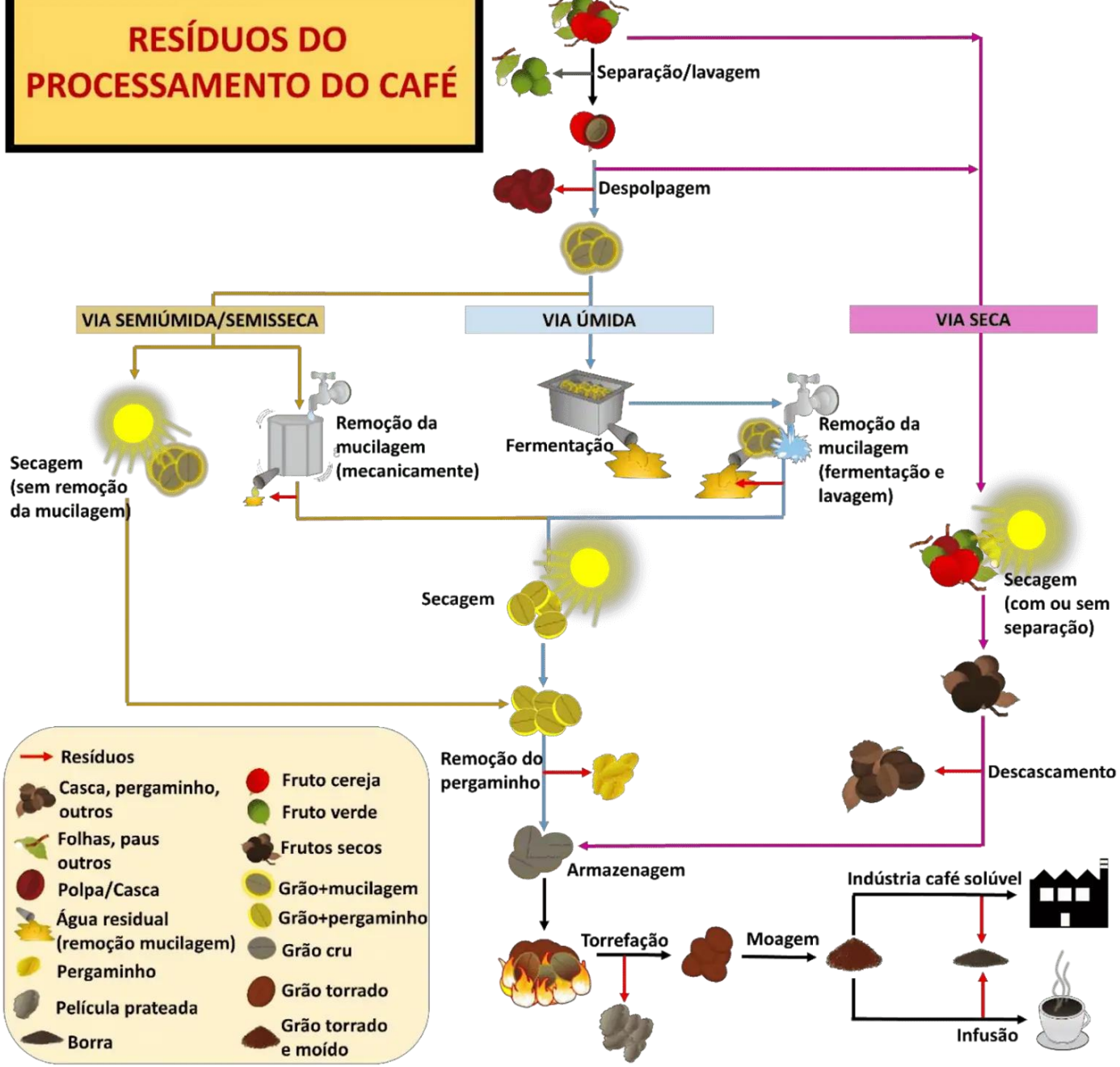
1.3. Torra.
Café descafeinado.
Café solúvel

Etapas do processamento de café (Fonte: QNInt)

https://blog.aegro.com.br/pos-colheita-cafe/



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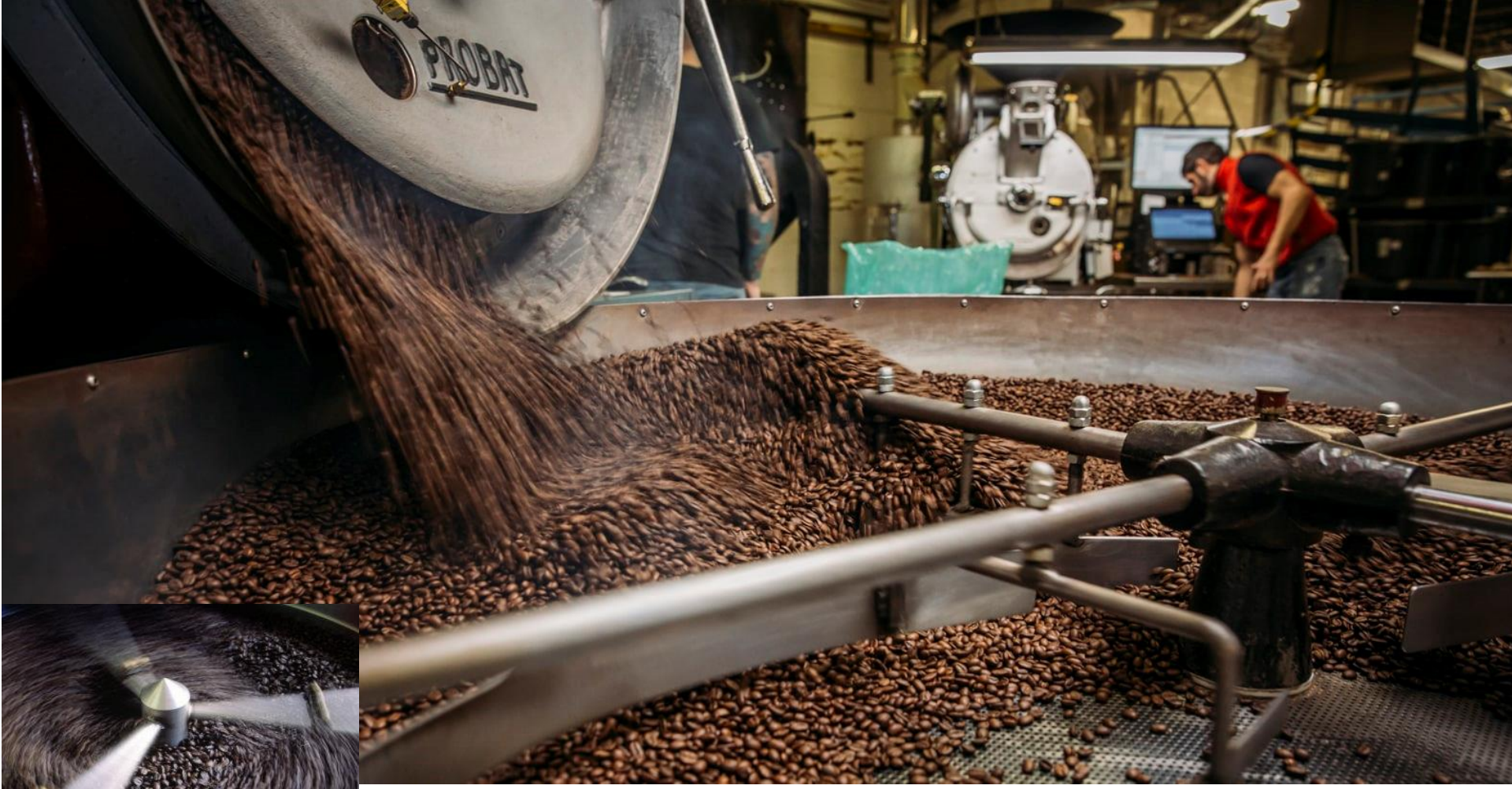
Torra

M. Helena Guimarães de Almeida/ Tecnologia dos Produtos Tropicais/Instituto

https://kaldiscoffee.com/pages/roasting

Torrador em “Monte Café”, São Tomé e Príncipe

M. Helena Guimarães de Almeida/ Tecnologia dos Produtos Tropiocais/Instituto



https://kaldiscoffee.com/pages/roasting

http://www.allposters.com/-sp/Coffee-Roaster-Posters_i3510100_.htm

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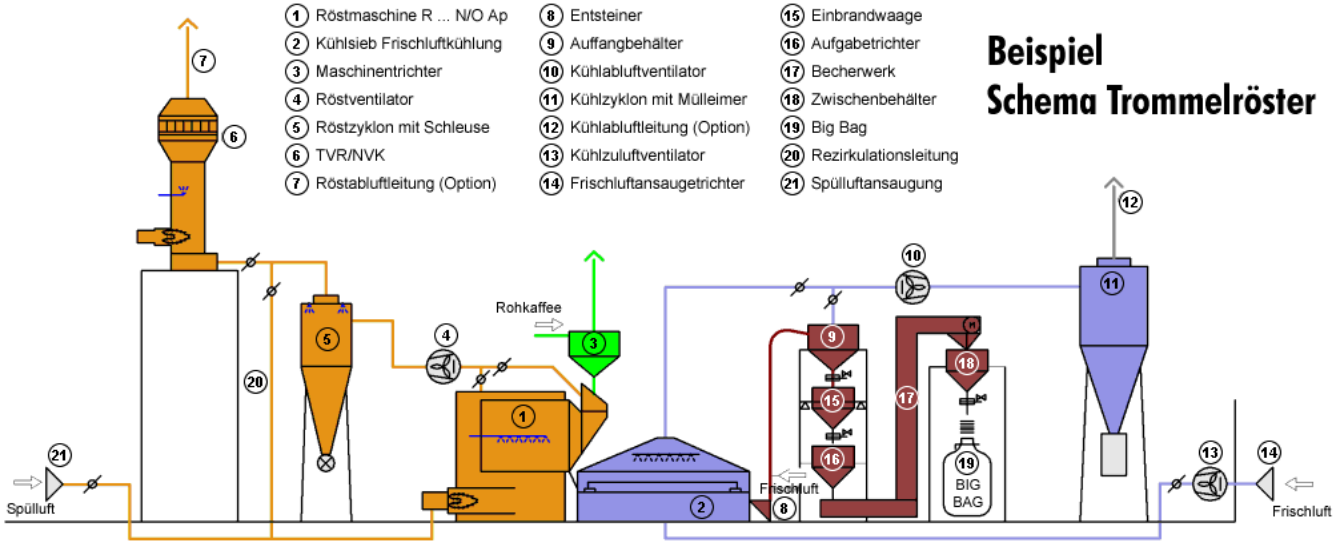
http://kmareka.com/coffee.htm



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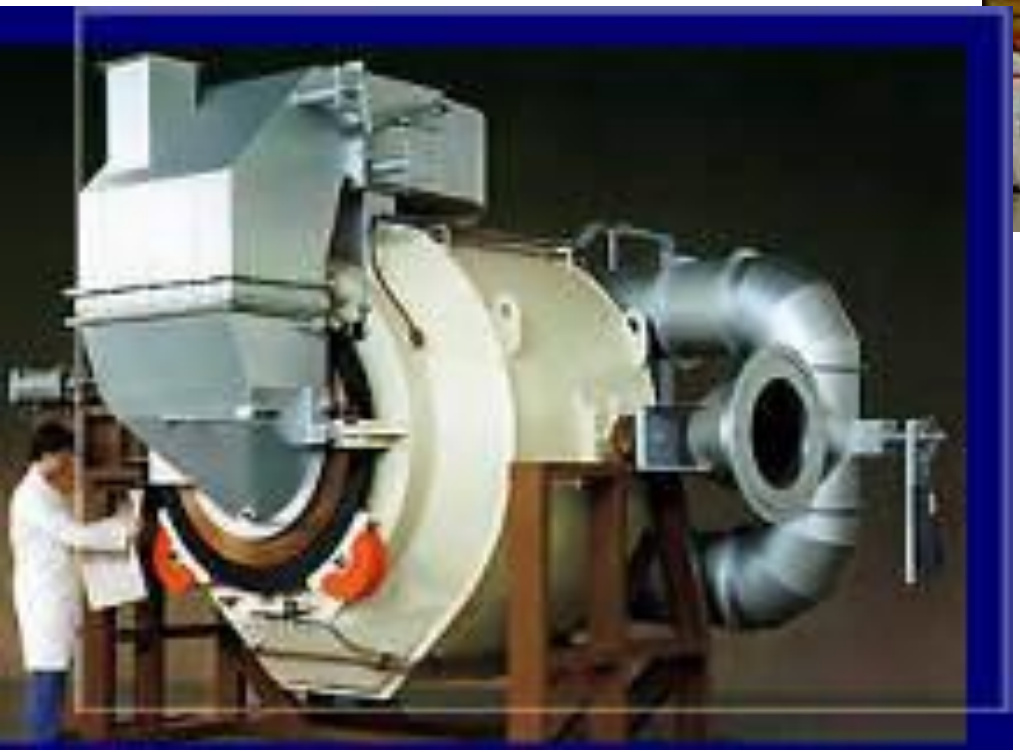
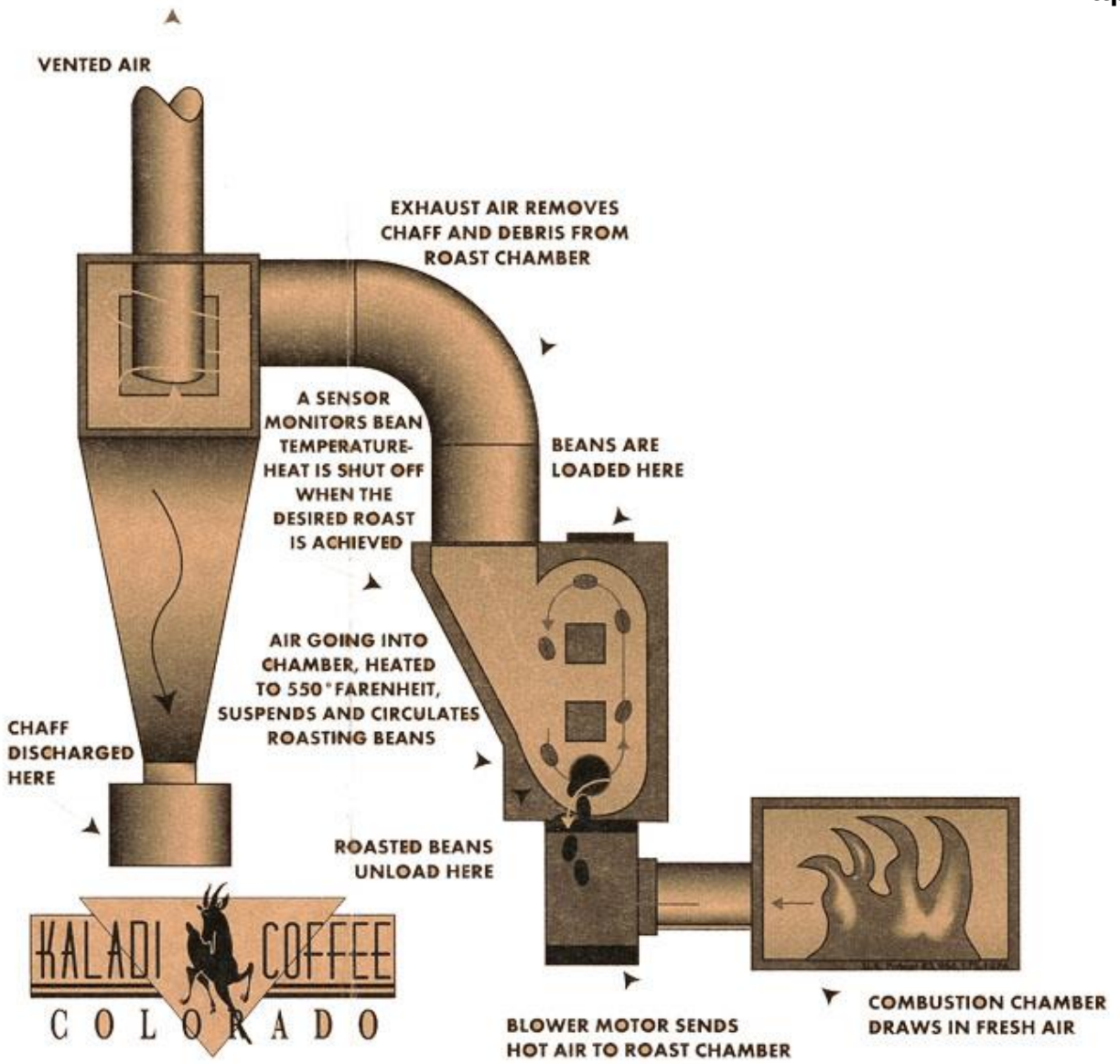
G 120
R 1500
RT 3000
RZ 4000
TT 1200

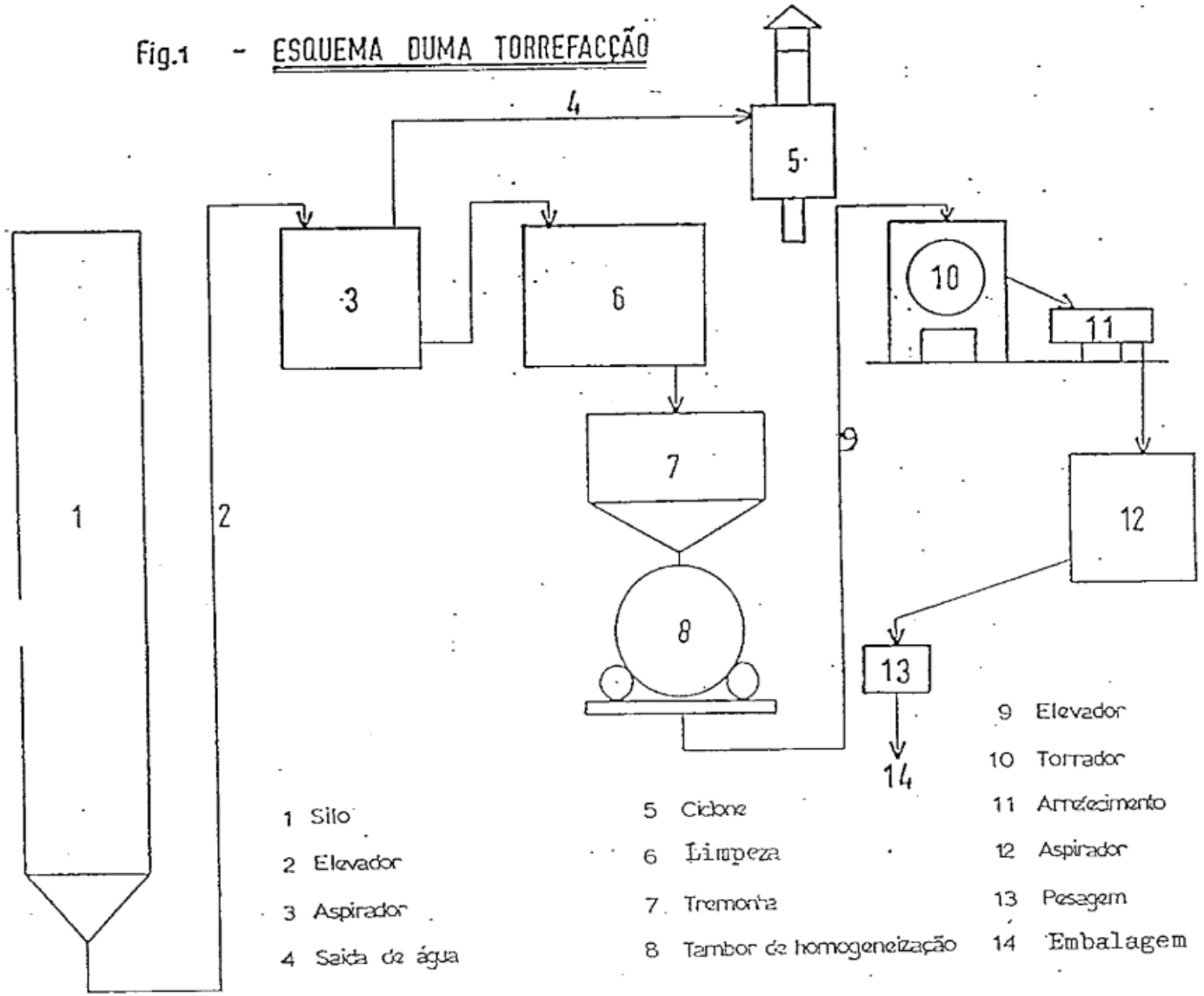


http://air-roasted-coffee.com/

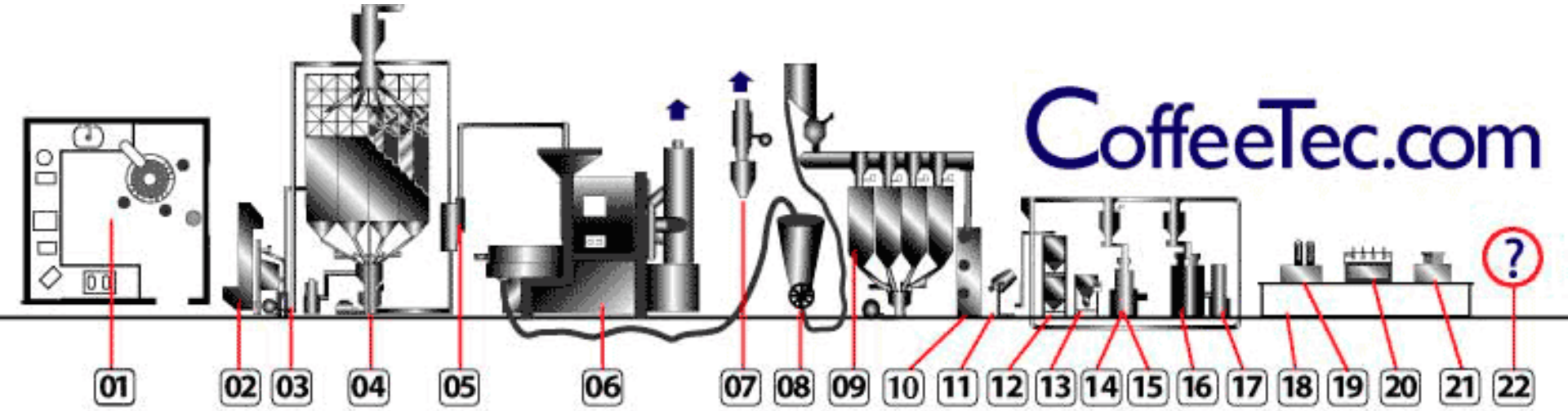


M. Helena Guimarães de Almeida/

Fig.1 - ESQUEMA DUMA TORREFACÇÃO



Produção de café torrado moído (exemplo)



000 - Used Equipment

00 - Antiques

01 - Cupping Lab

02 - Dockside

03 - Coffee Handling

04 - Green Silos

05 - Loaders

06 - Roasters

07 - Afterburner Options

08 - Stoner Conveyors

09 - Roasted Storage

10 - Grinders

11 - Mixers (Flavor)

12 - Ground Storage

13 - Net Weigh

14 - Labeling

15 - Sealers

16 - Form Fill Seal

17 - Packaging Line

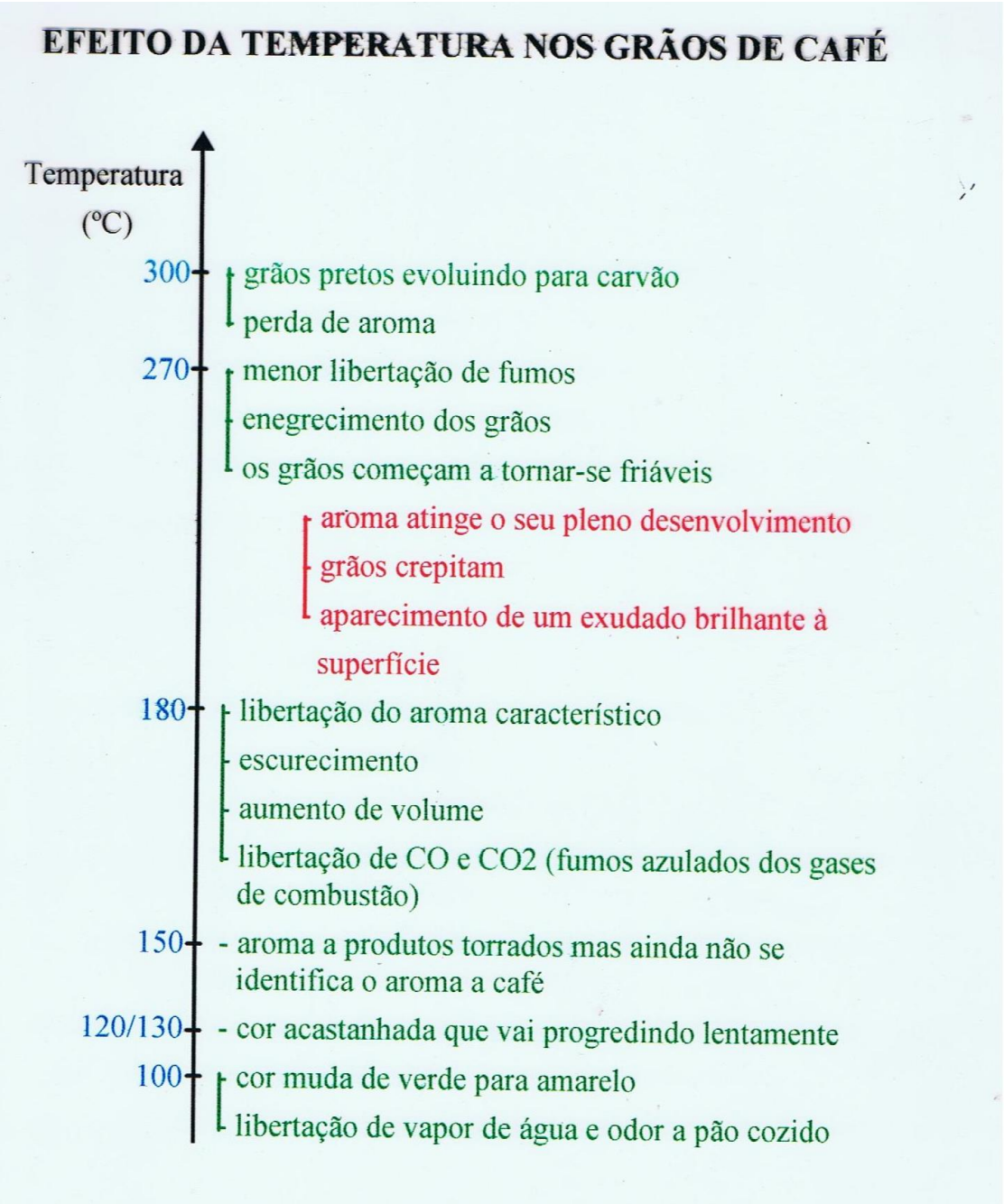
18 - Coffee House

19 - Brewers

20 - Espresso

21 - Maintenance

EFEITO DA TEMPERATURA NOS GRÃOS DE CAFÉ



The art of coffee roasting

The art of coffee roasting has made dramatic improvements in recent years. Roasting coffee changes the chemistry and physical characteristics of the green coffee bean. The beans shrink in weight depending on the roast profile. Typically a lighter roast is about 15% and a darker roast about 20% by weight. During the roasting the beans acquire the hue and aroma of fresh roasted coffee.

