, Lilla showed 3 types of roasting, with 5, 9 and 14 minutes roasting, using same green coffee bean, same recipe, reaching same final color, but very different cuppings. YES, this is what you can get with the 4G technology. This technology is also available for small roasters, from 120 to 360 kilos-hour.

THE OPUS 4G

THE BEST DRUM ROASTER TECHNOLOGY IN THE WORLD.

Achieving different cup profiles using the same raw material while getting the same final color is easy? IT IS FOR LILLA

The 4g technology is the best for INSTANT COFFEE and SPECIALITY COFFEE due its amazing profile flexibility.

875 - 1750 - 3500 kilos/hour

Contact us to get more information

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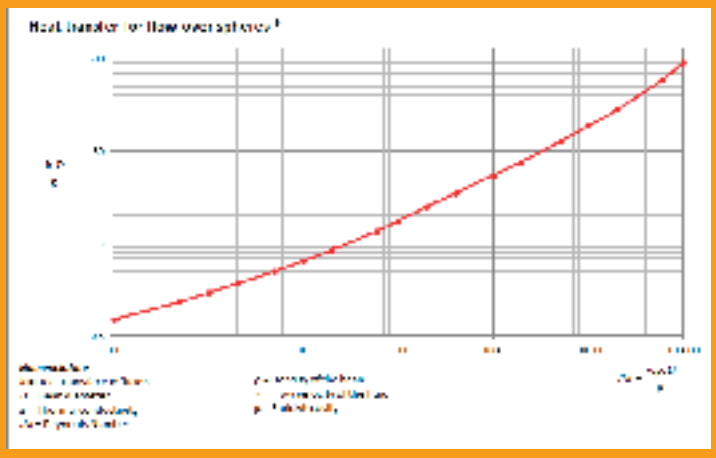
PART 2:

e. A surprising fact:

In our last gazette we presented the formula to calculate the heat transfer for a given air temperature and flow rate, as shown below:

Q = h*A*(Tair – Tbean) where: **h** = Coefficient of heat transfer
A = Surface of coffee bean
Tair = Hot air temperature
Tbean = Bean temperature

The coefficient of heat transfer "h" depends on air speed as shown in the graphic below:



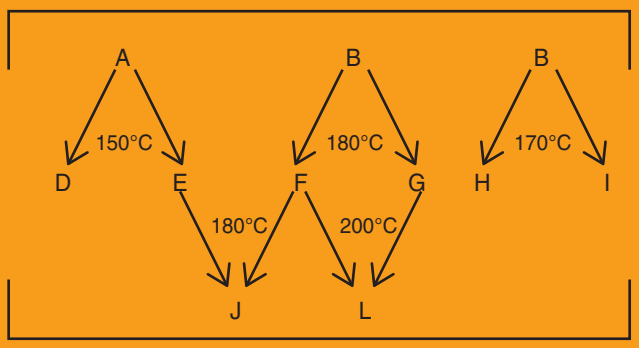
We can conclude, from the information above, that It´s possible to obtain the same heat exchange using different combinations of hot air temperature and flow rate. Let us first calculate the heat transfer for a specific combination of air temperature and air speed. Based on that, if we increase the temperature of hot air, maintaining the air speed, we determine from the formula above that the heat exchange will become higher. Now, maintaining this higher temperature, we conclude from the same formula and chart that the flow rate can be lowed until we get the same initial value of heat transfer.
In fact, the same amount of heat transfer can be obtained by infinite combinations of hot air temperature and speed and, for all of these combinations; the physical effect on the coffee bean will be the same.

This reality can also be experienced by us in everyday life. We can feel the same thermic sensation of -10 º C, in a day without wind, on windy days when the air temperatures are different: one day 0 º C, on the other, -2 º C and +4 º C. It is only necessary that the air speed in these days are different from each other at values that result in exactly the same heat exchange between the air and your body.

What makes the coffee to roast is the bean temperature:

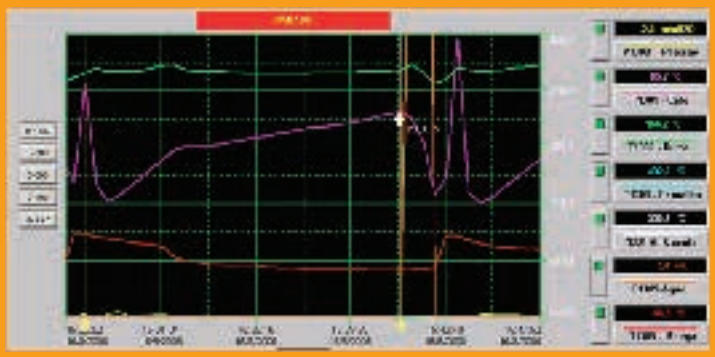
Up to this point we have reached in our coffee roasting analysis that neither the temperature of hot air nor the flow of air are the primary agent of the coffee roasting process. However, we learned that the heat transfer is a result of these two variables. Could it be that the heat is what it makes coffee to roast?
Knowing that the process of roasting the beans is basically a chemical transformation, we will see that in fact, the heat is simply a tool to get to what really makes the coffee to roast. In the science of chemistry, there is a concept named activation energy. This is the energy required to initiate a chemical reaction[1]. The question we have to ask is, how this energy is measured or to which variable it is related to.
Thermodynamics comes to answer this question by pointing out that the internal energy of a substance is a function of its temperature and pressure. Thinking in practical terms, in the case of coffee roasting , this energy is primarily a function of the temperature of the coffee bean, because the pressure influence over the energy of a solid element is irrelevant.