Coffee roasting is a chemical process by which aromatics, acids, and other flavour components are either created, balanced, or altered in a way that should augment the flavour, acidity, aftertaste and body of the coffee as desired by the roaster.

The first stage of roasting is endothermic (beans absorb heat), where the green beans are slowly dried to become a yellow colour and the beans begin to smell like toast or popcorn.

The second step, often called the first crack, occurs at approximately 205°C in which the bean increases in size, becomes a light brown colour, and experiences a weight loss of approximately 5 %. The corresponding Agtron number for this colour is between 95-90 (Davids, Roasting, 68).

As already stated our beans are not roasted further than this step as we believe this is were the optimum flavour is achieved

HOWEVER for reference, in the next step the temperature rises from 205 °C to approximately 220 °C, the colour changes from light brown to medium brown (Agtron # 60-50), and a weight loss of approximately 13% occurs (Davids, Roasting, 68). The resulting chemical process is called pyrolysis and is characterized by a change in the chemical composition of the bean as well as a release of CO2. The second step is followed by a short endothermic period, which is followed by another exothermic (beans release heat) step called the second crack. This second pyrolysis occurs between 225-230°C, and the roast colour is defined as medium-dark brown (Agtron #50-45) (Davids, Roasting, 68). The second pop is much quicker sounding and the beans take on an oily sheen. Roasting well into the second pop or darker is not favourable since volatile aromatic compounds are stripped off and oils on the outside of the bean are more easily oxidized.

Unfortunately there is a world wide trend, that has its base in the lower quality beans, to roast to a dark black, with a bright-shiny surface (this is actually oil), and a final temperature of 240°C. This type of roast is often preferred by some coffee-sellers since it masks poor blending, dirty machines, and stale coffee.

Every coffee will taste different at different roast degrees. A roast will bring out certain nuances that will lend themselves to amplification. Until there is a scientific way to predetermine proper roast degree it is necessary to experiment until you achieve the desired flavours.

M. Helena Guimarães de Almeida/ Tecnologia dos Produtos Tropiocais/Instituto

Transformações durante a torra

• Físicas (cor, aumento de volume, perda de massa, diminuição da densidade aparente, da resistência à pressão e da humidade).

• químicas (formação do *flavour*):

1) Reacções de Maillard (escurecimento não enzimático) entre compostos azotados, aminoácidos e proteínas bem como trigonelina, serotonina e hidratos de carbono, acidos hidroxílicos e fenóis.
2) Degradação de Strecker
3) Degradação de aminoácidos, particularmente, aminoácidos sulfurados, aminoácidos hdroxilados, e prolina.
4) Degradação da trigonelina.
5) Degradação de açúcares.
6) Degradação dos ácidos fenólicos, particularmente ácido quínico.
7) degradação ligeira dos lípidos.
8) Interacção entre produtos intermediários de decomposição

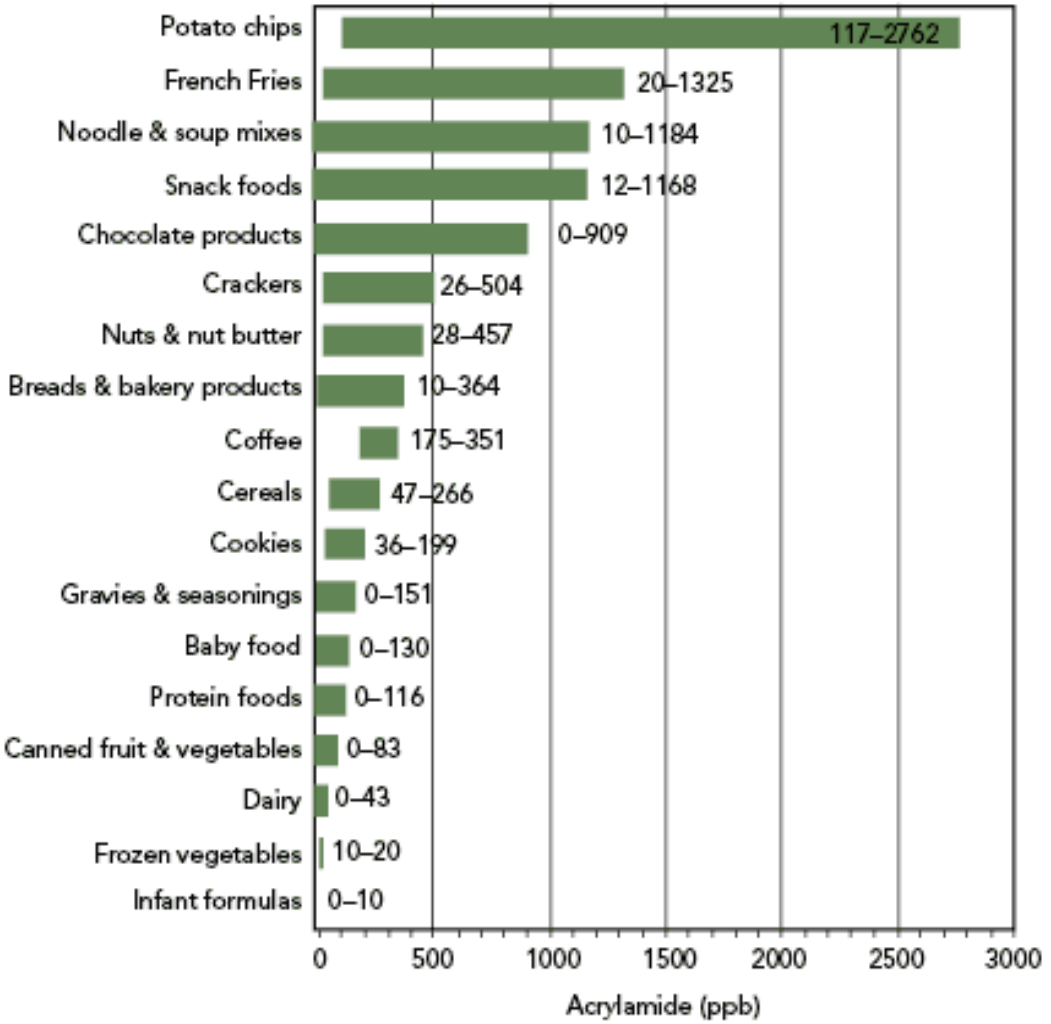
Os torrefactores americanos distinguem vários tipos de torra, conforme a perda de massa que indicamos a seguir.

- Light roast - torra clara
- Cinamnon roast - torra cor de canela - ± 12%
- Medium roast - torra média - ± 14%
- City roast - torra escura - ± 15 - 16%
- Fully city roast - torra um pouco mais escura - - ± 16 - 17%
- High roast - torra bastante escura - ± 17%
- French roast - torra francesa (grãos com aspecto oleoso) - ± 18%
- Italiam roast - torra italiana (carbonizada) - ± 20%

Figure 1

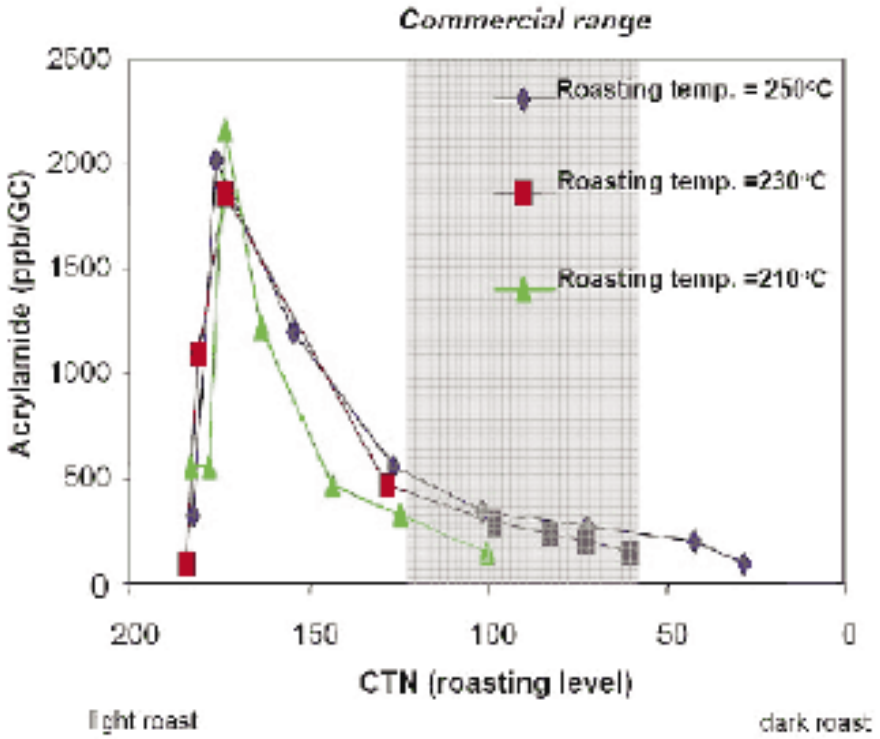
Acrylamide content in common food products.

Data from FDA/CFSAN, 2002.

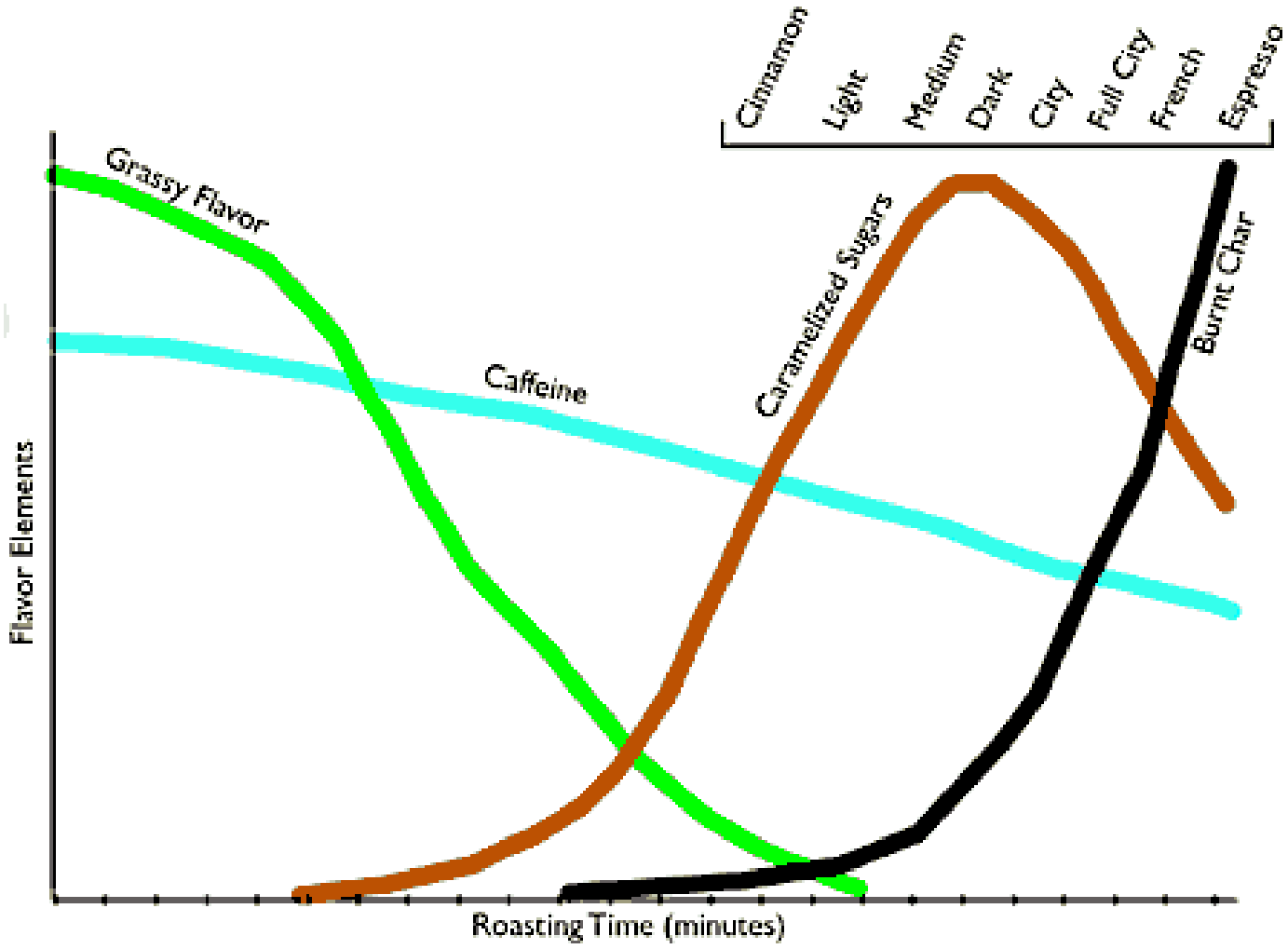


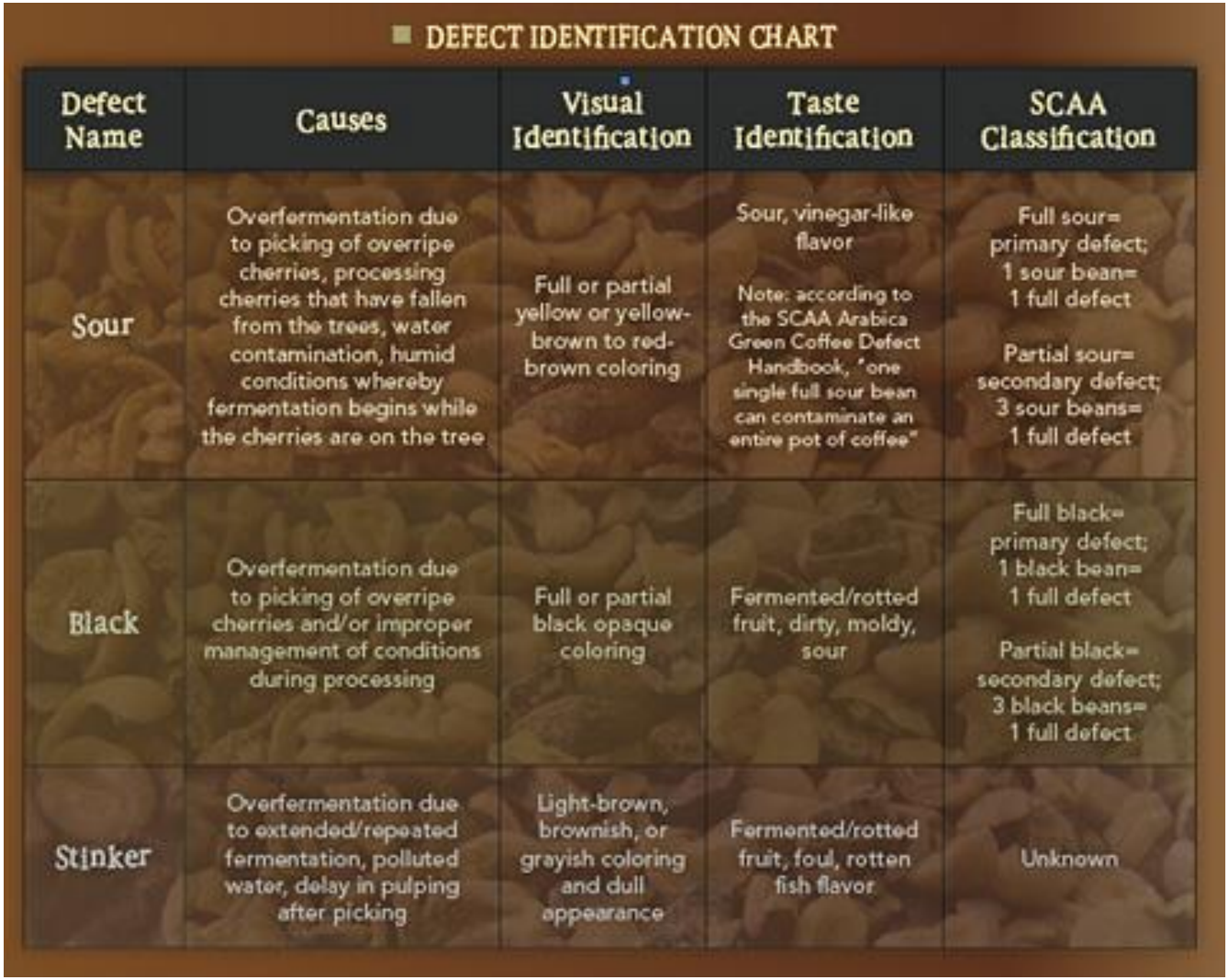
http://www.roastmagazine.com/backissues/janfeb2008/underthemicroscope.html

FIGURE 2
Formation of acrylamide during coffee roasting. (CTN = Color tile number)



http://www.roastmagazine.com/backissues/janfeb2008/underthemicroscope.html


Cinnamon
Light
Medium
Dark
City
Full City
French
Espresso
Grassy Flavor
Caffeine
Caramelized Sugars
Burnt Char
Flavor Elements
Roasting Time (minutes)



DEFECT IDENTIFICATION CHART

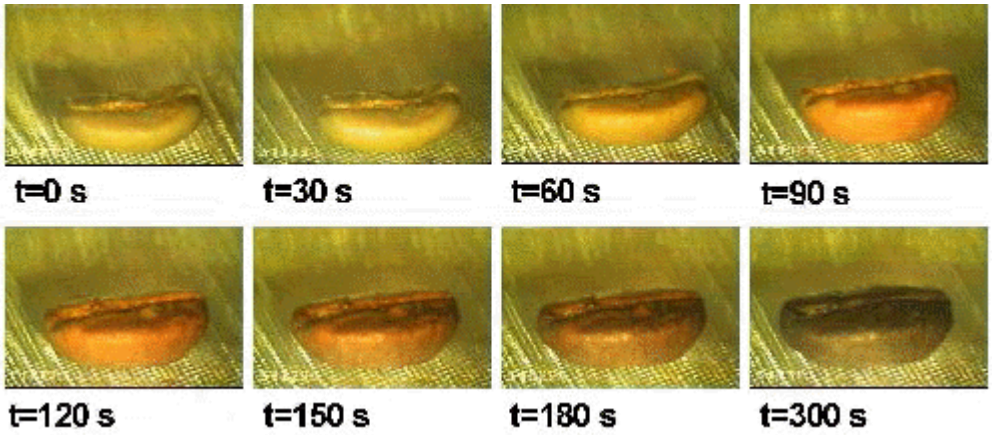
Defect Name	Causes	Visual Identification	Taste Identification	SCAA Classification
Sour	Overfermentation due to picking of overripe cherries, processing cherries that have fallen from the trees, water contamination, humid conditions whereby fermentation begins while the cherries are on the tree	Full or partial yellow or yellow-brown to red-brown coloring	Sour, vinegar-like flavor Note: according to the SCAA Arabica Green Coffee Defect Handbook, "one single full sour bean can contaminate an entire pot of coffee"	Full sour= primary defect; 1 sour bean= 1 full defect Partial sour= secondary defect; 3 sour beans= 1 full defect
Black	Overfermentation due to picking of overripe cherries and/or improper management of conditions during processing	Full or partial black opaque coloring	Fermented/rotted fruit, dirty, moldy, sour	Full black= primary defect; 1 black bean= 1 full defect Partial black= secondary defect; 3 black beans= 1 full defect
Stinker	Overfermentation due to extended/repeated fermentation, polluted water, delay in pulping after picking	Light-brown, brownish, or grayish coloring and dull appearance	Fermented/rotted fruit, foul, rotten fish flavor	Unknown

http://www.roastmagazine.com/currentissue/detectingdefects.html

Table 2. List of major coffee consuming countries in the world.

Country	Per capita, kg year-1	Roasting	Roasting and grinding	Soluble=instant
Finland	12.4	Light		
Sweden	11.45	Light		
Denmark	11.03	Medium		
Norway	9.71	Light		
Netherlands	7.7	Light		
Belgium/Luxembourg	7.26	Medium		
Germany	6.42	Light		
Switzerland	5.69	Medium		
France	5.67	Dark		
Austria	5.67	Dark		
USA	4.8	Light		
Canada	4.34	Light		
Italy	3.7	Dark		
Hungary	3.2	Dark		
Israel	2.58	Dark		
Cyprus	2.49	Dark		
Spain	2.46	Dark		
Yugoslavia	2.25	Dark		
Greece	2.23	Dark		
UK	2.19	Medium		
Australia	2.06	Medium		
New Zealand	1.78	Medium		
Japan	1.48	Light		
Portugal	1.25	Dark		
Ireland	1	Medium		
Hong Kong	0.61	Medium		

H. N. CHANAKYA1,* and A. A. P. DE ALWIS2
ENVIRONMENTAL ISSUES AND MANAGEMENT IN PRIMARY COFFEE PROCESSING
Trans IChemE, Part B, Process Safety and Environmental Protection, 2004, 82(B4): 291–300.
http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B8JGG-4RSJN5S-5-1&_cdi=43670&_user=10&_orig=search&_coverDate=07%2F31%2F2004&_sk=999179995&view=c&wchp=dGLzVtz-zSkWA&_valck=1&md5=7eae436dfebc68a01104c3c2b95358d4&ie=/sdarticle.pdf


t=0 s
t=30 s
t=60 s
t=90 s
t=120 s
t=150 s
t=180 s
t=300 s

http://www.sweetmarias.com/roastprocess-singlebean/roasting-allin1.jpg

Torrefacção leve

Torrefacção média

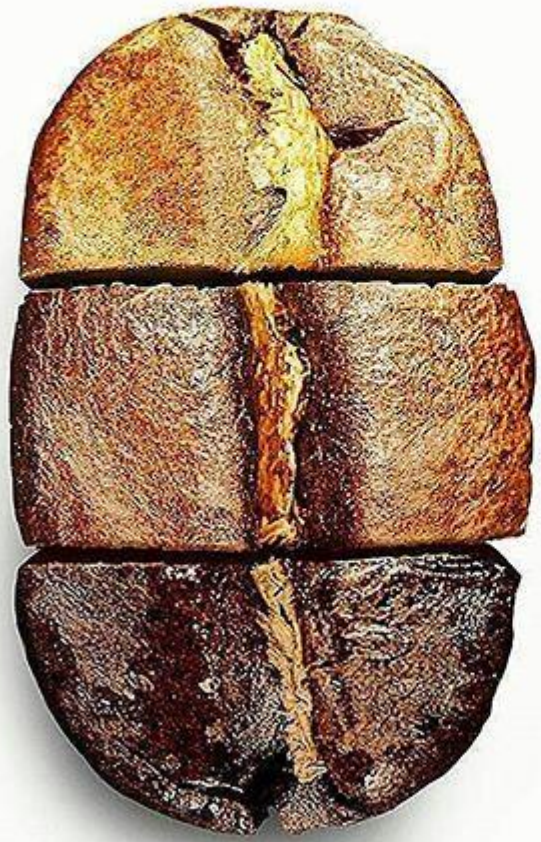
Torrefacção forte

Em cima: Uma faceta muito apreciável do café é o facto de existirem enormes diferenças, que apenas podem ser saboreadas quando cada café é tratado com a melhor torrefacção, mesmo que os seus atributos mais invulgares sejam, se não chocantes, pelo menos diferentes da gama normal de sabores do café.

M. Helena Guimarães de Almeida/ Tecnologia dos Produtos Tropiocais/Instituto

COFFEE ROAST

TYPE



LIGHT ROAST

- Roasting time 9 min
- Light brown in color
- High acidity
- Fruity smell

MEDIUM ROAST

- Roasting time 16 min
- Medium brown in color
- Balanced flavor & acidity
- Slightly sweet taste

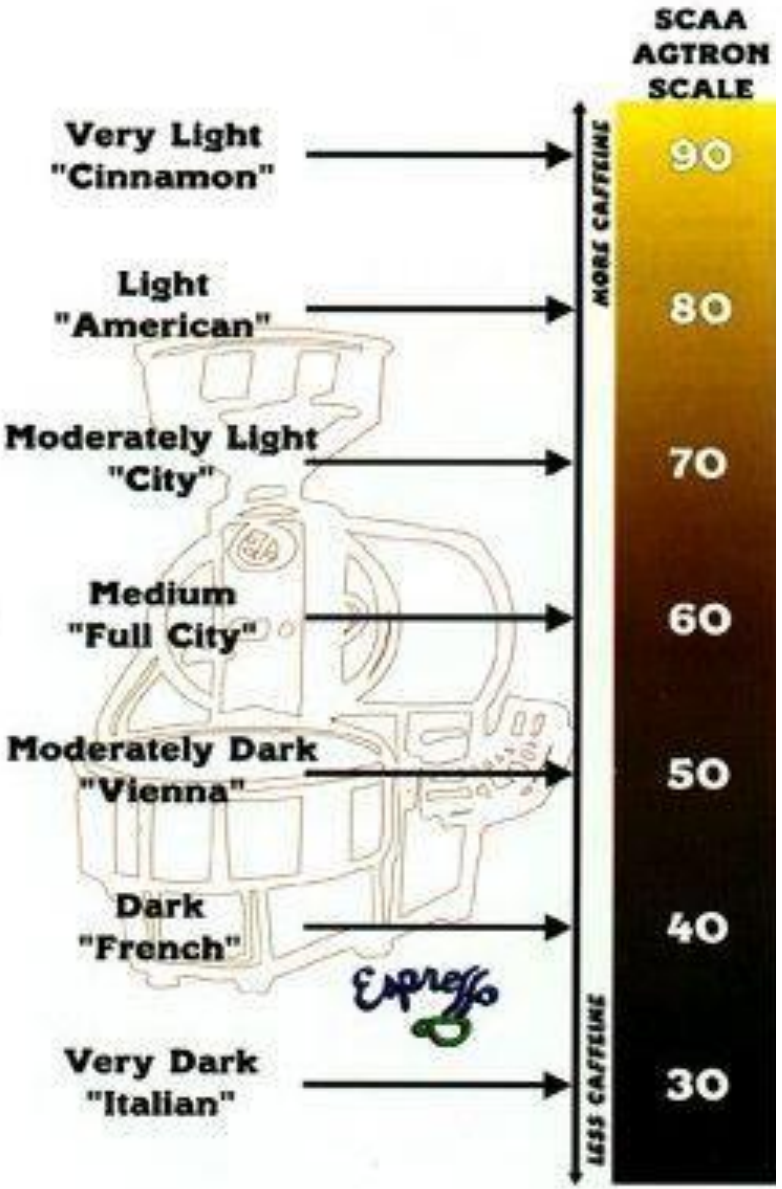
DARK ROAST

- Roasting time 30 min
- Rich, darker in color
- Oily surface
- Bitter, smoky taste

spazio_creativenolimit

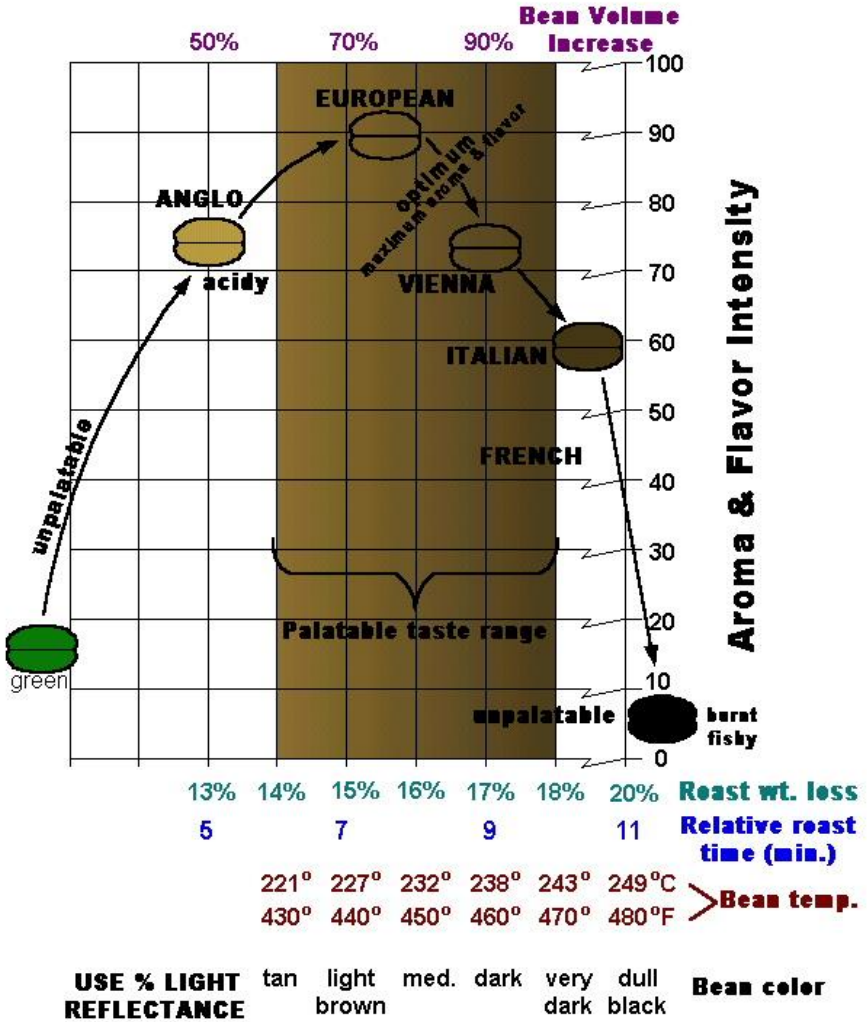
https://i.pinimg.com/originals/5b/1a/e2/5b1ae2cf985668a13717809a6ce9fbd6.jpg

http://www.sivetzcoffee.com/images/roastdegree1.jpg



Understanding Roasting of Coffee Beans
Degree of Roast vs Intensity of Aroma Development

BEAN END TEMPERATURE DETERMINES "Degree of Roast"



Horizontal Scale... **Degrees of Roast**

M. Helena Guimarães de Almeida

- Torração: Classificação por meio do Sistema Agtron / SCAA Roast Classification Color Disk ou Neuhaus (instrumento similar de detecção eletrônica de cores, colorímetro).

Ficha Técnica – Torração	No. Disco Agtron	Classificação
Não Recomendável	25	Muito escura
	35	Escura
Escura	45	Moderadamente Escura
Média	55	Média
	65	Média Clara
Clara	75	Moderadamente Clara
Não Recomendável	85	Clara
	95	Muito Clara

Em caso de utilização de colorímetro Neuhaus, a resposta deverá ser equivalente à classificação do Sistema Agtron, conforme tabela abaixo:

Agtron	25	35	45	55	65	75	85	95
Colorímetro	46 a 51	51 a 56	55 a 69	61 a 88	81 a 102	101 a 121	125 a 137	135 a 146

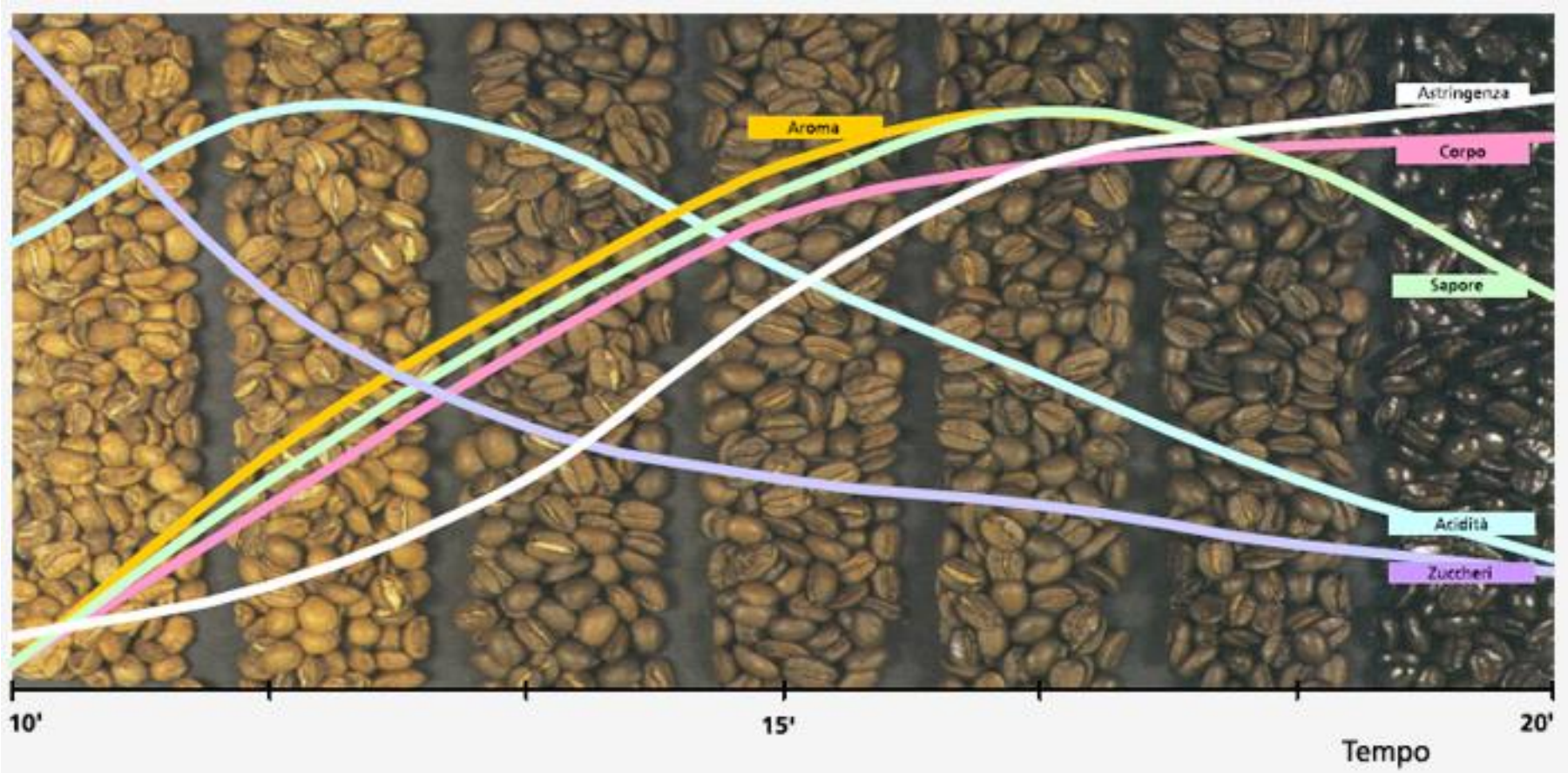
http://www.abic.com.br/gar_qualidade.html

Chart A. Roast Styles

Roast Style	Agtron Color	Description
Light	64–68	The first crack is completed. Some coffees can now be consumed, provided that the first crack occurred slowly. To accomplish this, the roaster operator must reduce the heat supply at least one minute before the first crack.
Medium Light	60–64	About one to two minutes after the finish of the first crack. Color of the beans is quite even. There is a minimum of darker roast spots on the beans. To accomplish this roast style, the roaster operator must reduce the heat supply just before the start of the first crack.
Medium	55–59	This is just before the start of the second crack. Beans are evenly roasted and start to expand more. At this point, the heat inside the beans almost becomes exothermic and you can notice that subtle aromas are released by the coffee.
Well-Done	50–54	At the beginning of the second pop and the heat inside the beans becomes exothermic.
Dark	44–49	The second crack is about 25 percent completed. There is now a rapid staccato of cracks occurring.
Very Dark	36–43	The second crack is at least 50 percent completed and oils start showing on the beans.
French	28–35	The second crack is complete; the beans develop more oils and swell to their maximum size.

NOTE: *I strongly recommend exploring the roast styles between Agtron 40 and 60. With these roast styles you will obtain more coffee flavor with complex and potentially sweet, refreshing attributes. Try to build your market niche with this lighter roasting style!*

http://www.roastmagazine.com/backissues/julyaug2006/blendingtherules.html



http://www.nuovasimonelli.it/it/sapevi-che/coffee-knowledge/know-how/la-tostatura

Table 1. Roast Color Impact on Cup Flavor

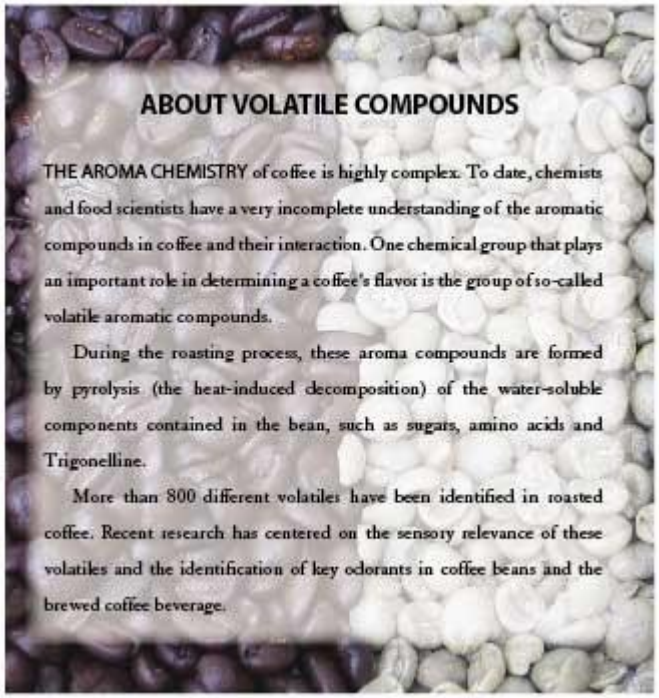
(From the presentation handout of the Coffee Blending Workshop presented by Victor Allen Mondry at the SCAA Conference in 2001)

SCAA Tile	Temperature	Roast	Weight Loss	Cup
75	420	Moderately light	15%	Bright, sharp
65	430	Light medium	16%	Milk chocolate
55	445	Medium	17%	Caramel, dark chocolate
45	460	Moderately dark	19%	Smoothly smoky
35	470	Dark	20%	Pungently smoky

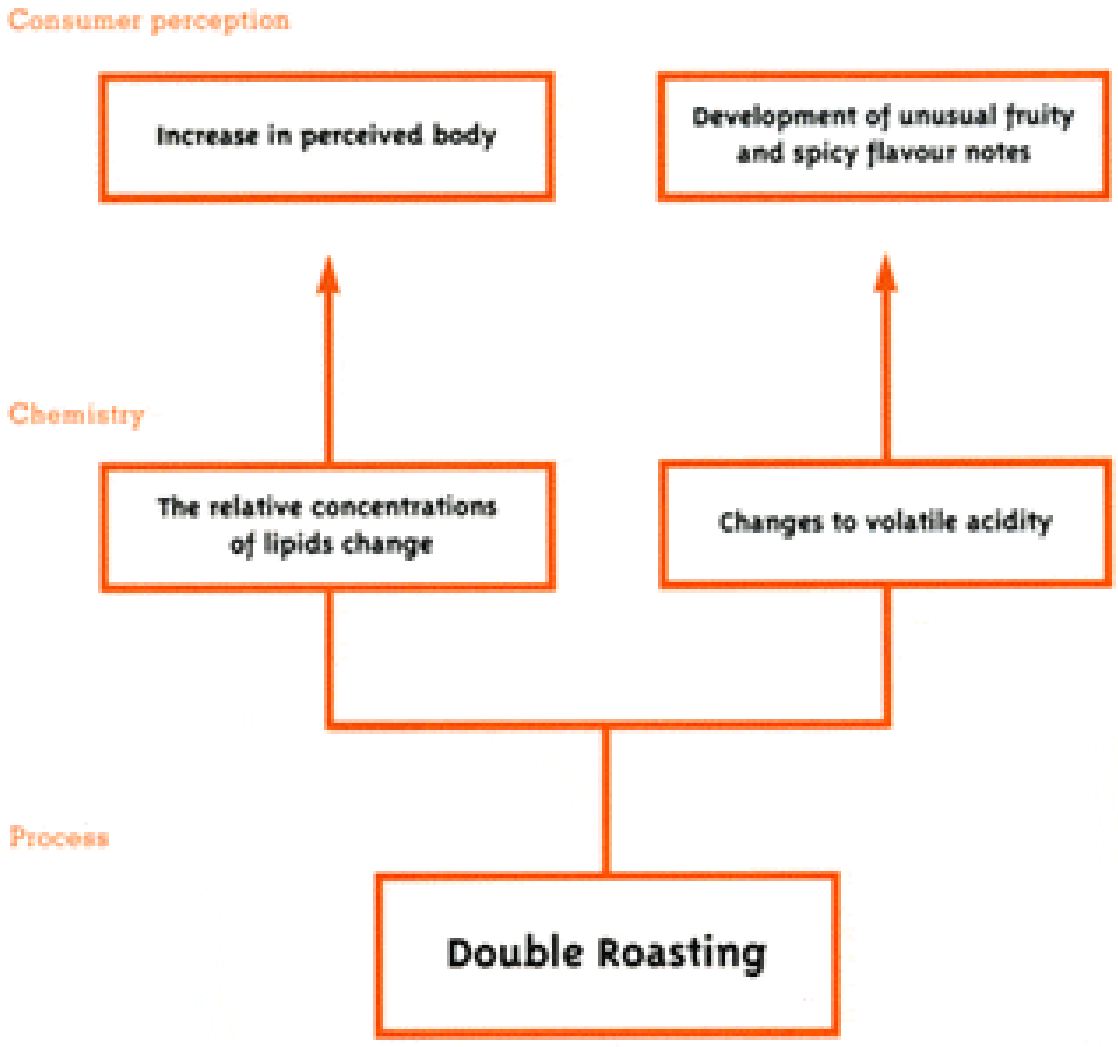
http://www.roastmagazine.com/

Table 2.
List of Volatile Compounds and Their Maximum Concentration During Roasting

Volatile Compound	Aroma Characteristics	Roasting Stage of Maximum Concentration
5-Methylfurfural	Light, fruity, floral	Light and medium
Furfural	Grassy, hay-like	Light and medium
Acetic acid	Adds snap	Medium
Furfuryl alcohol	Bitter and burnt	Dark
Pyridine	Disagreeable odor and sharpness	Dark
Cyclopentanone	Sweet, fruity, burnt sugar	Dark
Phenol	Smoky, spicy, clove-like and bitter	Dark



http://www.matthewalgie.com/find_out/lab-dealing.html



Culture plays an important part in the expectation of taste. Most cultures prefer a particular taste because it has become a tradition. The French dark roast their beans (about a 15), the Italians not as dark (about a 14). This is mainly because there is a belief that darker roasts decrease acidity. It does but it also decreases flavour, replacing delicate coffee flavours with an almost burnt toast taste. Most of Europe chooses the darker 13+ roasts. This may be related to the fact that although Europeans initially started drinking their coffees from the true source namely Africa, once the modified beans made it to Brazil, and the Robusta's were introduced in the 30's the only way flavour could be reached was to dark roast. We at Quaffee believe that these roasts are not desirable, and none of our roasts will ever go past 12, otherwise it is disposed of.

The art of coffee roasting

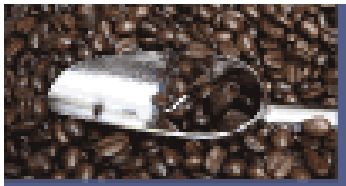
http://www.quaffee.co.za/pages/CoffeeProcess.aspx

LOTEAMENTO

ARÁBICA

ROBUSTA

LOTEAMENTO – exemplo



Beans for Blending

BRAZIL Choose a pulped natural type with full body, no musty notes and slight aftertaste of fermented fruit.

SUMATRA Select a Gayo or Mandheling region coffee with clean earthy notes, preferably double-picked.

PANAMA I recommend choosing a Volcan- or Santa Clara-grown Panama with medium to bright acidity and lingering sweetness.

GUATEMALA Find any SHB Guatemala with vibrant acidity and clean fruit notes (with lighter roast levels these attributes generally contribute to a piquant acidity; with darker roast degrees they develop attractive chocolate notes).

KENYA Source a stellar bean with multi-layered acidity and bright berry notes (these are most predominant in bourbon varieties).

ETHIOPIA For this exercise, I recommend a sun-dried Yirgacheffe or Sidamo grade 3 with well-ripened, dense fruit flavors.

NICARAGUA Prepare a Nueva Segovia or Jinotega with pleasant fruit notes and smooth mouthfeel.

COLOMBIA For this exercise, I prefer a Colombian that is of the caturra or typica variety with a bright acidity, full body and clean aftertaste. The coffee can have some fruit attributes, but if you use a Huila watch out for dominant fruity notes.

DECAF I prefer the Mountain Water Process Decaf or the Swiss Water Decaf, and I recommend trying Ethiopian decaf for the described blend.

http://www.roastmagazine.com/backissues/julyaug2006/blendingtherules.html

LOTEAMENTO - exemplo

Chart B. Blend Styles

Blend Style	Brazil	Sumatra	Panama	Guatemala	Kenya	Ethiopia	Nicaragua	Colombia	Decaf
Breakfast Blend		25% Dark		50% Very Dark				25% Medium	
House Blend			50% Medium	25% Dark	12.5% Very Dark	12.5% Dark			
Espresso Blend	25% Well-Done		35% Well-Done	20% Dark		20% Well-Done			
Pacific Blend			33% Medium				33% Well-Done	33% Medium	
Summer Blend			25% Medium		37.5% Med. Light		37.5% Medium		
French Roast Blend		50% French						50% Very Dark	
Fifty-Fifty Blend			25% Well-Done	25% Medium					50% Medium
Vienna Roast Blend		33% Dark		33% Very Dark			37.5% Well-Done		
Exotic Blend			25% Well-Done		25% Well-Done	50% Medium			
Light Roast Blend	25% Light					25% Light	50% Med. Light		

Types of Coffee Blends

BREAKFAST BLEND Usually has a slight punch (to wake up) but it should be very accessible so that the client will consume more than one cup. The described blend should be pleasantly refreshing without over-exposed acidity. Use a slightly darker roast for the Sumatra and Guatemala.

HOUSE BLEND In general, house blends should be designed for all-day enjoyment. The flavor must be accessible for most of your clients. Recently, I tasted Peet's house blend and I found that the flavor profile represented quite well the philosophy of Peet's, which advocates a deep, dark roasting style. Despite my personal preference for lighter roasting styles, I found this coffee to be well balanced with a pleasant chocolate-sweet flavor followed by a slight, refreshing aftertaste.

ESPRESSO BLEND The four components of this lighter-roasted espresso blend create a balanced flavor profile with sweet and chocolaty notes, followed by a slightly fruity finish (which is the influence of the sun-dried Ethiopia).

PACIFIC BLEND Contains three coffee types that can be found near the Pacific region. The blend is overall pleasant and can be a crowd-pleaser.

SUMMER BLEND Think of those long, warm summer days. This coffee blend will refresh your customer's palate, and hopefully make them crave a second cup. The lighter roast style accentuates the acidity.

FRENCH ROAST BLEND So you want the really dark roast? Here you go. Make sure that the Sumatra has a sweet flavor and that the bitter roast notes are not too dominant. Brace yourself for the bittersweet aftertaste.

FIFTY-FIFTY BLEND Creating a blend with 50 percent decaf and not telling your clients about the lower caffeine contents might be a smart trick. Some clients reported an increase in consumption after the introduction of this 50 percent decaf blend.

VIENNESE BLEND This blend combines a spicy and sweet flavor with a lingering aftertaste. The darker roasted Guatemala component creates the spice.

EXOTIC BLEND What can be more exotic than marrying two African coffees, one fully washed and one sun-dried natural? Look for the invigorating floral aroma with sweet, fruity flavor notes. If the fruit is over the top, then I recommend reducing the Ethiopia sun-dried component.

LIGHT ROAST BLEND Now we put your roasting skills to the test! Make sure that all coffees are roasted in a timeframe of 12 to 15 minutes.

http://www.roastmagazine.com/backissues/julyaug2006/blendingtherules.html

Experiment #2: More Results

Blend Number	Percentage of Robusta in Blend	Average Crema Volume	Average Persistence
1	0%	20.00 ml	1:26
2	15%	22.50 ml	2:03
3	25%	23.00 ml	1:54
4	50%	20.00 ml	1:43
5	75%	21.67 ml	1:31
6	100%	22.5 ml	1:11

Experiment #1: The Results

Blend Number	Percentage of Robusta in Blend	Average Crema Volume	Average Persistence
1	7.5%	21.67 ml	02:18
2	10%	20.00 ml	02:46
3	15%	19.33 ml	02:54
4	16%	20.00 ml	02:33
5	20%	23.33 ml	03:13

http://www.roastmagazine.com/backissues/janfeb2007/roastbusters.html

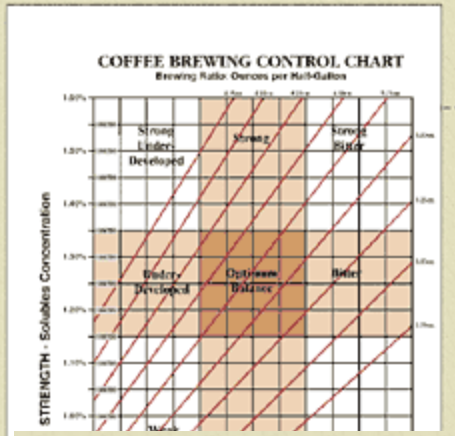
MOENDA

- Moagem: Classificação com base na percentagem de retenção em peneiras granulométricas nºs 12, 16, 20, 30 e fundo, em equipamento específico com agitação por 10 minutos e reostato na posição 5, ou similar.