It is essential to emphasize at this point that the activation energy, which allows the chemical reactions of roasting to happen, depends only on the temperature of the bean. It does not depend on the temperature of the hot air as well as it is not dependent of the flow of hot air. It also does not depend on heat exchange, but only on the temperature that can be measured in coffee bean. Actually, the heat exchange is just a tool we use to increase the coffee temperature, therefore roasting it.
Both Maillard reactions such as pyrolysis reactions are part of the process we call coffee roasting. They represent thousands of chemical reactions that require different levels of activation energy. We can say that each of these numerous reactions will occur at different temperatures.
Thus we can consider the simplified example below:



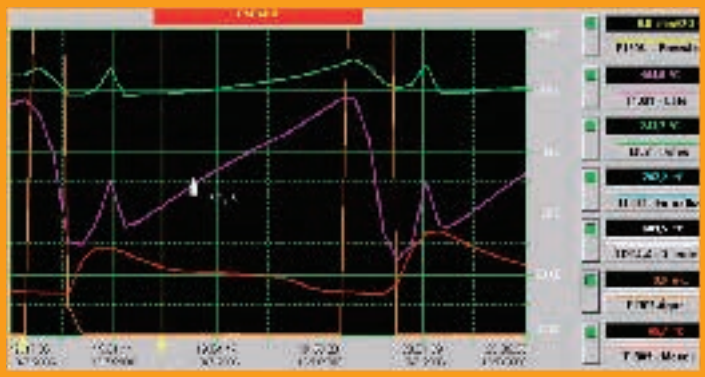
The model proposed above has assumed elements initially present in the coffee bean (A, B and C).
Supposedly the element A decomposes in D and E only when the bean temperature is 150 °C or higher, the element B decomposes at 160 °C and so forth.
The element E reacts with the element F, to form the J substance when the coffee reaches the temperature of 180 °C or above, but the combination of the same element F with G occurs only at the temperature of 200 °C or more.

Now let's imagine two experiments over the model proposed above. In the first experiment we draw a curve of the temperature of the coffee bean along time designing a plateau when the temperature gets to 180 °C. We're talking about a graph, more or less with the configuration shown below:



The purple line represents the temperature of the coffee beans, as a function of time and the area enclosed by the yellow line is where the temperature remains constant for some time.
While keeping the temperature of the beans at 180 º C, we are forcing the production of the substance "J". If we hold this temperature long enough, consuming all "F" substance, when the beans finally reach 200 ºC it will no longer be possible to form the "L" element.

Let´s now imagine a second experiment. We draw a new curve with a temperature rising faster, so that a short elapse of time passes between the moment when the beans reach a temperature of 180 °C and the moment when they get to 200 °C. We're talking about a chart with the configuration shown below:



In this case, when the temperature of 200 °C is reached, we will still have the "F" element present in the coffee composition, so that it can still react with "G" forming the "L" substance. The "L" element, now present in this second experiment, did not occur as a product of the roasting reactions in the first test. This difference has arisen because we increased the coffee beans temperature using different rates for each experiment.

4.CONCLUSION:

The several chemical reactions which take place during coffee roasting process require different temperatures to occur.
This leads us to conclude that the chemical composition of roasted coffee beans depends on how we work the beans temperature throughout the roasting process.
This composition will define the characteristics of coffee beverage and its aromatics. Therefore, **the evolution of the coffee beans temperature along time is the determining factor for roasting quality, cupping and aroma.** It is surprising to discover that there is no direct dependence on the temperature of the hot air used for roasting and that this temperature combined with hot air flow will determine the amount of heat supplied to the beans and so is the tool to control coffee temperature along the roast.

NOTES:

[1]General Chemistry
Donald A. McQuarrie , Peter A Rock , Ethan B Gallogly.Editora: University Science Books; 4 edition (June 1, 2010)Pag. 652

Big players in the Instant Coffee Market, who have Lilla

Nestlé · Unilever · CCL Products · DANKAFE · Universal Robina Corporation · PT Aneka Coffee Industry · Moscow Coffee House

NESTLÉ, UNILEVER, CCL, MELITA, DANKAFE, UNIVERSAL ROBINA, CAFÉ SOLUBLES, AND MANY OTHERS, WITH MORE THAN 1 ROASTER, WHICH MEANS THE TRUST ON LILLA´S MACHINERY.

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