Moagem	% de retenção			Tolerância p/ o % que passa da Peneira 30	
	Peneiras 12 e 16	Peneiras 20 e 30	Fundo	Mínimo	Máximo
Grossa	33%	55%	12%	9%	15%
Média	07%	73%	20%	16%	24%
Fina	00%	70%	30%	25%	40%

http://www.abic.com.br/gar_qualidade.html

The "Gold Cup" Standard Calculation



How do we brewed s

1. Use 64 oz. of v brewing
2. Subtract wate coffee ground
3. Use 3.75 oz. of to extract 20%
4. Brew to "Gold Standard that 20% of solids: *20% x 3.75 oz.*
5. Calculate brev

Uniform vs. Non-Uniform Coffee Grind

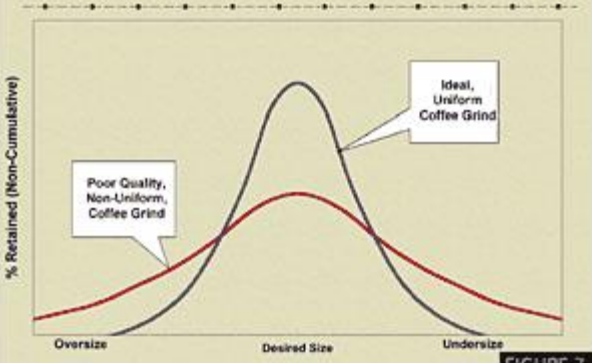
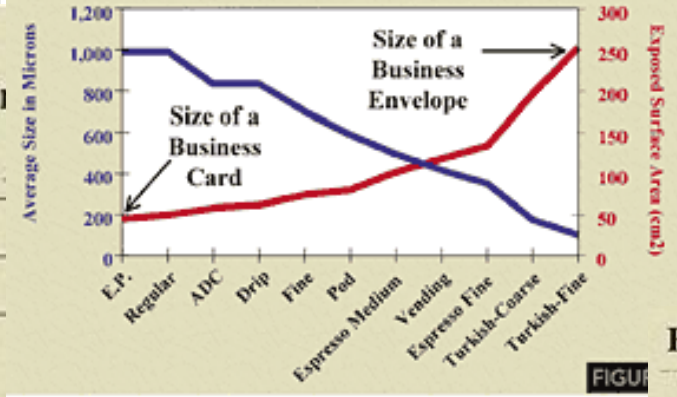


FIGURE 7

Brew Time vs. Particle Size

Time vs. Particle Size to ve 20% Extraction Rate

Particle Size vs. Exposed Surface Area (1 Bean = 3.4 cm^2 = Size of a Postage Stamp

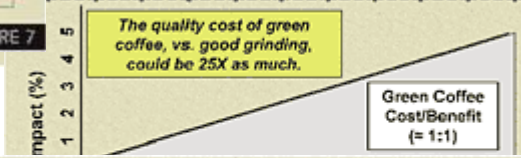


FIGURE

nd coffee.

IGURE 1

heoretical Green vs. Ground Coffee Cost/Benefit Ratios



Evaluation of the same grind (average particle size) but different uniformities

Particle Size/ Particle Uniformity:

3 – 670 um/0.97 _

1 – 645 um/1.35 _

5 – 734 um/0.89 _

4 – 720 um/1.16 _

2 – 650 um/ 3.0 _

(Good Quality Grind)

(Poor Quality Grind)

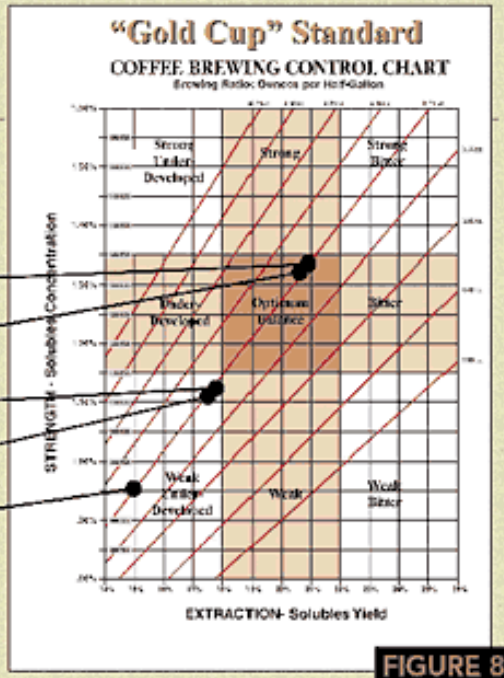
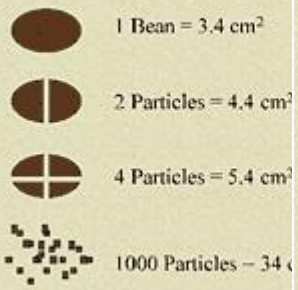
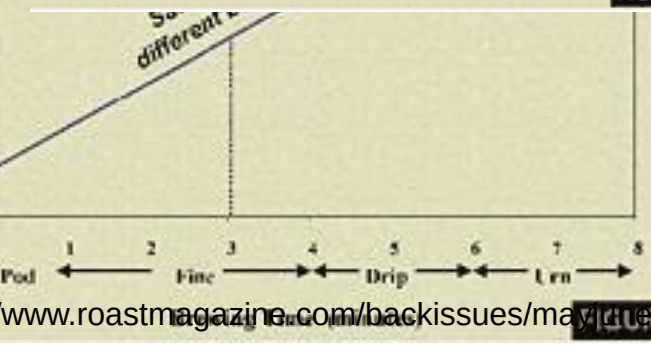


FIGURE 8

Effect of Grind Size o





/www.roastmagazine.com/backissues/may_june2007/gainingground.html

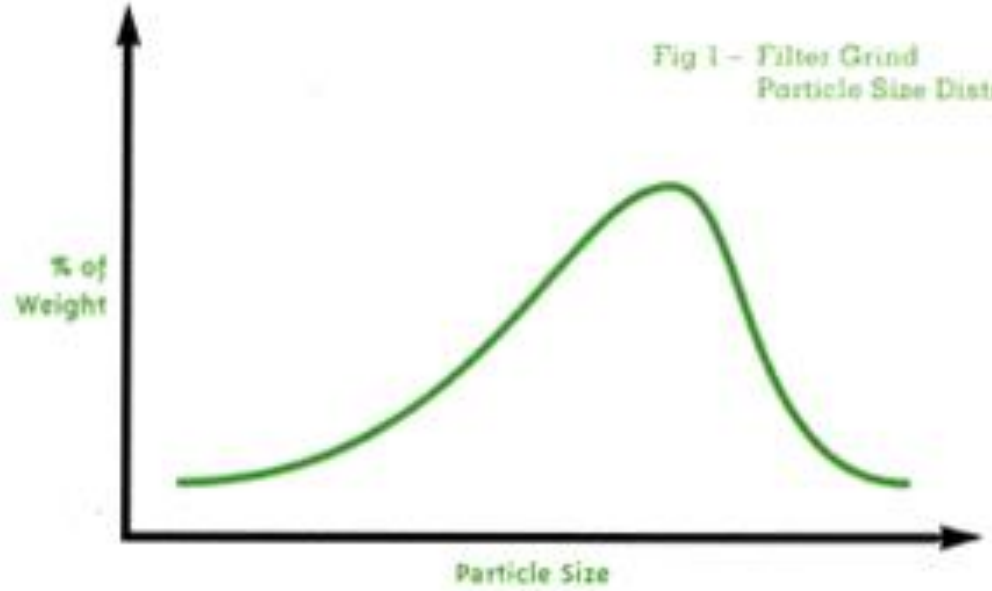


Fig 1 – Filter Grind
Particle Size Distribution

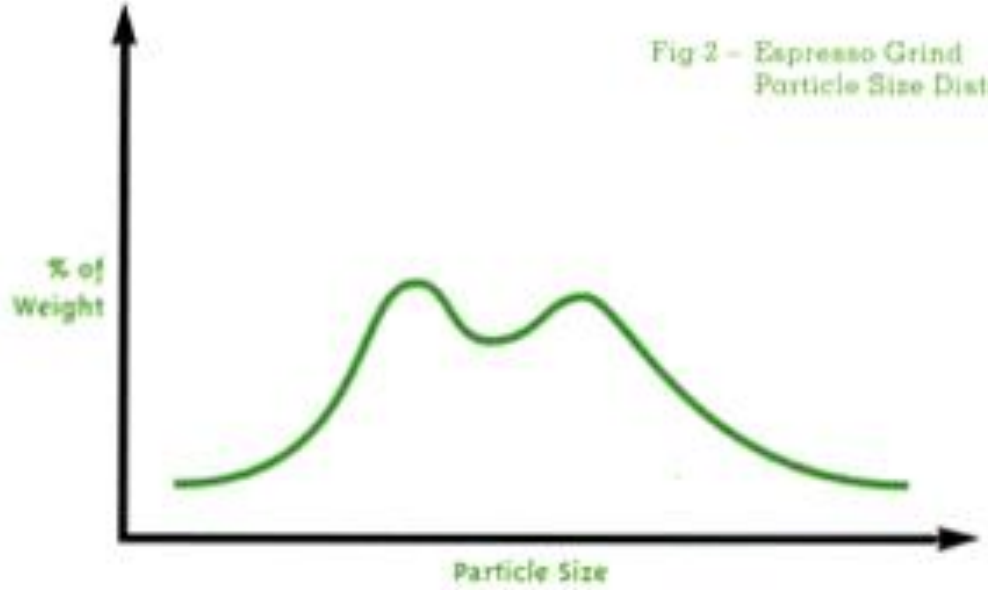
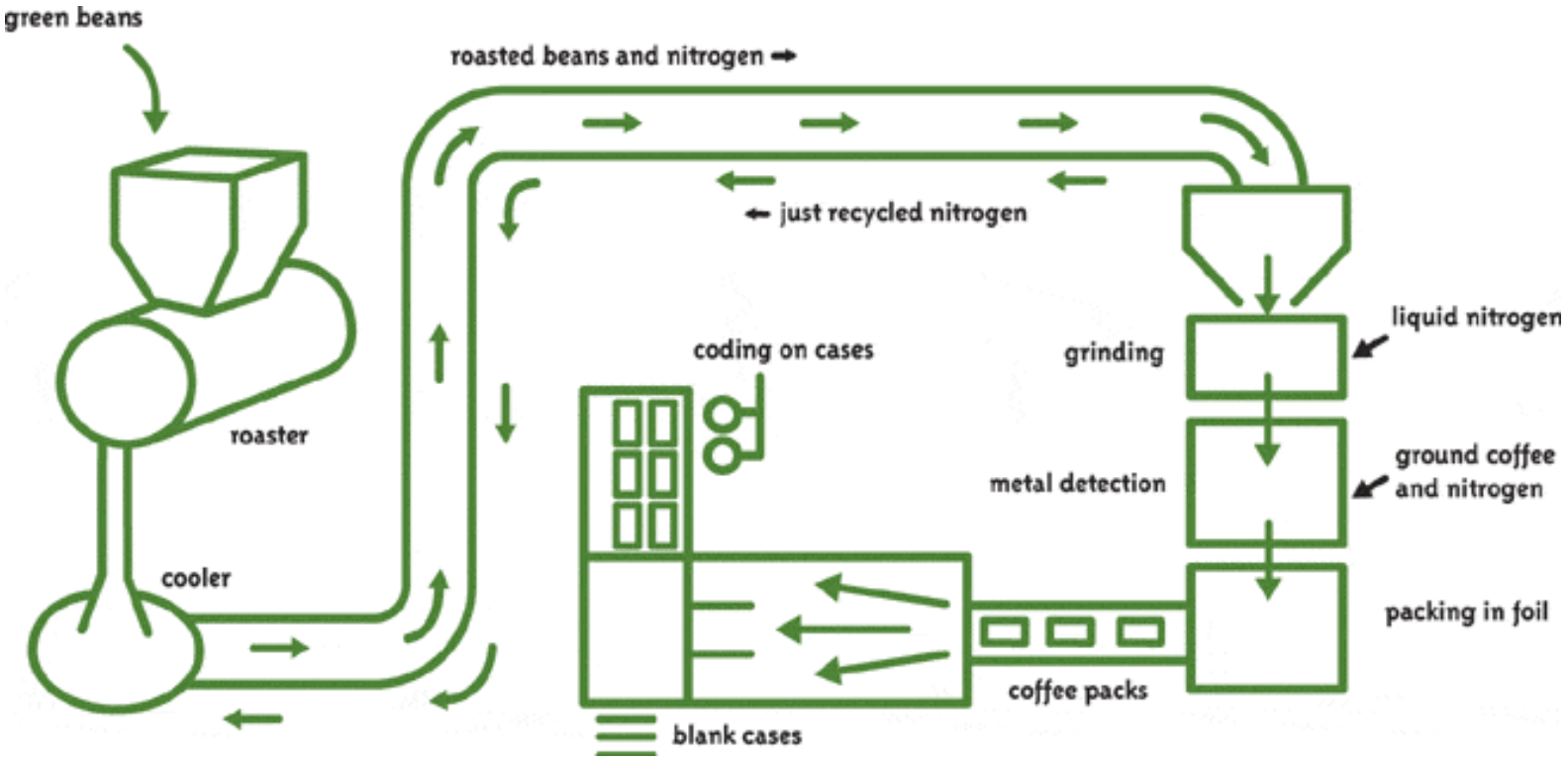


Fig 2 – Espresso Grind
Particle Size Distribution

http://www.matthewalgie.com/find_out/lab-dealing.html

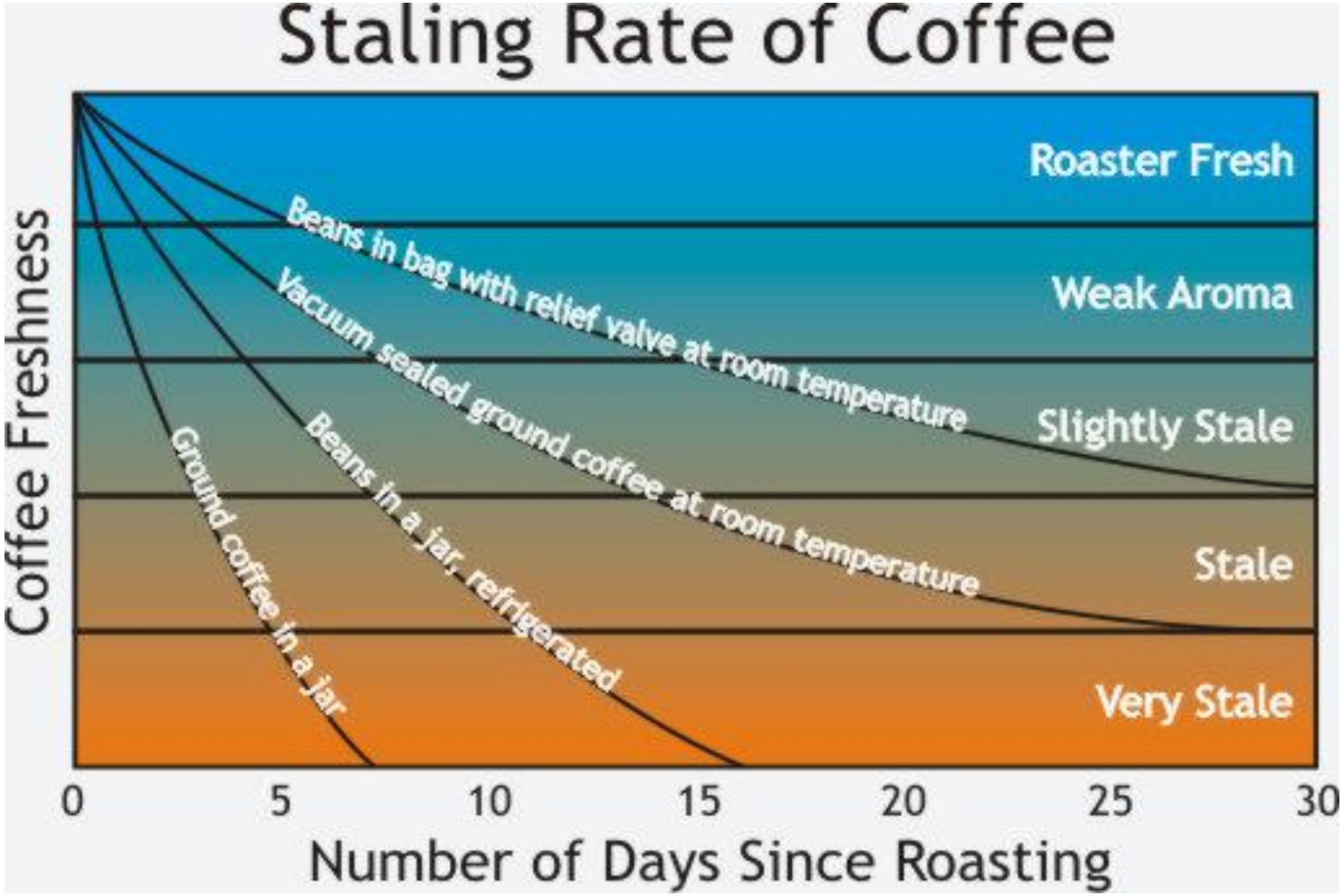


http://www.matthewalgie.com/find_out/lab-dealing.html

Site Muito interessante

Embalagem
Conservação

Conservação. Envelhecimento

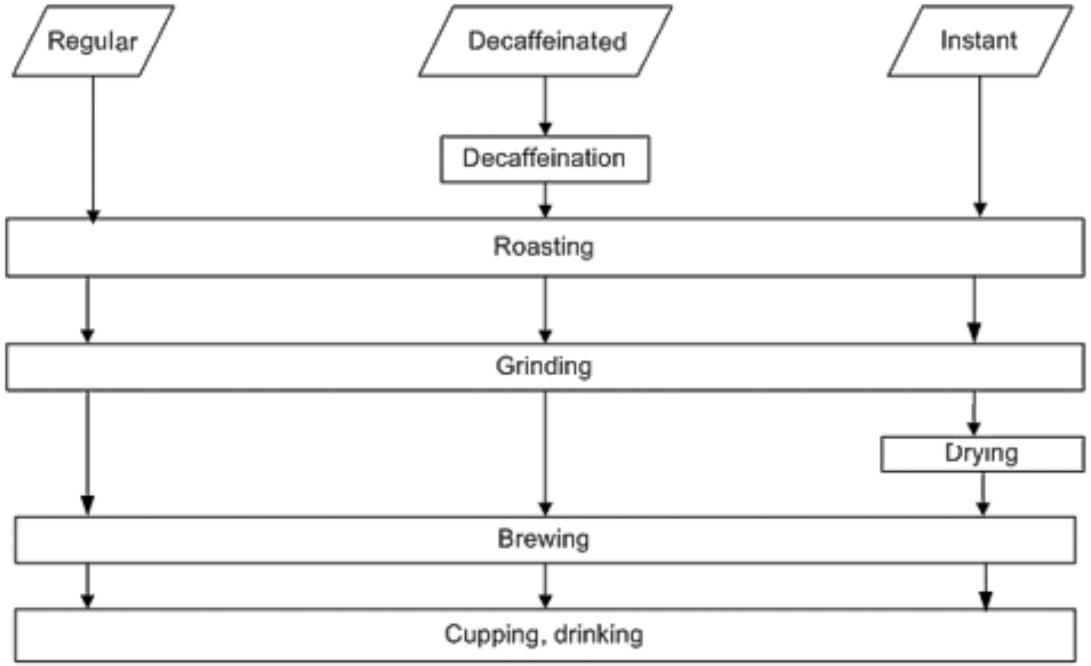


http://kafespress.com/index.php?page=coffeescience

https://www.sttark.com/blog/ultimate-guide-to-coffee-packaging

https://www.linkedin.com/pulse/what-good-coffee-packaging-logos-packaging-cy/

Beans to Brew



http://library.thinkquest.org/04oct/01639/light_en/process/index.html

Ver este site e outro

Café solúvel (instantâneo)

http://www.toonpool.com/cartoons/instant%20coffee_10180#img9

O café instantâneo é um dos alimentos de conveniência por excelência, inventado por um químico nipo-americano chamado Satori Kato em 1901.

Foi desenvolvido pela Nestlé em 1938 para o mercado comercial

em 1950 já havia várias marcas populares disponíveis.

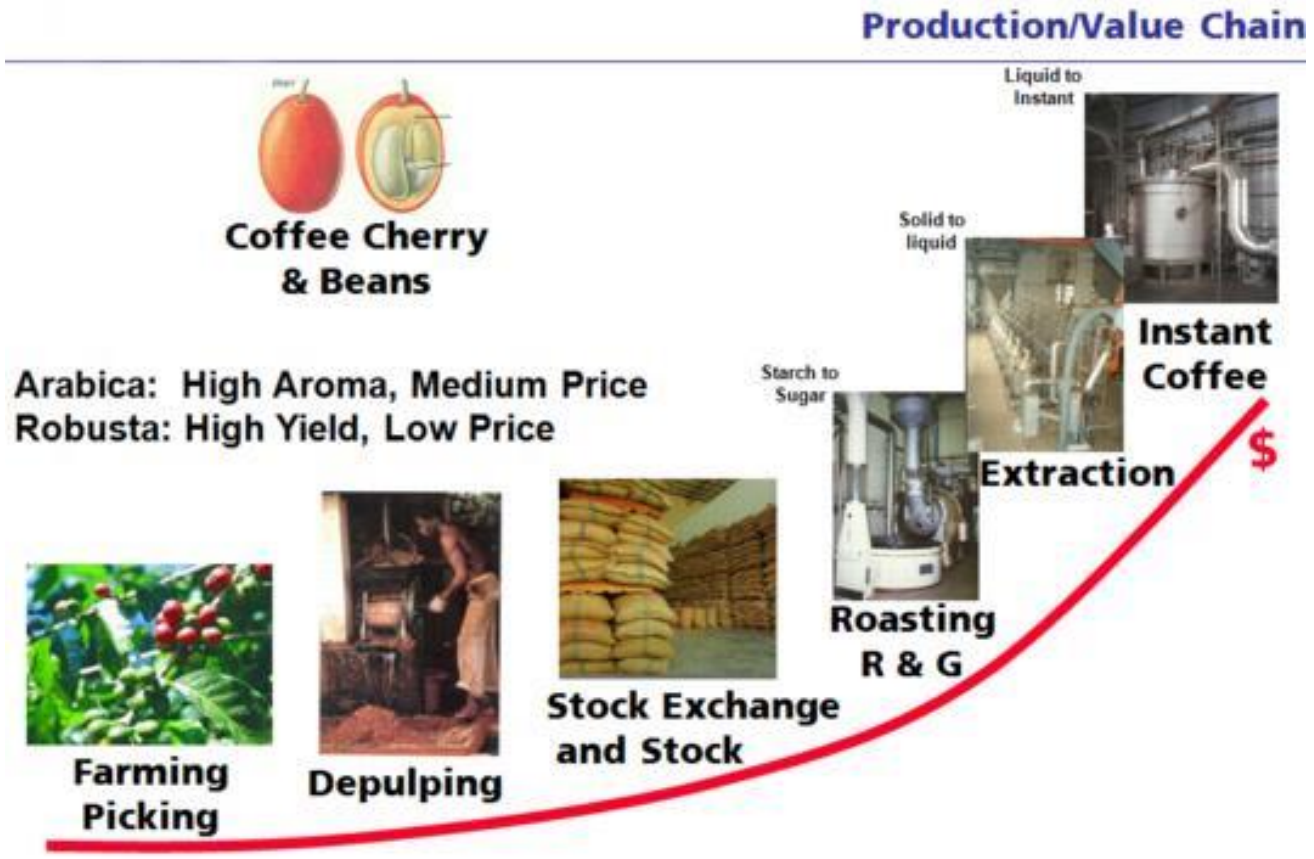
A popularidade do café solúvel aumentou ao longo dos anos e agora a sua posição no mercado é inatacável, com mais de 300 000 t.

Cada ano, mais de 7 milhões de toneladas de grãos de café verde são produzidos no mundo.

20% ou mais da produção mundial de café em grão é transformado em produtos de café instantâneo de alto valor acrescentado, tais como:

- concentrado líquido de café
- Café atomizado
- Café aglomerado
- café liofilizado

http://www.niro.com/niro/cmsdoc.nsf/webdoc/webb7nqh4p



http://www.niro.com/niro/cmsdoc.nsf/webdoc/ndkk5hvjqc

Instant (or soluble) coffee has been widely used for decades because of its convenience. During the height of its popularity in the 1970s, nearly a third of the roasted coffee imported into the United States was converted into an instant product, resulting in annual sales of more than 200 million pounds. Today, about 15% of the coffee consumed in the United States is prepared by mixing instant granules with hot water, either at home, in offices, or in vending machines. Furthermore, development of good quality instant products has helped popularize coffee in cultures that historically drank tea.

Since its invention, researchers have sought to improve instant coffee in a variety of ways. For example, some of the early powdered versions did not dissolve easily in water, leaving clumps of damp powder floating in the cup. Coffee aroma dissipates easily, and manufacturers have tried to develop treatments that will make a jar of instant coffee smell like freshly ground coffee when it is opened. More modern manufacturing processes make instant coffee granules that look more like ground coffee. Finally, a major goal has been to produce an instant coffee that tastes as much as possible like the freshly brewed beverage.

The primary advantage of instant coffee is that it allows the customer to make coffee without any equipment other than a cup and stirrer, as quickly as he or she can heat water. Market researchers have also found that consumers like making coffee without having to discard any damp grounds. Some coffee drinkers have become so used to drinking instant coffee that at least one manufacturer found in taste tests that their target audience did not even know what fresh-brewed coffee tastes like.

History

The desire to make coffee instantly by simply mixing a liquid or dry concentrate with hot water goes back hundreds of years. The earliest documented version of instant coffee was developed in Britain in 1771. The first American product was developed in 1853, and an experimental version (in cake form) was field tested during the Civil War. In 1901, the first successful technique for manufacturing a stable powdered product was invented in Japan by Sartori Kato, who used a process he had developed for making instant tea. Five years later, George Constant Washington, a British chemist living in Guatemala, developed the firqt commercially successful process for making instant coffee.

Washington's invention, marketed as "Red E Coffee," dominated the instant coffee market in the United States for 30 years, beginning around 1910. During the 1930s, the Brazilian coffee industry encouraged research on instant coffee as a way of preserving their excess coffee production. The Nestlé company worked on this effort and began manufacturing Nescafé in 1938, using a process of co-drying coffee extract along with an equal amount of soluble carbohydrate. Instant coffee was enormously popular with American soldiers during World War II; one year, the entire production from the U.S. Nescafé plant (in excess of one million cases) went solely to the military.

By 1950, Borden researchers had devised methods for making pure coffee extract without the additional carbohydrate component. This improvement boosted instant coffee use from one out of every 16 cups of coffee consumed domestically in 1946 to one out of every four cups in 1954. In 1963, Maxwell House began marketing freeze-dried granules, which reconstituted into a beverage that tasted more like freshly brewed coffee. During the next five years, all of the major manufacturers introduced freeze-dried versions, and by the mid-1980s, 40% of the instant coffee used in the United States was freeze dried.

Read more: How instant coffee is made - manufacture, making, history, used, processing, components, steps, product, industry, History, Raw Materials, The Manufacturing Process, Byproducts/Waste, The Future http://www.madehow.com/Volume-3/Instant-Coffee.html#ixzz1ZkUmAQZD

Café solúvel

Para a produção de café solúvel o café verde passa por todas as etapas até agora descritas, até à moenda. Seguem-se posteriormente as seguintes:

Extração

Tratamento do Extrato

- **Filtração das particulas em suspensão existentes no liquido preparado**

Concentração

- **Eliminação de água (objectivo: facilitar os processos seguintes e melhorar a fixação de aromas)**
- **Dois métodos: Evaporação e a frio**

Secagem

- **Objectivo: Eliminação de água até valores de humidade que não excedam os 2-5%**
- **Dois métodos: *Spray dried* e *freeze dried***

Embalagem

- **Impermeável à água**
- **Utiliza-se vidro combinado com películas de alumínio ou estanho, coladas na superfície dos frascos**

The Manufacturing Process

Extraction

1 The manufacture of instant coffee begins with brewing coffee in highly efficient extraction equipment. Softened water is passed through a series of five to eight columns of ground coffee beans. The water first passes through several "hot" cells (284-356°F, or 140-180°C), at least some of which operate at higher-than-atmospheric pressure, for extraction of difficult components like carbohydrates. It then passes through two or more "cold" cells (about 212°F, or 100°C) for extraction of the more flavorful elements. The extract is passed through a heat exchanger to cool it to about 40°F (5°C). By the end of this cycle, the coffee extract contains 20-30% solids.

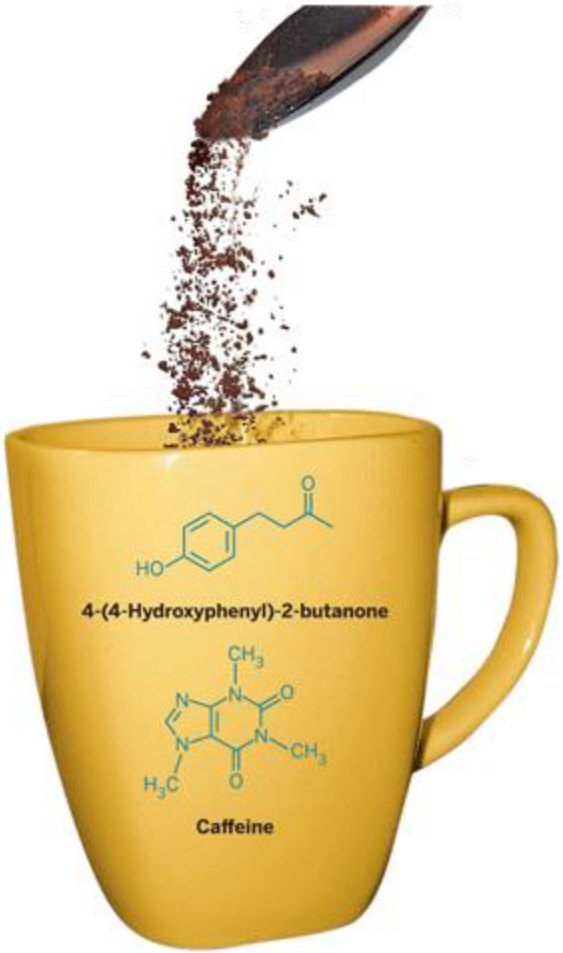
Filtration and concentration

2 After a filtering step, the brewed coffee is treated in one of several ways to increase its concentration. The goal is to create an extract that is about 40% solids. In some cases, the liquid is processed in a centrifuge to separate out the lighter water from the heavier coffee extract. Another technique is to remove water by evaporation before cooling the hot, brewed extract. A third alternative is to cool the extract enough to freeze water, and then mechanically separate the ice crystals from the coffee concentrate.

Recovery of aromatic volatiles

3 Part of the enjoyment of making and drinking coffee is smelling the aroma. During the several steps of the manufacturing process, volatile aromatic elements are lost; they must be returned in a later step to produce an attractive instant coffee product. Aromatics can be recovered during several stages of the manufacturing process. For instance, gases released during the roasting and/or grinding processes can be collected. Ground, roasted coffee can be heated to release additional aromatic gases. Passing steam or appropriate solvents through a bed of ground, roasted coffee can strip and capture aromatic components. Aromatic oils can be expressed from spent coffee grounds by exerting pressure of at least 2,000 lb per sq in (14,000 kPa). Gases can also be distilled from coffee extract after the brewing process is complete.

4 To preserve as much of the aroma and flavor as possible, oxygen is removed from the coffee extract. This is accomplished by foaming other gases, such as carbon dioxide or nitrogen, through the liquid before it enters the dehydration phase of the manufacturing process.



COFFEE IS ONE of the world's favorite beverages. It is definitely my liquid of choice, with all the invigorating caffeine, great taste, and wonderful-smelling volatile compounds such as 4-(4-hydroxyphenyl)-2-butanone, which gives coffee a sweet, fruity aroma. Organic, fair-trade whole-bean coffee is my preference, but those with less patience may desire long-lasting, easy-to-prepare "instant" soluble formulations.

The Japanese were the first to produce a stable instant coffee product in the early 1900s. During World War II, instant coffee gained fame among American soldiers after Nestlé marketed its Nescafé brand.

The instant beverage was updated in 1963, when Kraft introduced its Maxwell House freeze-dried instant coffee, which the company claimed tastes more similar to fresh-brewed coffee than other instant coffee products. Within a few years, all major manufacturers had freeze-dried coffee products on the market.

Taste and smell aside, most people drink coffee in all of its incarnations for that energizing alkaloid compound???caffeine. According to the National Nutrient Database for Standard Reference, instant coffee has about two-thirds the caffeine content of fresh-brewed coffee. More precisely, 8 oz of freshly brewed coffee contains 95 mg of caffeine, whereas the same amount of instant coffee has only 62 mg of caffeine.

But the caffeine content of coffee depends on many factors, including coffee bean species, bean ripeness, and the roasting and brewing processes. Thus, citations of caffeine content in different coffee beverages are reported with exceedingly wide ranges, and the database figures are more a rule of thumb than law.

All instant coffee production involves roasting coffee beans and then brewing them in hot water. Before the brew can be further processed into instant coffee, oxygen and insoluble particles such as coffee grounds must be removed. After this, the brew is dried by one of two methods to yield instant coffee.

One common way to desiccate the brew is through spray-drying: The coffee is sprayed through a nozzle to produce tiny 300-µm-sized droplets that fall through drying towers until they reach the base as a parched powder. The drying towers are kept at high pressures and temperatures near 270 ºC. The fine coffee powder may be rewetted to produce larger granules that are dried and finally packaged.

In the freeze-drying process, the brewed coffee is first frozen and then crushed to obtain the desired granule size. Standard & Alternative Products (SAAP), which produces instant coffee products, aims for granules of about 3 mm in diameter, for example. Granules that are too large or small are melted and refrozen. Frozen granules of the proper size are placed in low-pressure drying chambers at –50 ºC, and the water is removed by sublimation as the drying chamber warms.

Both processes run the risk of losing compounds that contribute to the desirability of the drink. For instance, caffeine sublimates at 180 °C at atmospheric pressure, so the high temperatures in spray-drying chambers may affect instant coffee's caffeine content and the content of organic compounds that provide taste and aroma. Whichever process is used, the final product is often packaged under carbon dioxide or nitrogen because the presence of oxygen will cause further loss of aroma and flavor.

ALL THIS PROCESSING means instant coffee contains little oxygen and has a water content of only 1 to 4%???much lower than microbes need to grow???allowing the product to stay on the shelf for more than two years without spoiling.

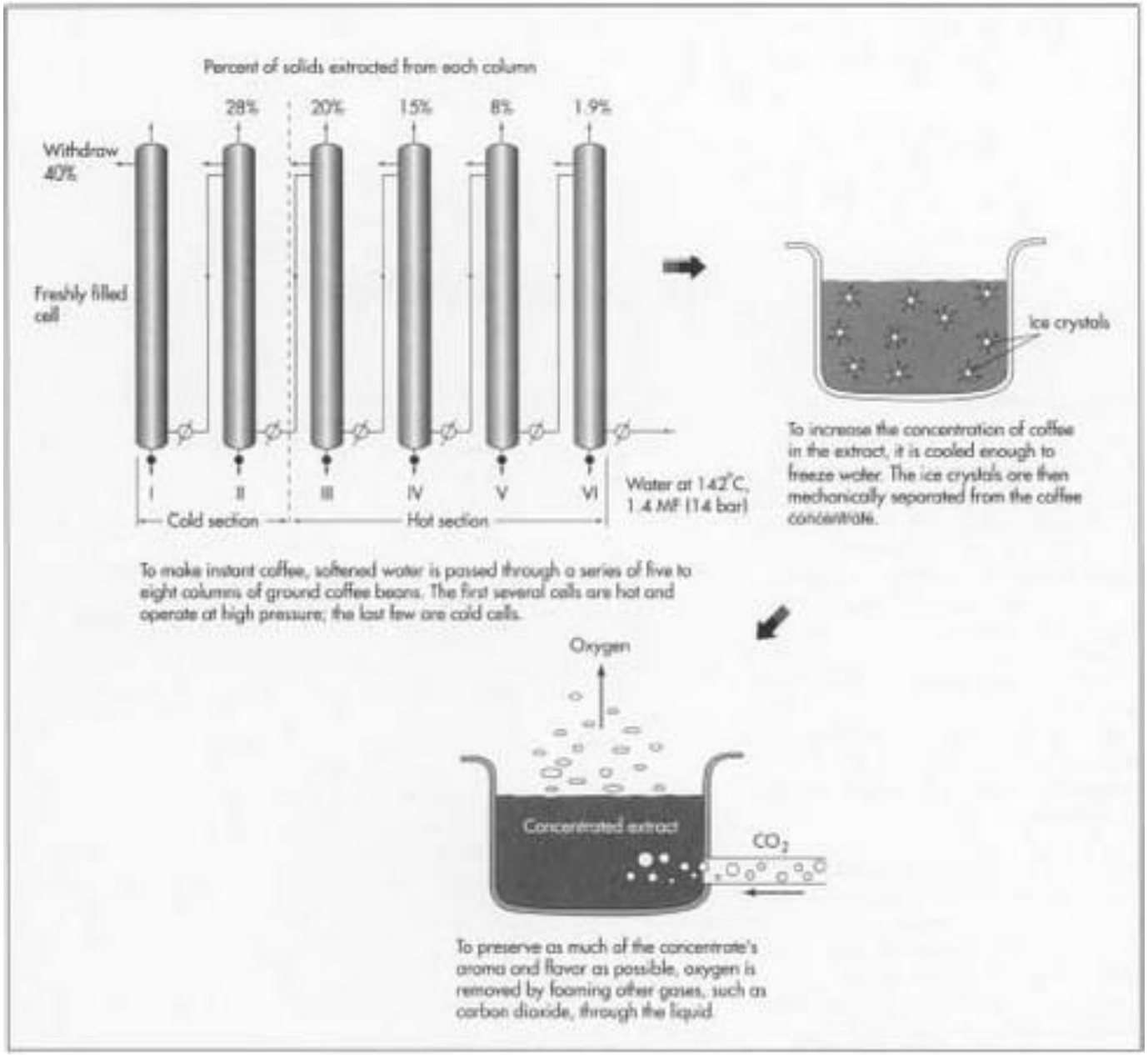
Today, most major manufacturers still use a freeze-drying process to make their instant coffees, says Daniel Gedance, president of SAAP. Although instant coffee is generally viewed as inferior to fresh coffee, Juliet Morris, sales manager of Just Us! Coffee Roasters Co-op, chooses to stock freeze-dried instant coffee because the freeze-drying process "most closely allows the fresh-roasted flavor of coffee to come through," she says.

But some instant coffee manufacturers do not use the freeze-drying process because of its prohibitive costs, Gedance says. Although the price of any retail instant coffee is determined largely by costs related to distribution, freeze-dried instant coffee production costs are 35% higher than the costs of production by spray-drying, he notes. The freeze-drying process is more expensive because making the same amount of instant coffee by freeze-drying methods requires larger quantities of better-quality beans than does the spray-drying process.

Susan C. Jackels, a chemistry professor and coffee researcher at Seattle University, says that beans used for some instant coffee products could not be sold for use in roasted, ground coffee products. For some instant coffees, however, coffee "cherries" are stripped from plants at the end of the season, whether they are ripe or not. Unripe beans add a bitter taste to coffees and have a less-well-developed aroma.

For people on the go, instant coffee might be the best thing since sliced bread. I, however, will stick to grinding my own beans.

http://pubs.acs.org/cen/whatstuff/86/8639sci3.html



http://www.madehow.com/Volume-3/Instant-Coffee.html

Dehydration

Two basic methods are available for converting the liquid coffee extract to a dry form. Spray drying is done at a higher temperature, which affects the taste of the final product, but it is less costly than freeze drying.

Spray drying

5 Cooled, clarified liquid concentrate is sprayed through a nozzle at the top of a drying tower. The tower is at least 75 ft (23 m) tall. Air that has been heated to about 480°F (250°C) is blown downward through the mist to evaporate the water. The air is diverted out of the tower near the bottom, and it is filtered to remove fine particles, which can be recirculated back through the tower or reintroduced during the agglomeration step. The dry coffee powder collects in the bottom of the tower before being discharged for further processing. The resulting powder contains 2-4% moisture and consists of free-flowing, non-dusty particles.

6 Spray drying may be followed by a step to form the powder into coarser particles that will dissolve more completely in the consumer's cup. The agglomeration process basically involves rewetting the surfaces of the coffee powder particles and bringing the particles into contact, so that they will adhere to each other and form larger, more granular particles. This is accomplished by exposing the powder to steam or a fine mist, while tumbling it in the air.

Freeze drying

7 Freeze drying may be used instead of spray drying. The process involves four steps, beginning with "primary freezing." Coffee extract is chilled to a slushy consistency at about 20°F (-6°C).

8 The prechilled slush is placed on a steel belt, trays, or drums and further cooled in a series of steps, until it reaches a temperature of -40-(-50)°F (-40-[-45]°C). Quick cooling processes (taking 30-120 seconds) result in smaller, lighter colored products, while slower processes (taking 10-180 minutes) generate larger, darker granules.

9 The slabs of ice are broken into pieces and ground into particles of the proper size for the drying step. The particles are sieved to ensure proper sizing, and those that are too small are melted and returned to the primary freezing stage.

10 The frozen particles are sent into a drying chamber where, under proper conditions of heat and vacuum, the ice vaporizes and is removed.

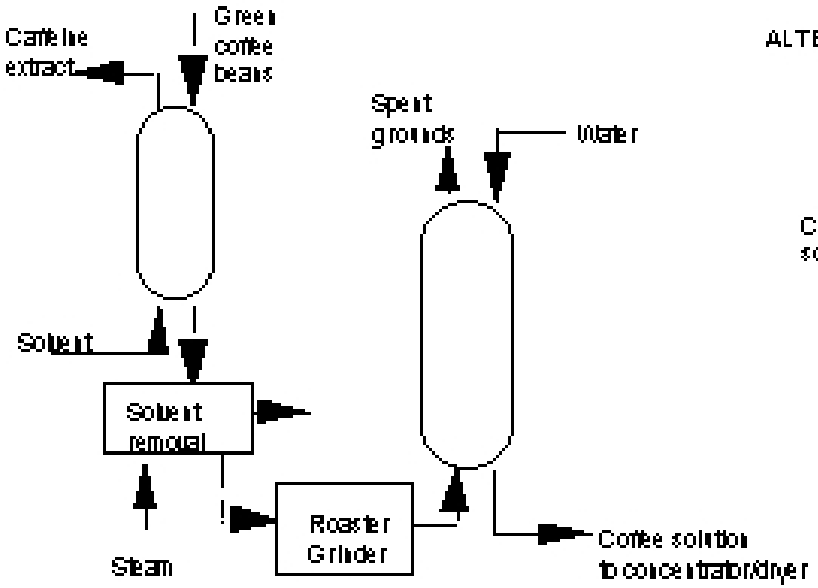
Aromatization

11 Volatile aromas that have been recovered from earlier steps in the manufacturing process are sprayed on the dry coffee particles. This may be done during the packaging operation.

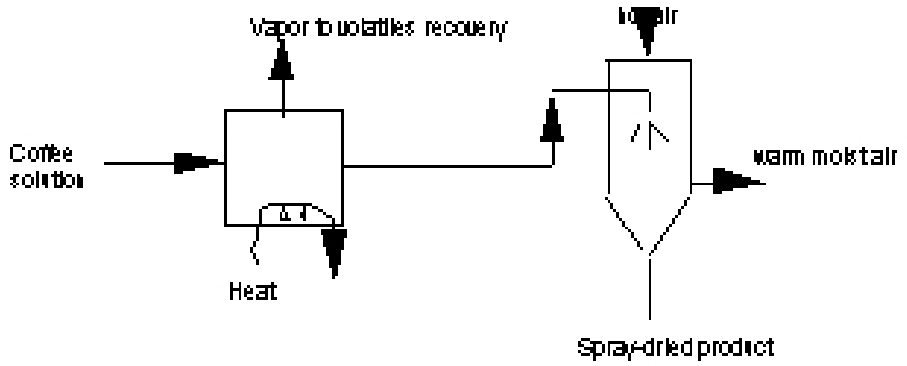
Packaging

12 Instant coffee particles are hygroscopic—that is, they absorb moisture from the air. Consequently, they must be packaged under low humidity conditions in a moisture-proof container to keep the product dry until purchased and opened by the consumer. Also, to prevent loss of aroma and flavor, the product is packaged in a low-oxygen atmosphere (usually carbon dioxide or nitrogen).

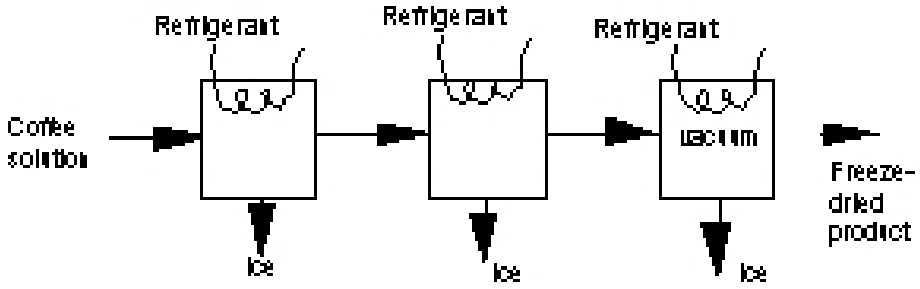
DECAFFEINATION AND PRODUCTION OF COFFEE SOLUTION



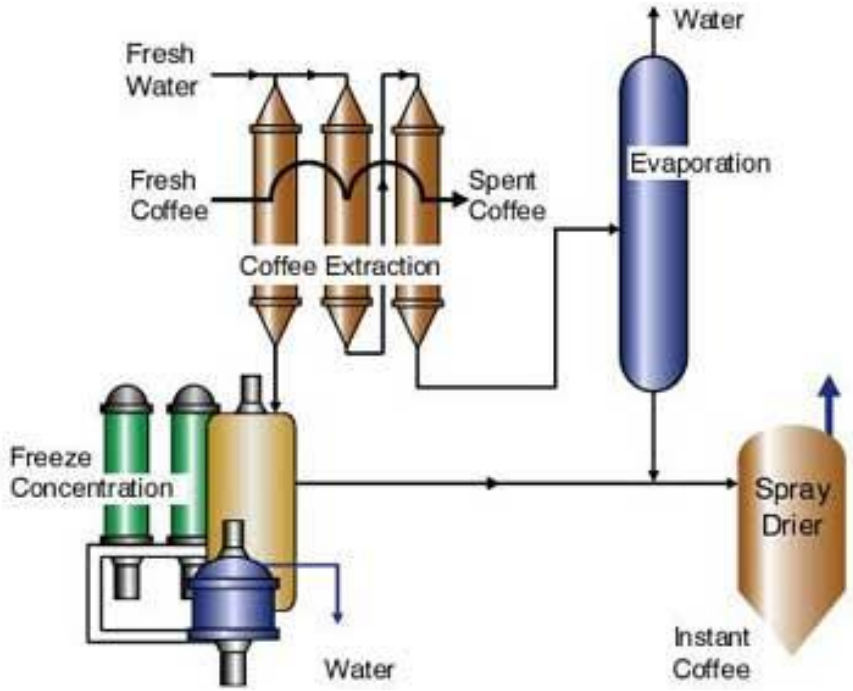
ALTERNATIVE 1: CONCENTRATION BY EVAPORATION/SPRAY DRYING

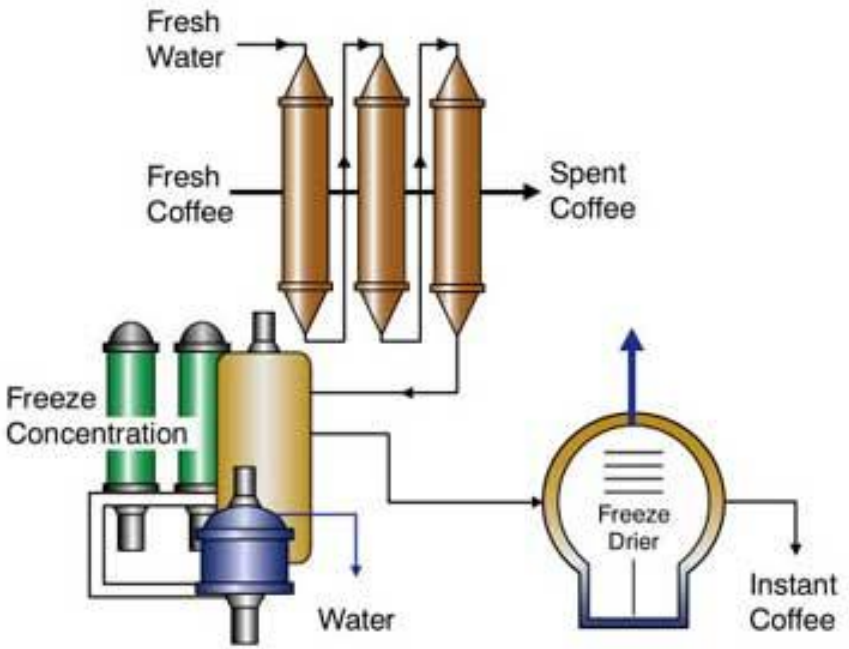


ALTERNATIVE 2: FREEZE CONCENTRATION/FREEZE DRYING



http://homepages.cae.wisc.edu/~che426/homeworks/h1.html





http://www.niro-pt.nl/ndk_website/NIROPT/cmsdoc.nsf/WebDoc/ndkw5nkfwc

Byproducts/Waste

Spent coffee grounds from the brewing process are the primary waste product. At least one manufacturer burns these grounds to heat water and generate steam that is used in the manufacturing process. The process is designed to be environmentally friendly, minimizing waste products by maximizing the use of the raw materials.

The Future

Since the introduction of General Foods International Coffees in the 1970s, instant coffees have been available in flavored varieties. Recent innovations include instant mixes for latte and mocha beverages. Maxwell House is test marketing an instant iced coffee product in vanilla, mocha, and original coffee flavors.

Where to Learn More

Books

Pintauro, Nicholas. *Soluble Coffee Manufacturing Processes.* Noyes Development Corp., 1969.

Pintauro, Nicholas. *Coffee Solubilization: Commercial Processes and Techniques.* Noyes Data Corp., 1975.

Ullmann, Fritz. "Coffee." *Ullmann's Encyclopedia of Industrial Chemistry.* VCH, 1985, pp. 315-339.

Periodicals

McCormack, Tim. "To Brew or Not To Brew." *Fancy Food Magazine,* January 1996.

Read more: How instant coffee is made - manufacture, making, history, used, processing, components, steps, product, industry, History, Raw Materials, The Manufacturing Process, Byproducts/Waste, The Future http://www.madehow.com/Volume-3/Instant-Coffee.html#ixzz1ZkWaONWF

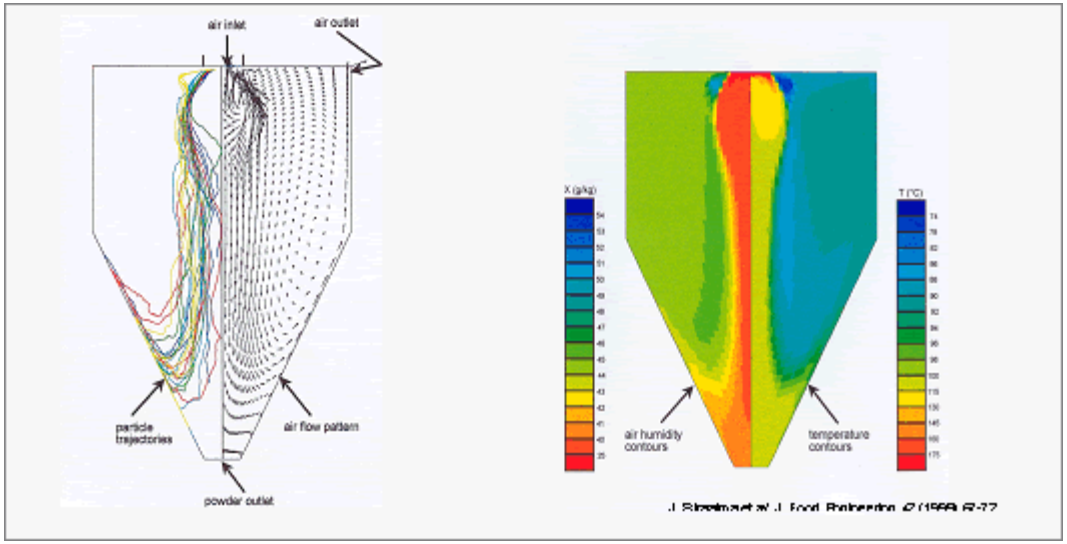
Brand: Liwell

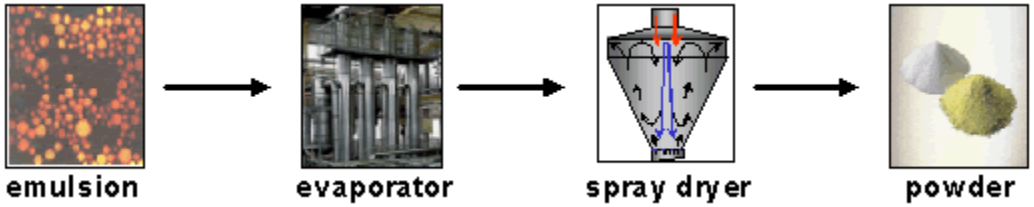
Origin: Made In China

Description:

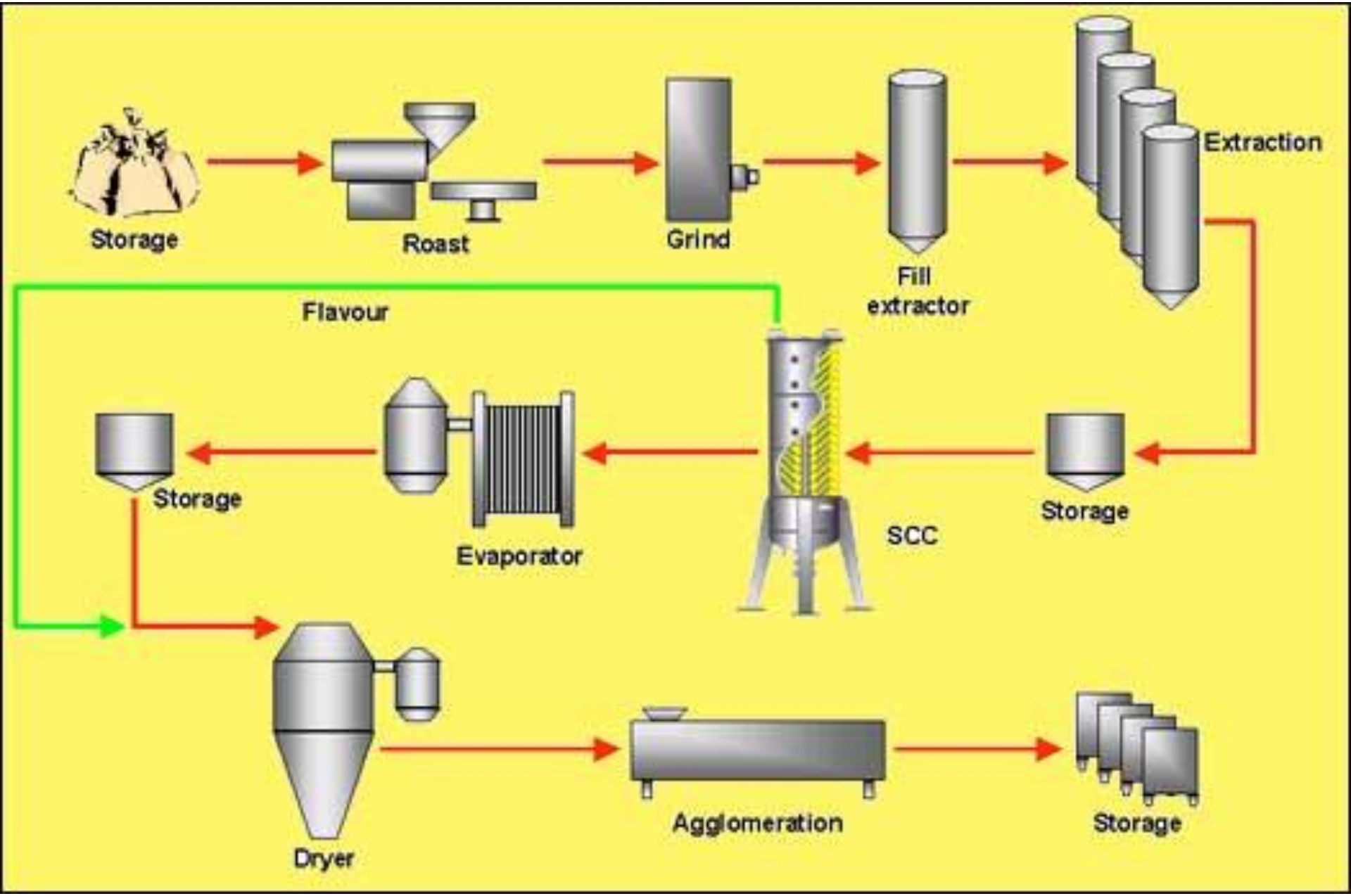
1. Shelling machine for shelling coffee beans
2. Roasting machine for roasting kernel coffee
3. Grinding mill for comminuting roasted kernel coffee
4. Extracting machine for extracting comminuted kernel coffee with water
5. Vacuum concentrator for concentrating extracted coffee solution
6. Spray drying machine for drying concentrated solution into soluble powder
7. Granulator for granulating soluble powder coffee
8. Packaging machine for packing instant coffee products

http://www.diytrade.com/china/4/products/537734/Instant_Coffee_Plant.html


air inlet
air outlet
particle trajectories
air flow pattern
powder outlet
X (g/kg)
T (°C)
air humidity contours
temperature contours


emulsion
evaporator
spray dryer
powder

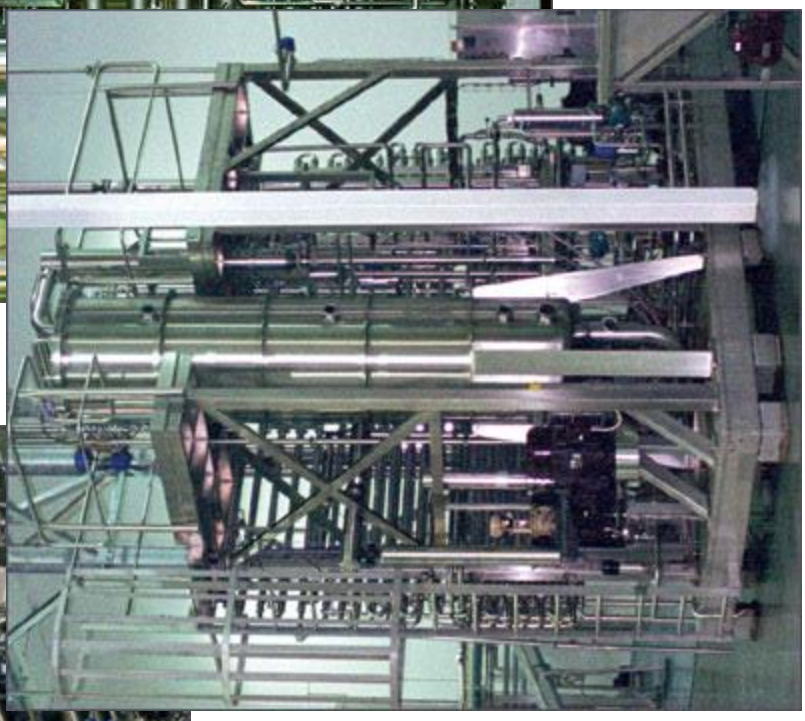
Linha de produção de café solúvel (Flavourtech) com sistema de captura aromas (SCC)

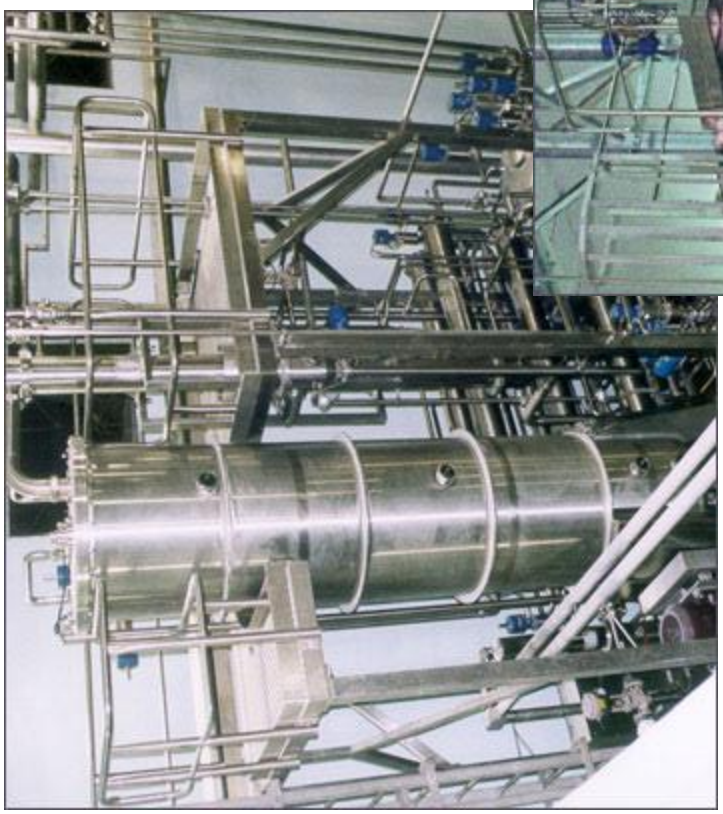


http://www.flavourtech.com/Expertise/Coffee-Tea/soluble-coffee.html

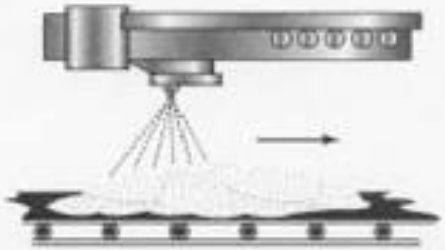
http://www.flavourtech.com/Expertise/Coffee-Tea/soluble-coffee.html

SCC





To evaporate the coffee, the liquid concentrate is sprayed through a nozzle at the top of a drying tower. Warm air blows downward, evaporating the water. Dry coffee powder collects in the bottom of the tower.



Volatile aromas that have been recovered from earlier steps in the manufacturing process are sprayed on the dry coffee particles.

Coffee is packaged in a low-oxygen and low-humidity atmosphere to optimize product flavor and consistency.

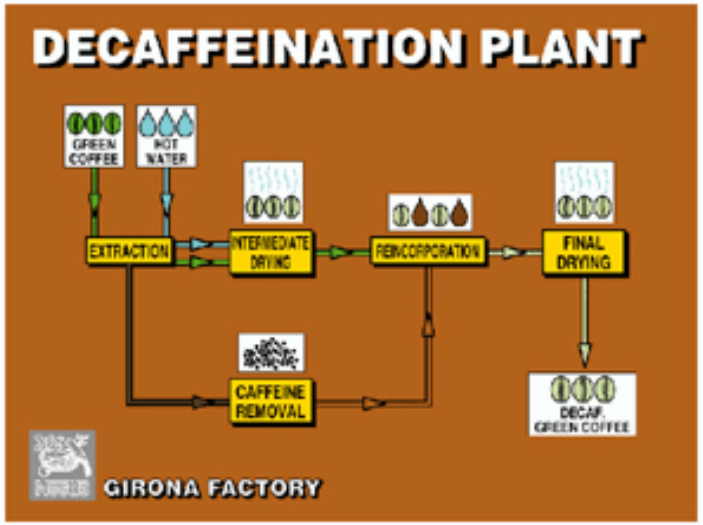
http://www.madehow.com/Volume-3/Instant-Coffee.html

ConRad 500 freeze-drying equipment has been installed at the Seda Solubles facility.

Granular instant coffee

Coffee beans drying prior to undergoing processing. Instant coffee is generally produced from the lower-quality beans.

http://www.foodprocessing-technology.com/projects/sedacoffee/



WWW.nescafe.pt

http://www.dkimages.com/discover/Home/Food-and-Drink/Drinks/Beverages/Coffee/Instant/Instant-05.html

DESCAFEINAÇÃO

DESCAFEINAÇÃO

- **No café verde**
- **Métodos:**

Dichlorometano* (CH_2Cl_2)	Remove cafeína mas muito pouco *flavour*	Suspeita de carcinogénese - não muito utilizado actualmente
Acetato de etilo	Remove algum *flavour*	Pouco tóxico. Presente naturalmente me alguns frutos
Água	Não tóxico	Método complexo. Exige cuidados para não remover o *flavour*
Dióxido de carbono Supercrítico	Remove cafeína mas muito pouco *flavour*	Pouco ou nenhum resíduo nas sementes

*** Decreto-lei 53/59:** resíduo máximo de 5mg/kg do produto final

The Supercritical Solution

Supercritical carbon dioxide (scCO2) is now widely used for decaffeination. It was one of the first commercial applications for scCO2 and has been in use since the 1980s. Advantages over other methods include:

Precise control of pressure can selectively dissolve the caffeine, leaving the flavour intact

Once the beans are at normal pressure, any residual carbon dioxide will be lost easily, and this can safely be vented into the atmosphere

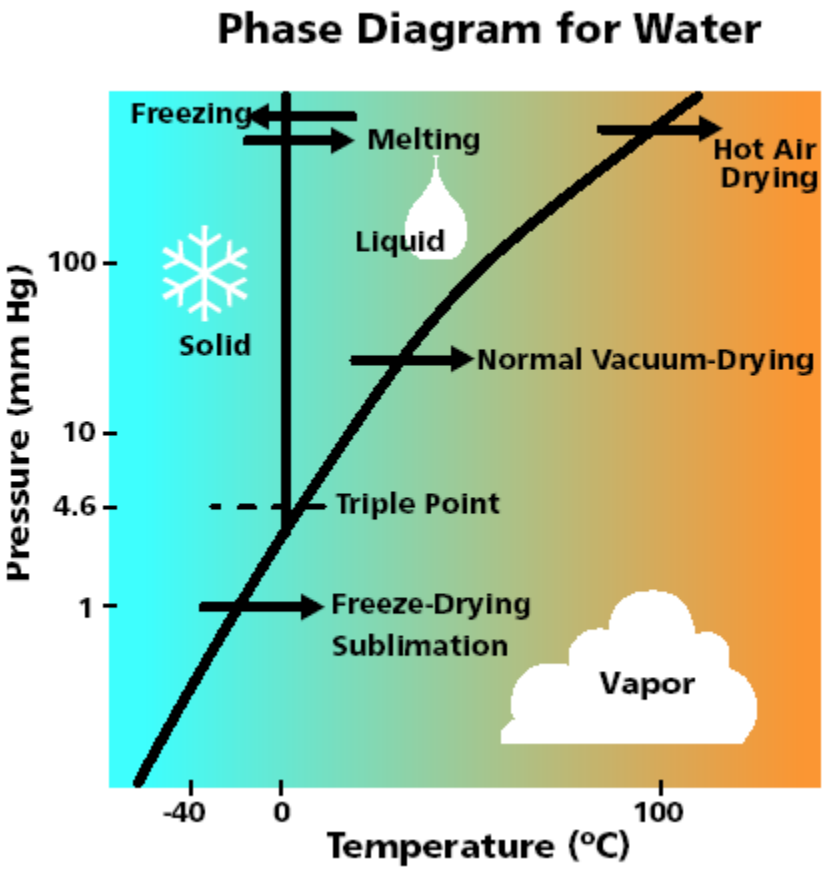
Between 97-99% of the caffeine is removed by this method

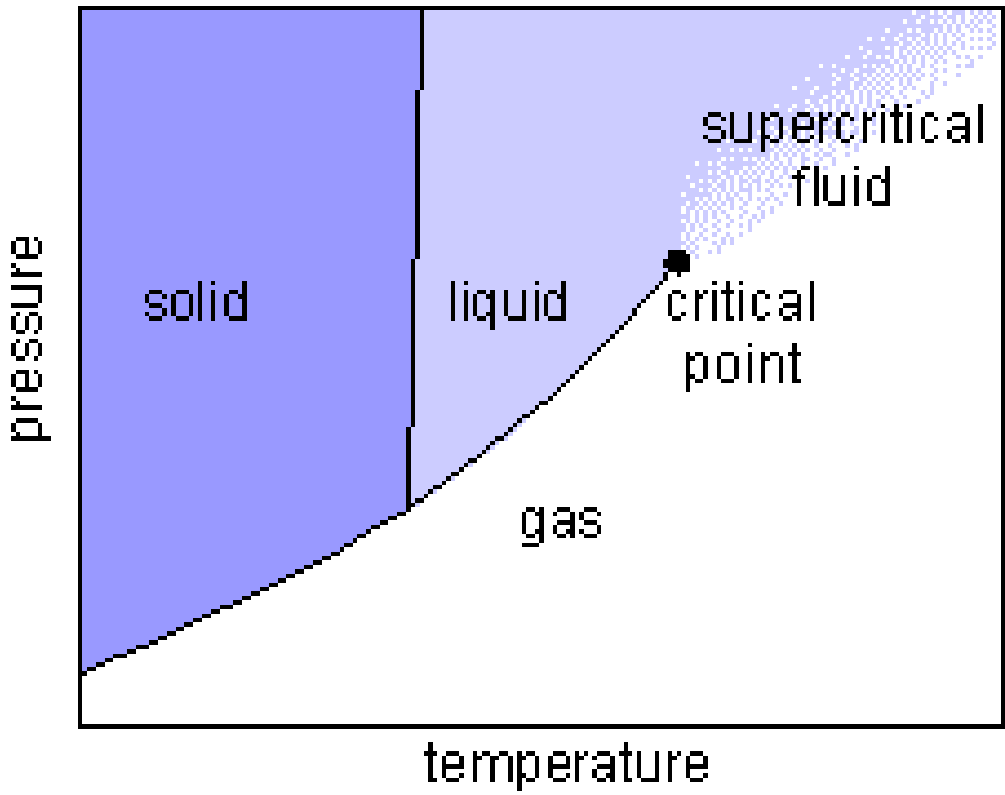
The Process

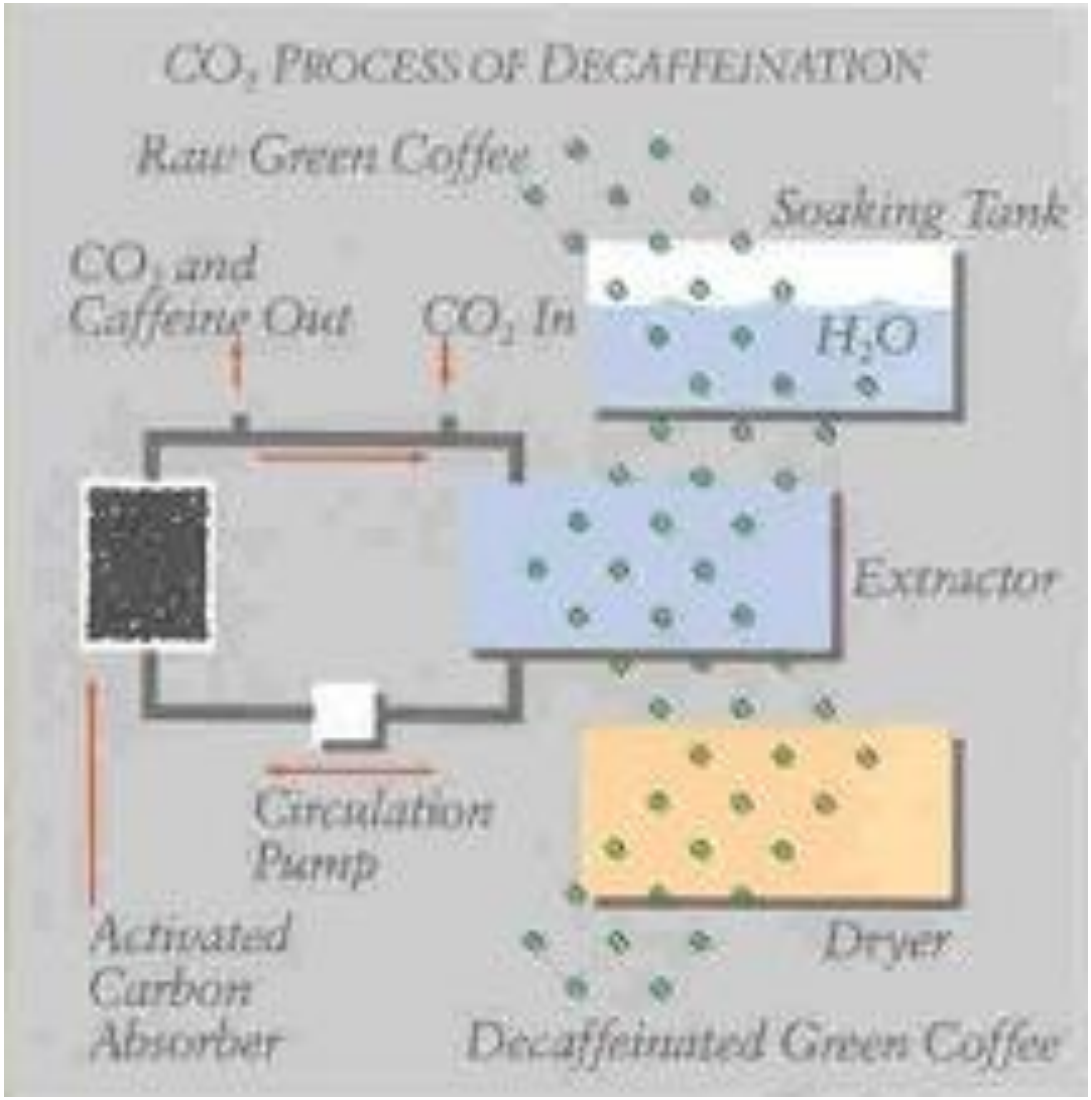
Green coffee beans (before roasting) are first soaked in water to make them swell and allow the scCO2 to penetrate more easily. It is also thought water may be needed to help free the caffeine from chemical complexes in the bean.

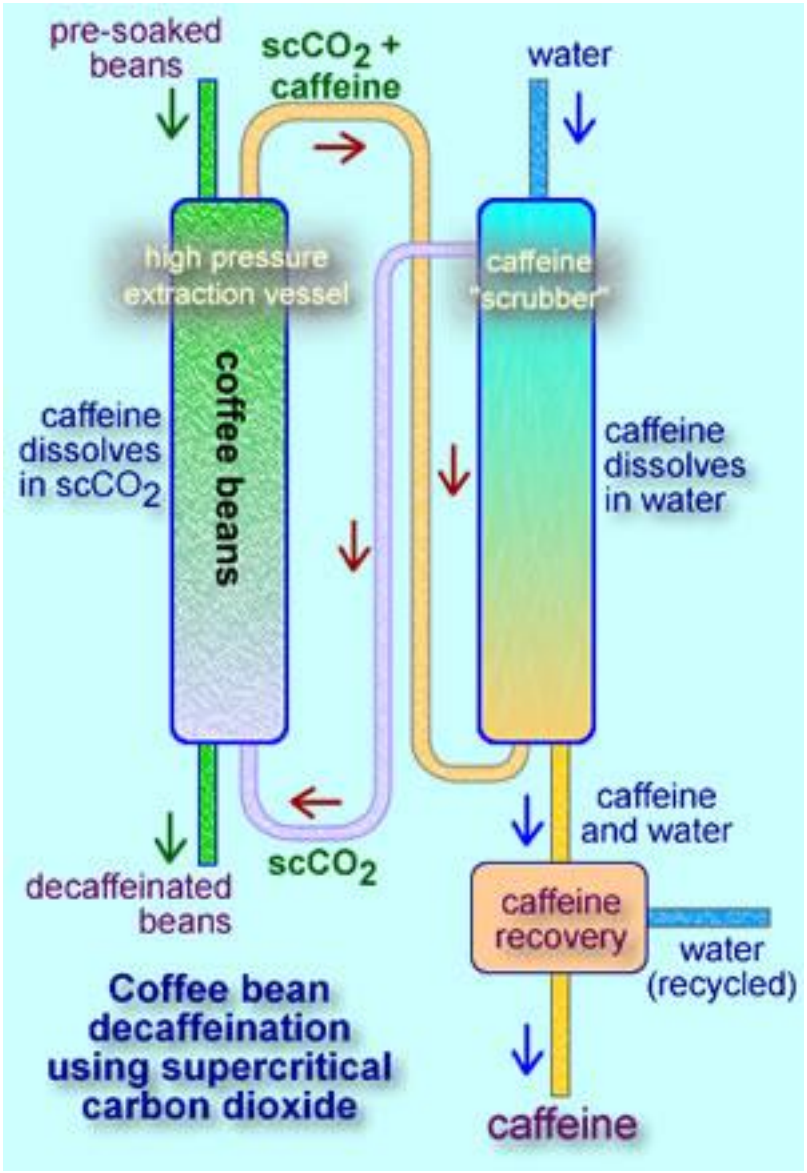
ScCO2 is circulated for up to 10 hours through pre-soaked beans in a high-pressure extraction chamber. In the second vessel, water and the caffeine-rich carbon dioxide are passed in opposite directions and the caffeine dissolves in the water. The carbon dioxide is re-pressurised and re-used.

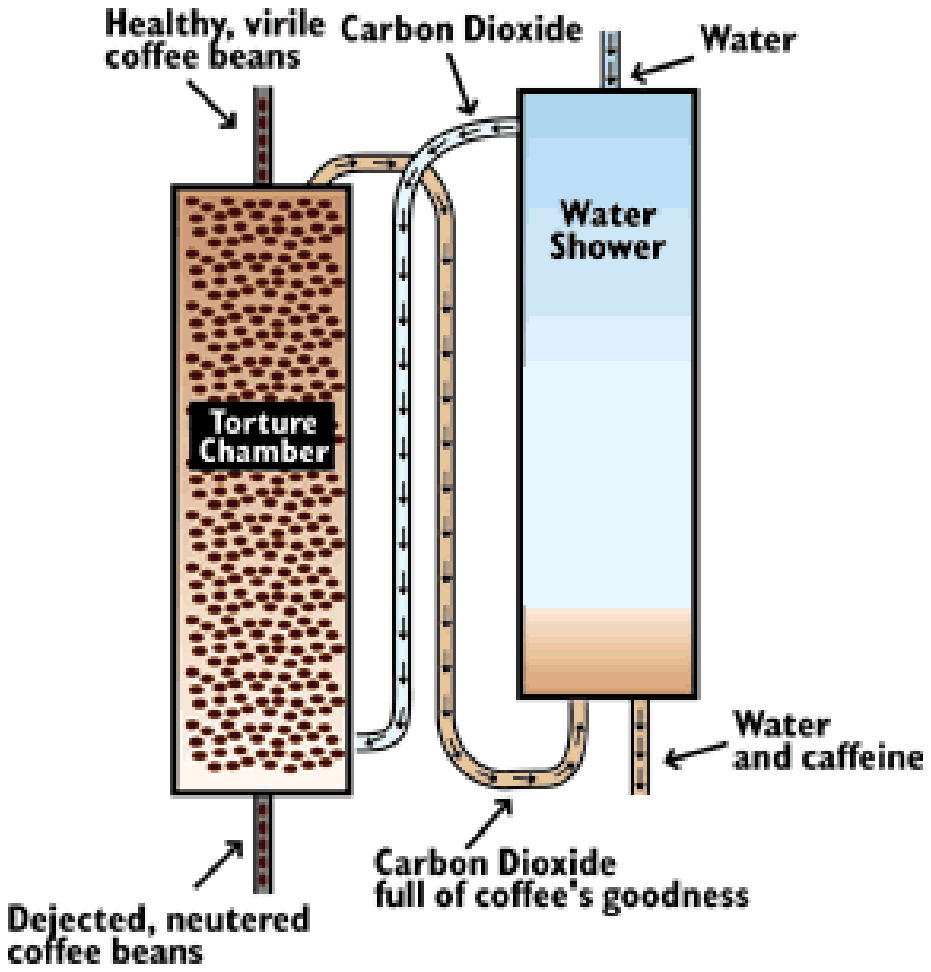
Caffeine is recovered from the water as a concentrated solution using one of a range of processes, including reverse osmosis. In reverse osmosis pressure is used to make solvent pass through a semi-permeable membrane from high to low concentration of solute, rather than the other way round. This concentrates the caffeine further.

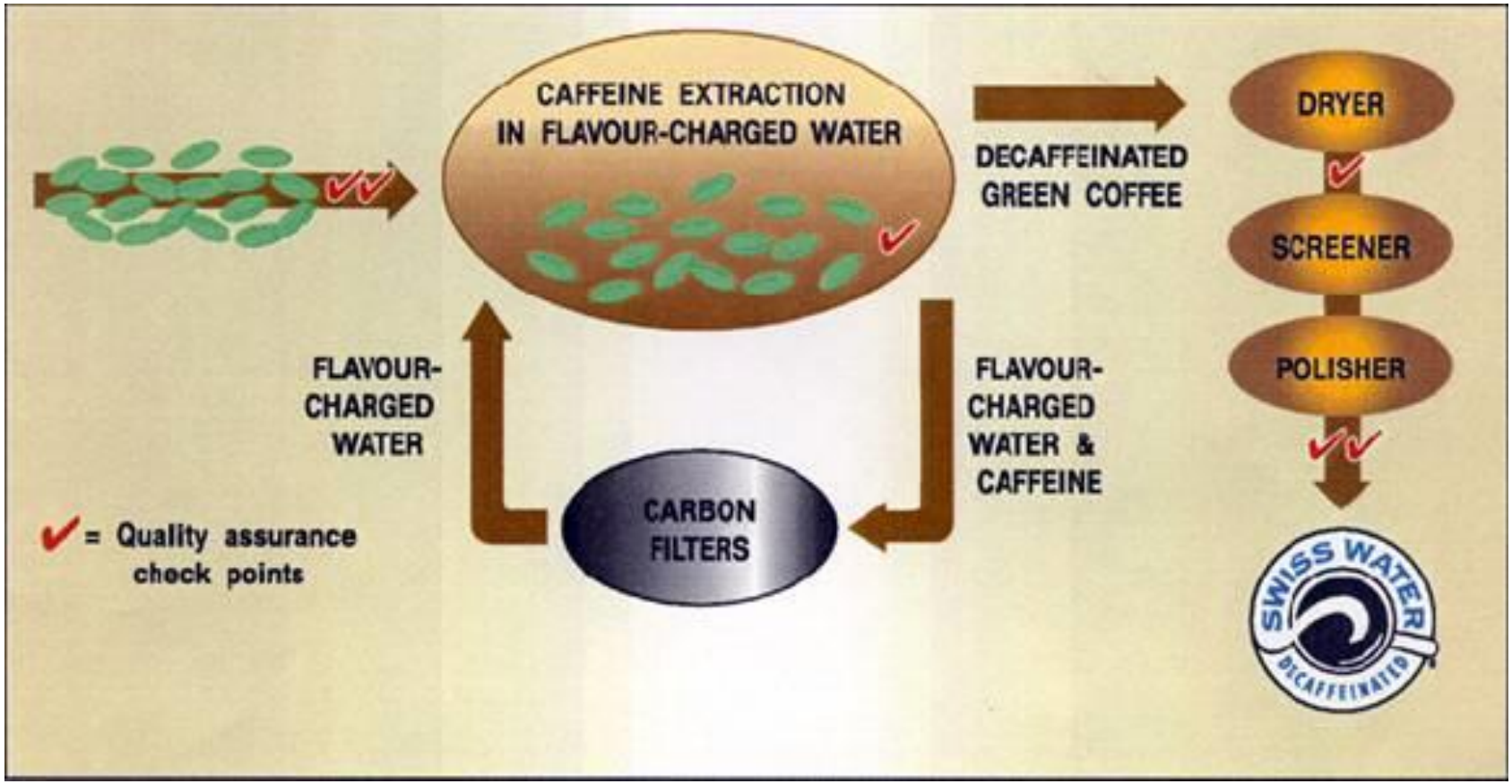

Phase Diagram for Water
Freezing
Melting
Hot Air Drying
Liquid
Solid
Normal Vacuum-Drying
Triple Point
Freeze-Drying
Sublimation
Vapor
Pressure (mm Hg)
100
10
4.6
1
-40
0
100
Temperature (°C)

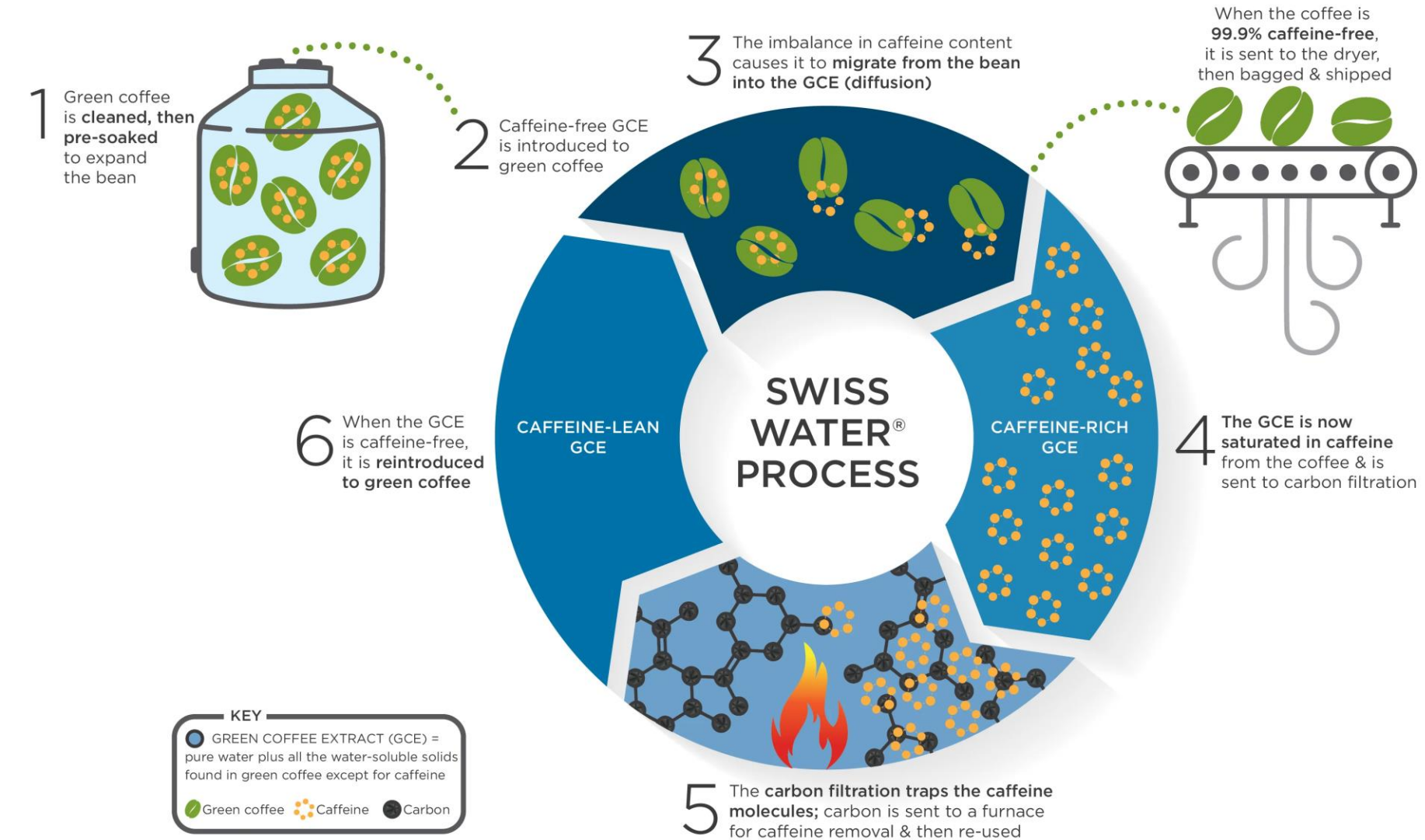

pressure
solid
liquid
gas
supercritical fluid
critical point
temperature


CO_2 PROCESS OF DECAFFEINATION
Raw Green Coffee
Soaking Tank
CO_2 and Caffeine Out
CO_2 In
H_2O
Extractor
Circulation Pump
Activated Carbon Absorber
Dryer
Decaffeinated Green Coffee


pre-soaked beans
scCO2 + caffeine
water
high pressure extraction vessel
coffee beans
caffeine "scrubber"
caffeine dissolves in scCO2
caffeine dissolves in water
caffeine and water
scCO2
decaffeinated beans
caffeine recovery
water (recycled)
Coffee bean decaffeination using supercritical carbon dioxide
caffeine

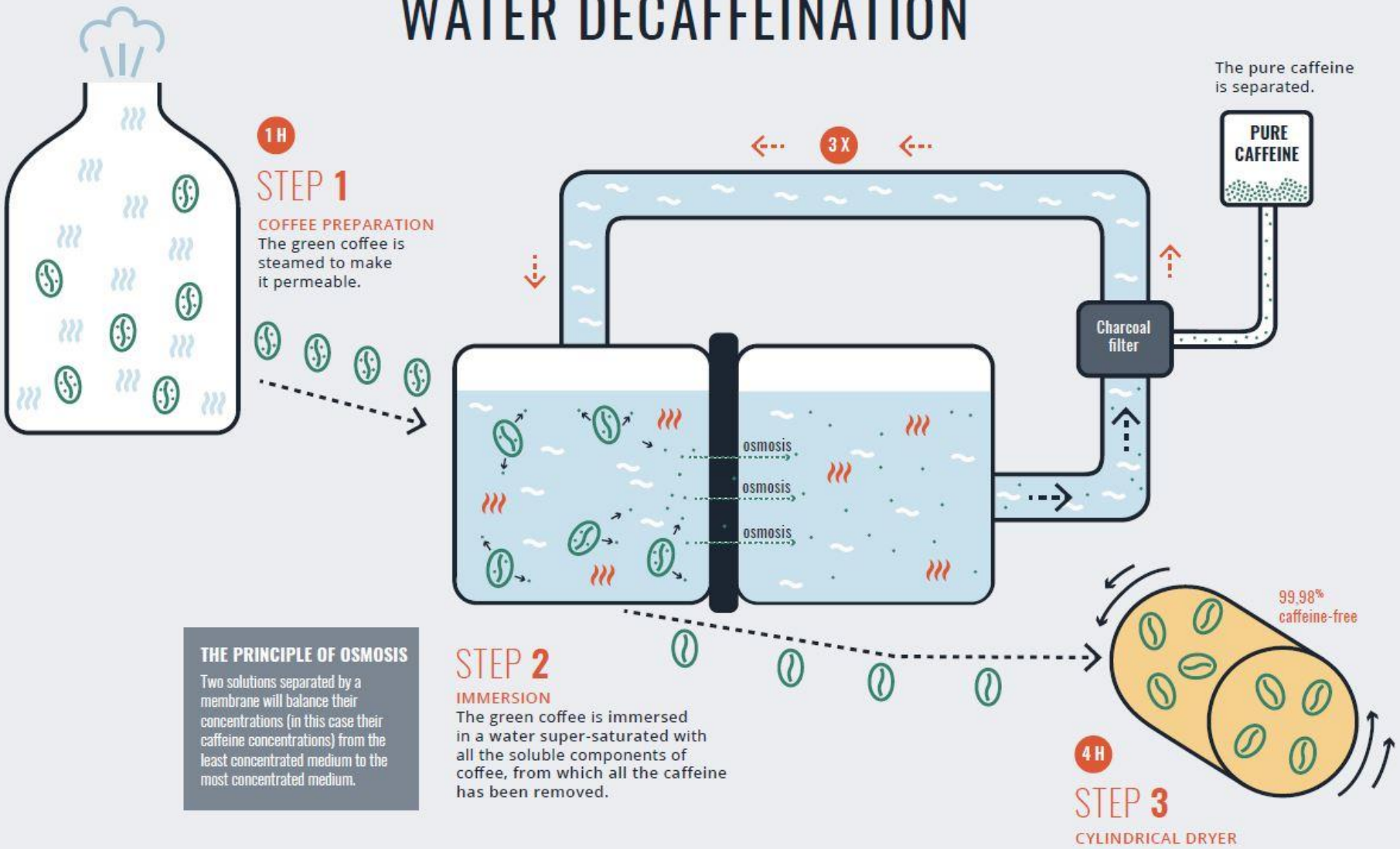

Healthy, virile coffee beans
Carbon Dioxide
Water
Water Shower
Torture Chamber
Water and caffeine
Carbon Dioxide full of coffee's goodness
Dejected, neutered coffee beans


CAFFEINE EXTRACTION
IN FLAVOUR-CHARGED WATER
DECAFFEINATED
GREEN COFFEE
DRYER
SCREENER
POLISHER
FLAVOUR-
CHARGED
WATER
FLAVOUR-
CHARGED
WATER &
CAFFEINE
CARBON
FILTERS
= Quality assurance
check points
SWISS WATER
DECAFFEINATED



https://newkingscoffee.co.uk/blogs/blog/does-decaf-coffee-give-you-more-energy

WATER DECAFFEINATION

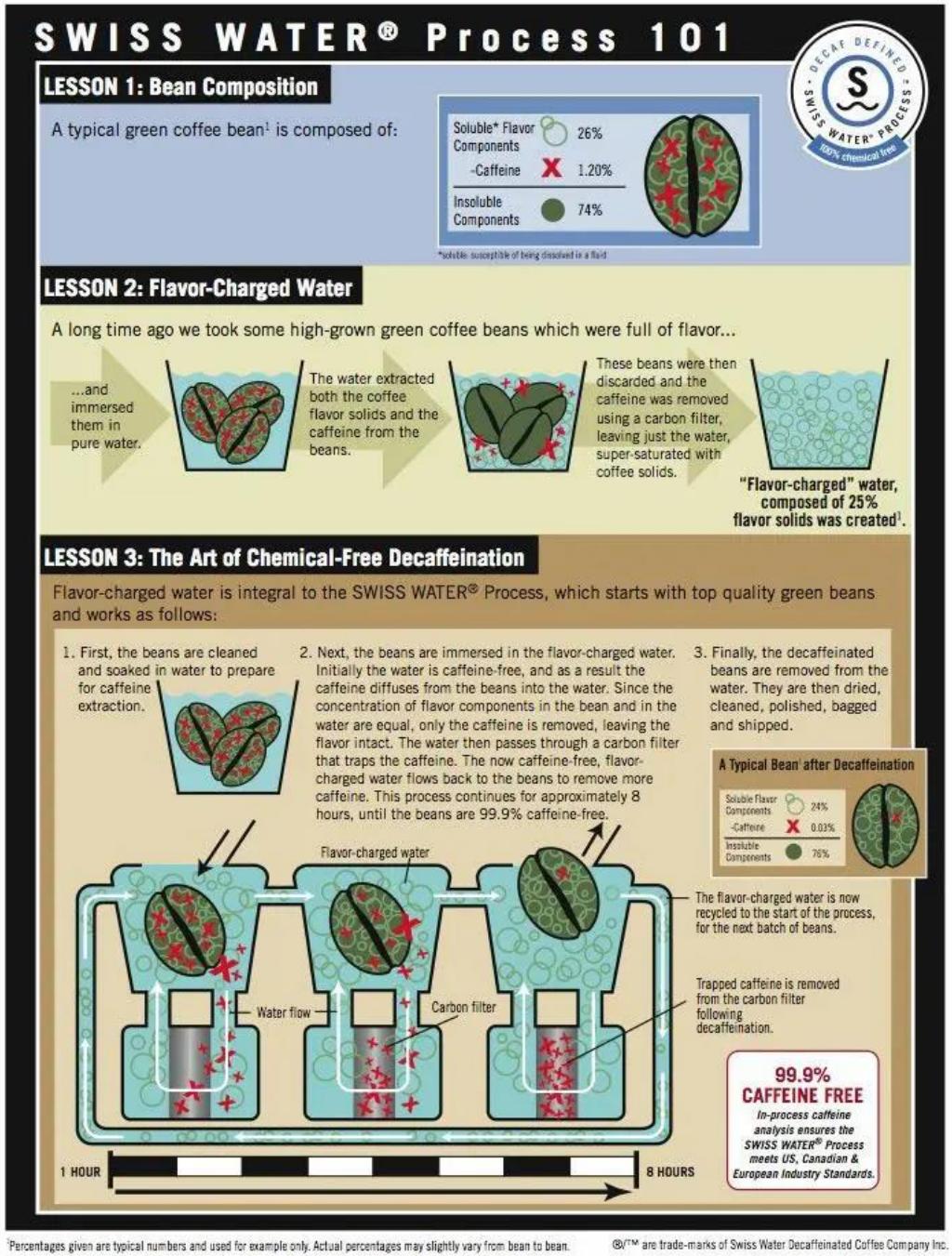


BELCO

DECAFFEINATION METHOD 3

Caffeine molecule ● Steam ≈ Heat ≈

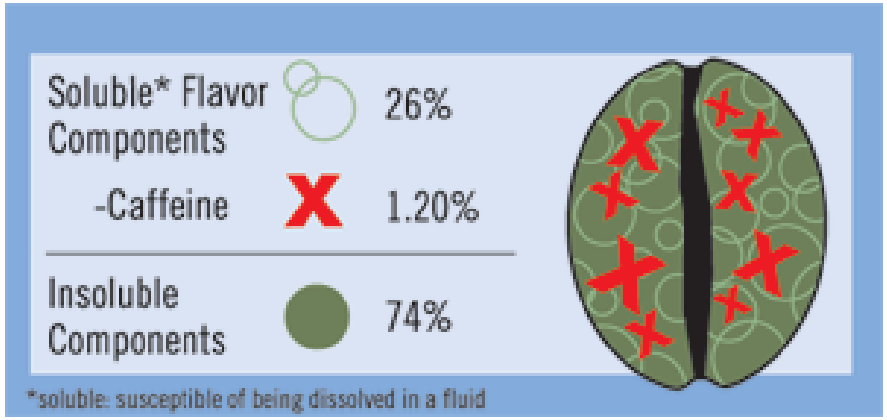
https://www.belco.fr/green-coffee-article.php?article=475



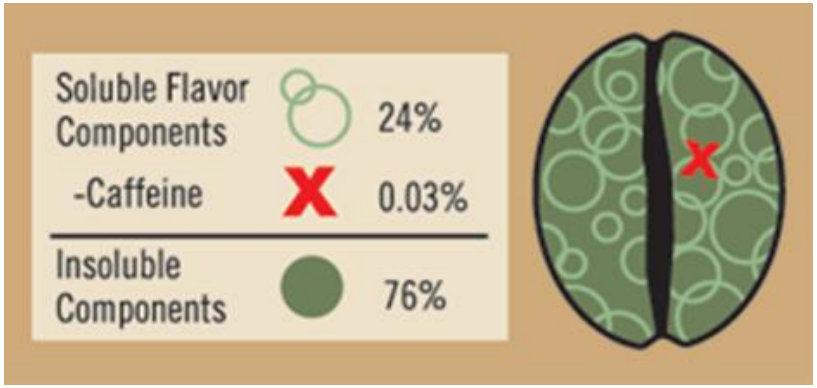
https://thequeenbean.blog/2017/08/05/natural-decaffeination-swiss-water-and-co2-processes/

Bean Composition

A typical green bean is composed of:



A typical green bean, after decaffeination, is composed of:

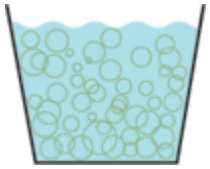


Flavor-Charged Water

A long time ago we took some high-grown green coffee beans which were full of flavor ....

... and immersed them in pure water.

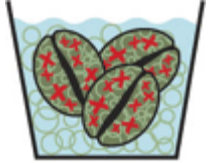
The water extracted both the coffee flavor solids and the caffeine from the beans.



These beans were then discarded and the caffeine was removed using a carbon filter, leaving just the water, super-saturated with coffee solids.

The Art of Chemical-Free Decaffeination

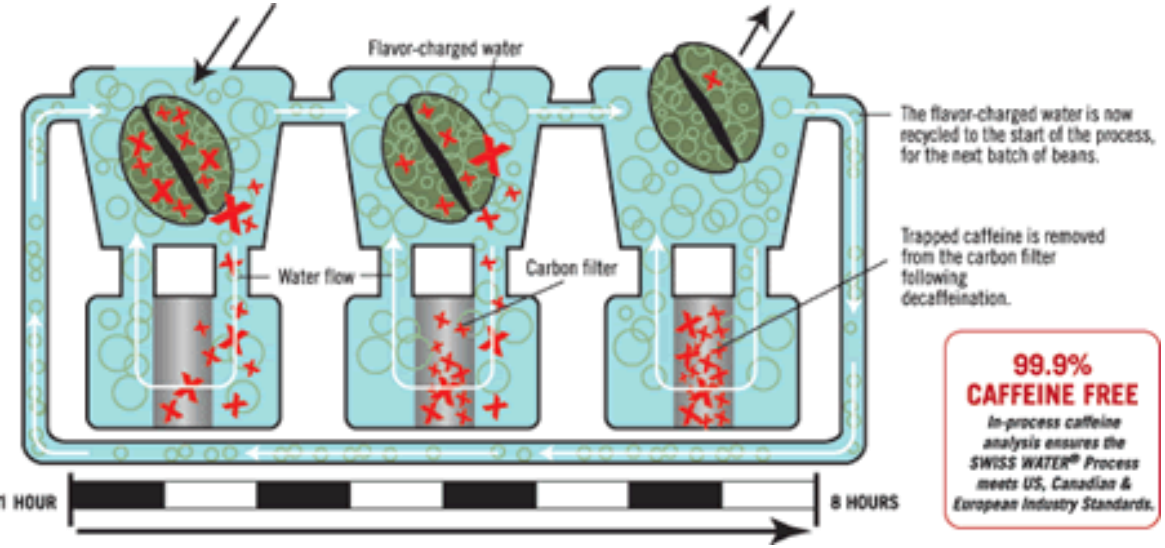
Flavor-charged water is integral to the SWISS WATER® Process, which starts with top quality green beans and works as follows.

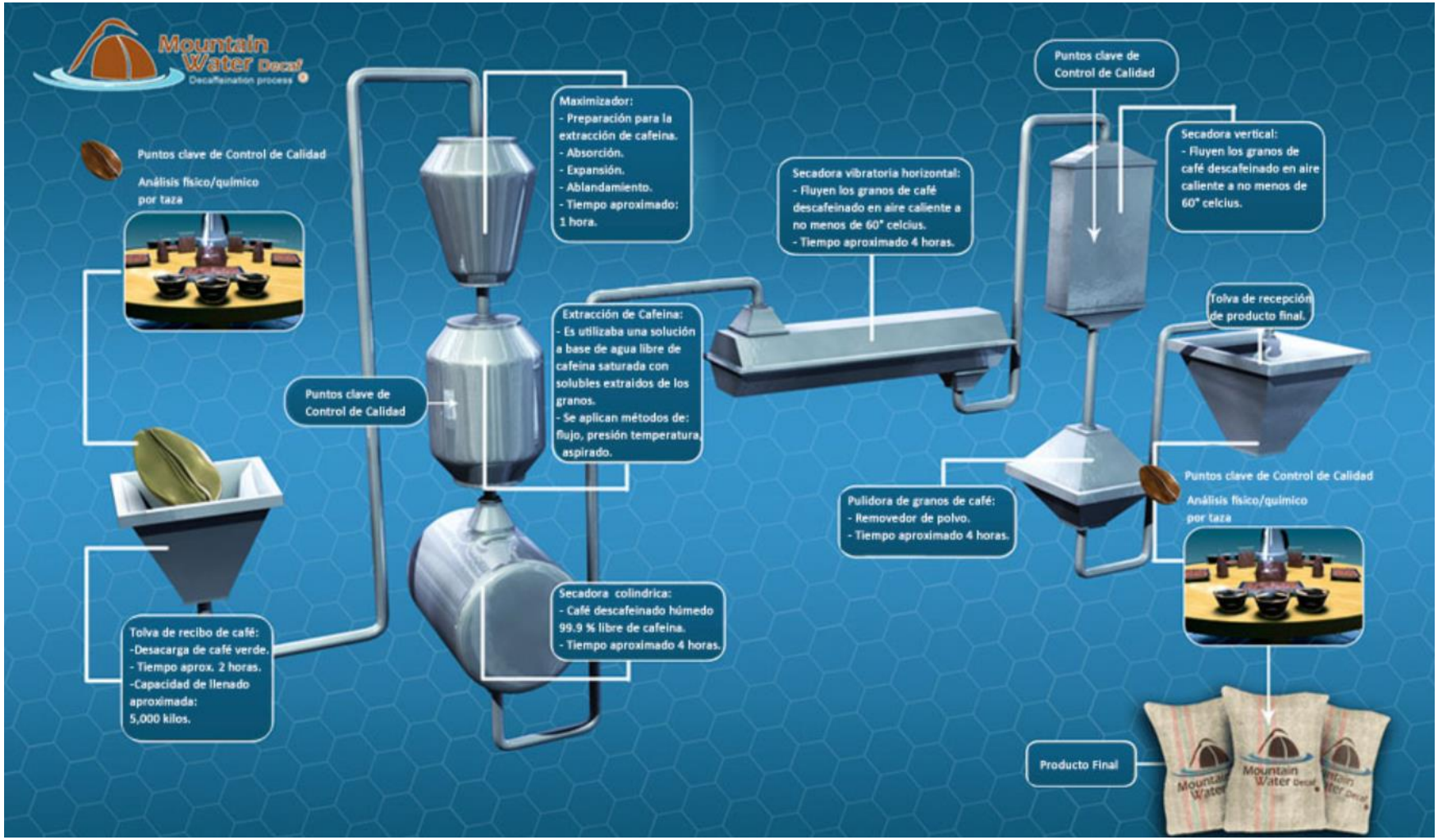


First, the beans are cleaned and soaked water, partially saturated with coffee flavor solids, in preparation for caffeine extraction.

Next, the beans are immersed in the flavor-charged water. Initially the water is caffeine-free, and as a result the caffeine diffuses from the beans into the water. Since the concentration of flavor components in the bean and in the water are equal, only the caffeine is removed, leaving the flavor intact. The water then passes through a carbon filter that traps the caffeine. The now caffeine-free, flavor-charged water flows back to the beans to remove more caffeine. This process continues for approximately 8 hours, until the beans are 99.9% caffeine-free.

Following decaffeination, the trapped caffeine is removed from the carbon filter. The flavor-charged water is then recycled to the start of the process for the next batch of beans.





Chemical Decaffeination Processes

What chemicals do other decaffeination processes use?

The majority of decaf coffee, about 80%, is decaffeinated with a chemical decaffeination method using chemicals like methylene chloride or ethyl acetate.

How do the chemical decaffeination processes work?

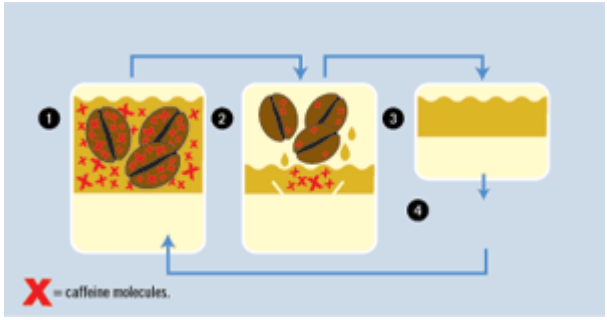
1.Beans are soaked in a caffeine absorbing solvent.
2.The solvent, now containing the caffeine, is separated from the beans.
3.The caffeine is removed from the solvent.
4.Steps 1-3 are repeated until sufficient caffeine is removed from the beans.

How are chemicals used in these processes?

There are two types of chemical caffeine removal processes: direct and indirect.

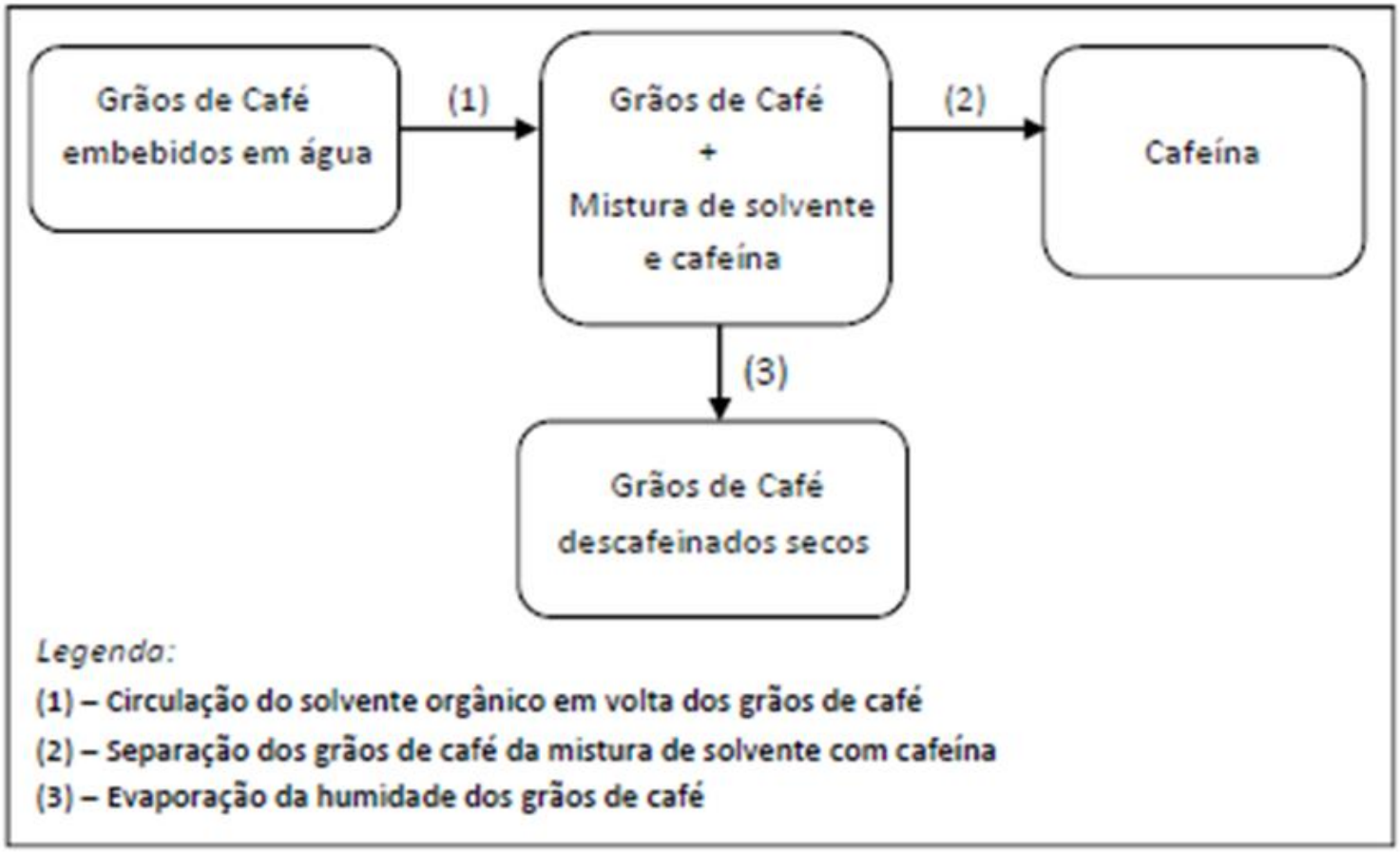
Direct process: The chemicals are used in steps 1 and 2 as the caffeine absorbing solvent.

Indirect process: The chemicals are used in step 3 to remove the caffeine from the solvent (a liquid composed primarily of water).

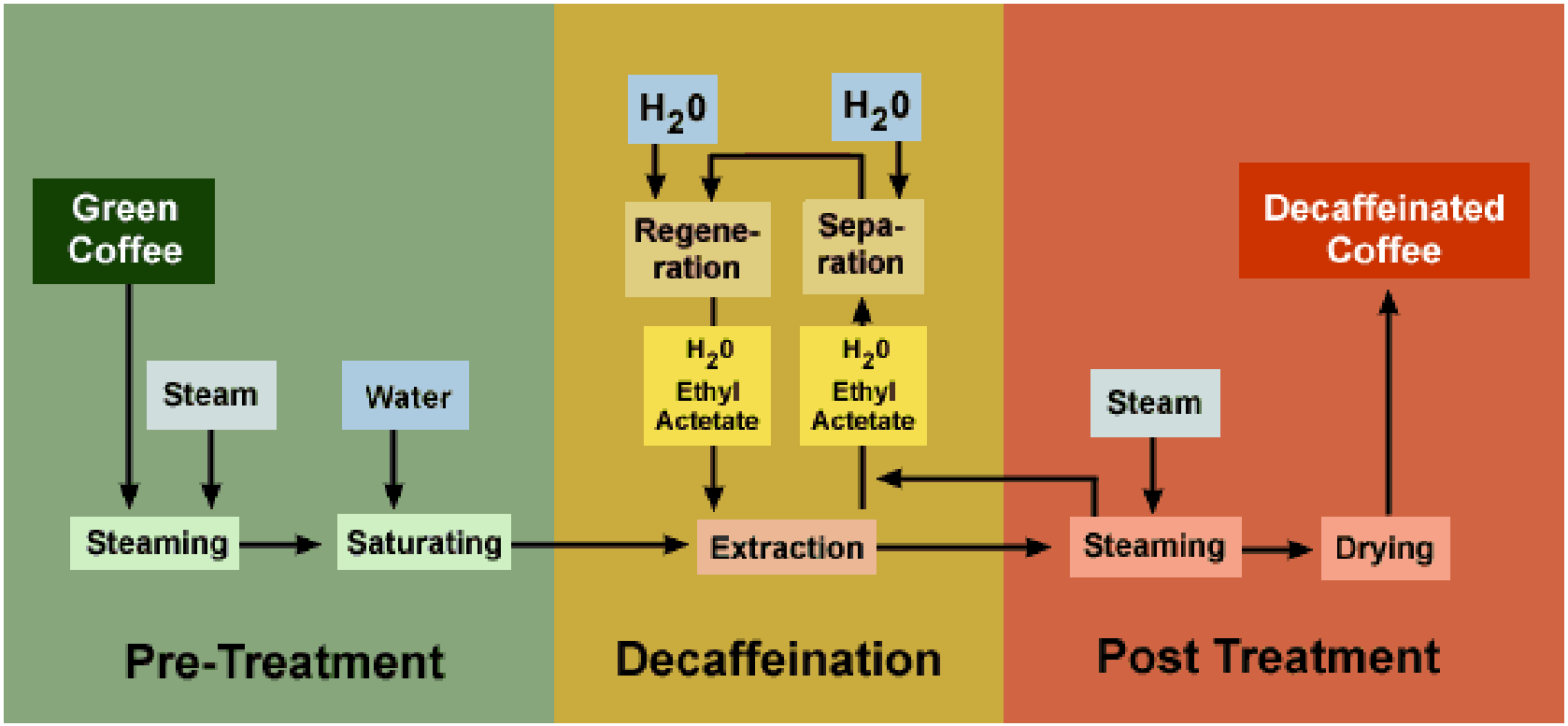


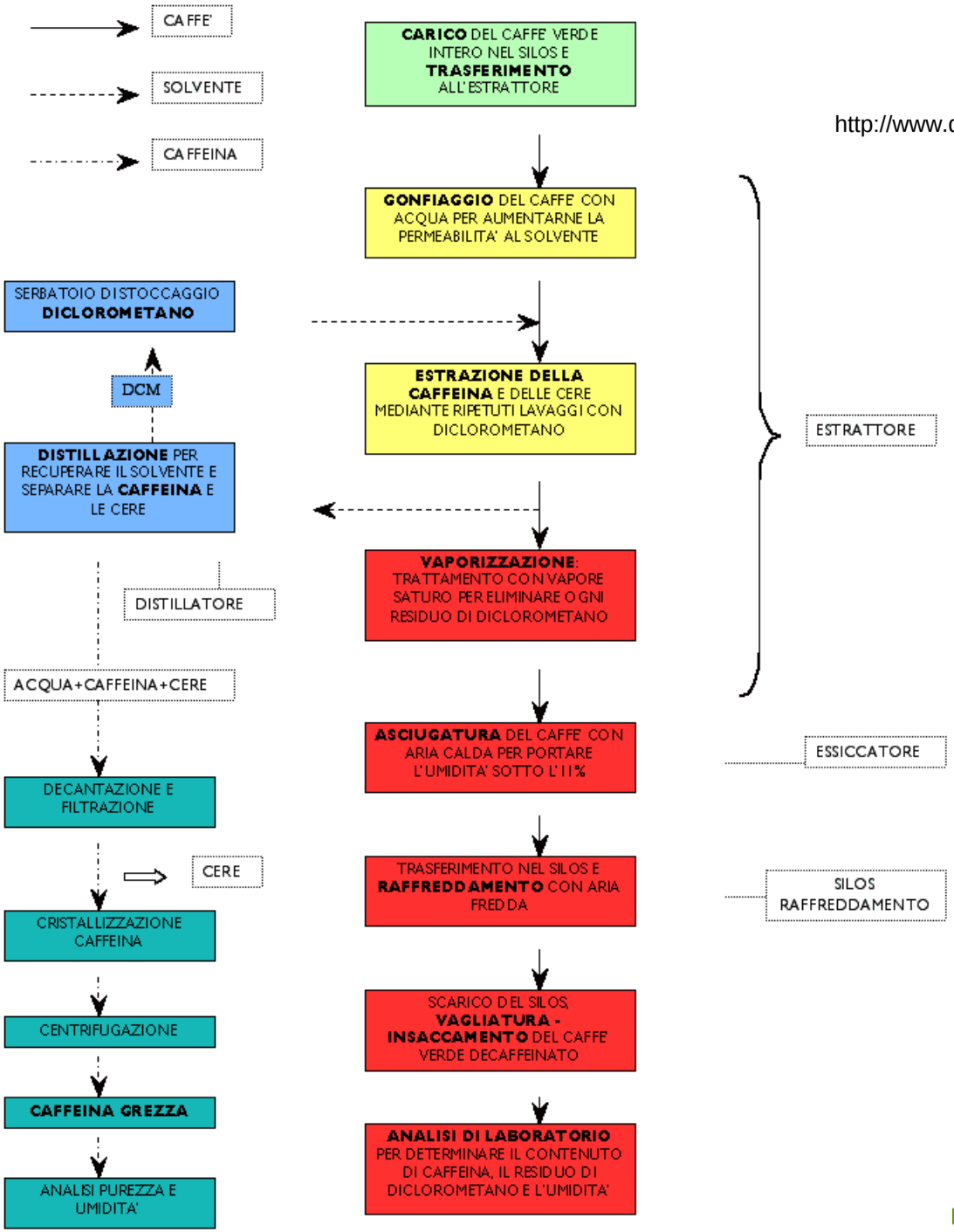
The terms “water process”, “natural process”, and “European process” are sometimes used to describe decaffeination processes. In fact, all three terms often refer to decaffeination processes that use chemicals.

M. Helena Guimarães de Almeida/ Tecnologia dos Produtos Tropiocais/Instituto



Fonte: http://paginas.fe.up.pt/~projfeup/cd_2010_11/files/QUI604_relatorio.pdf


Green Coffee
Steam
Water
Steaming
Saturating
Pre-Treatment
H_2O
H_2O
Regene-ration
Sepa-ration
H_2O Ethyl Actetate
H_2O Ethyl Actetate
Extraction
Decaffeination
Steam
Steaming
Drying
Decaffeinated Coffee
Post Treatment



http://www.demus.it/download/processo_eng.pdf

Alguns números….

Bulk density	(kg/m)
Red cherry	800
Wet green beans	800
Dry beans / pergamino	400
Light roast beans	368
Dark roast beans	288
Coarse ground coffee	304
Fine ground coffee	400

Weight yields

Wet processed coffee:

250kg fresh cherry = 102kg wet parchment = 54kg dry parchment = 45kg dry polished coffee

Dry processed coffee:

250kg fresh cherry = 91kg dry cherry = 45kg dry polished coffee

Roasting causes on average a 16% loss in weight and a 50-80% increase in bean volume.

Moisture content (m.c.)

Fresh cherry:	≈ 50%
Green bean:	8-13%
Roast coffee:	< 7% (depending on humidity)
Soluble powder:	< 4%

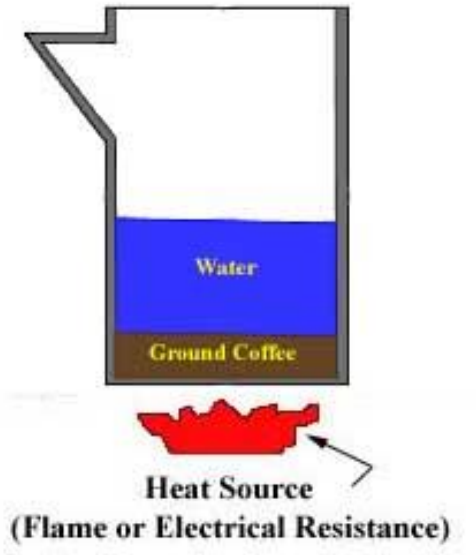
http://www.coffee-ota.org/3_7_property.asp

Bebida

moenda

Método:	Grau de moenda:
Turco	pulverizado
Filtro	Muito fina
Expresso	Fina mas não muito pulverizado
Cafeteira francesa	Média
Cafeteira	Média ou um pouco grosseira
Cafeteira Mocha	Fina
Percolador Original	Média
Vácuo	Média ou um pouco grosseira

CAFETEIRA


Water
Ground Coffee
Heat Source
(Flame or Electrical Resistance)


Brew
Grounds
Grounds could be placed in a cloth bag or "biggin"
Screen to Filter Brew
Brew
Grounds

CAFÉ TURCO

(cezve, briki, mbiki ,toorka, …)

http://www.brewed-coffee.com/2006/10/

Ibrik

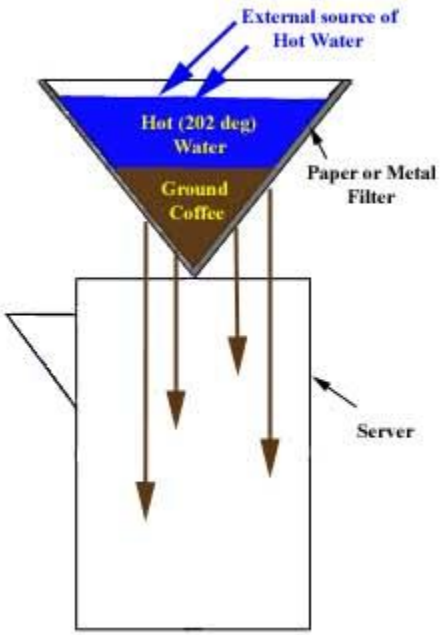
Popular na região do oriente médio, norte da África, leste europeu e Ásia, conhecido com vários nomes como café sírio, café árabe, café grego, ou o próprio café turco.
Para fazer um café turco consiste em utilizar a moagem mais fina possível colocando o mesmo directamente na água fria, onde vai ocorrer uma rápida infusão. Deve-se esperar o café levantar três vezes na Ibrik, sem deixar queimá-lo, para após um minuto, quando a borra do café baixar para o fundo da panelinha servir.
O café turco é feito já com açúcar e pode levar especiarias como semente do cardamomo *. De qualquer forma pode-se utilizar adoçante ou outras especiarias e até mesmo leite, como no café turco ao leite. Outra forma de se adoçá-lo é não colocar açúcar durante o seu preparo, mas colocar torrões de açúcar na boca no momento do primeiro gole da bebida.*
O sabor do café turco é único. Não parece um expresso e muito menos um café de coador. O café turco bem preparado possui um creme espesso e delicado e seu sabor é forte e

http://www.ineedcoffee.com/04/turkishcoffee/

http://www.agais.com/tpc/capitulo14_lidiane.pdf

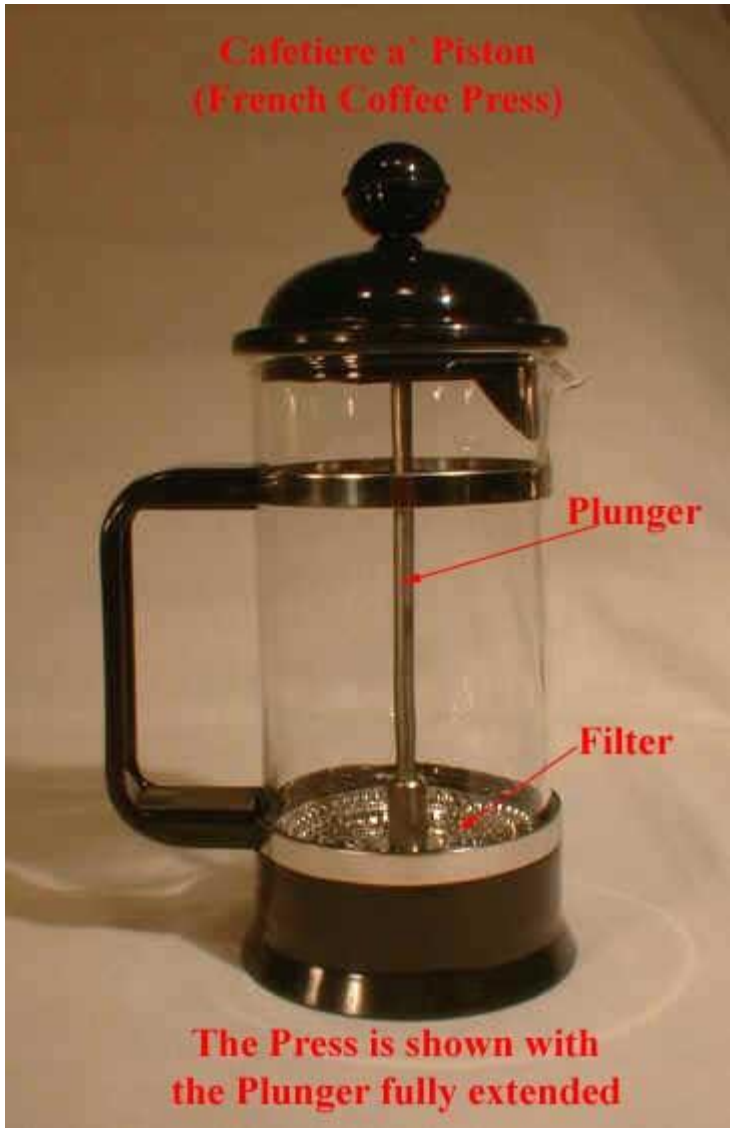
PERCOLAÇÃO

FILTRO



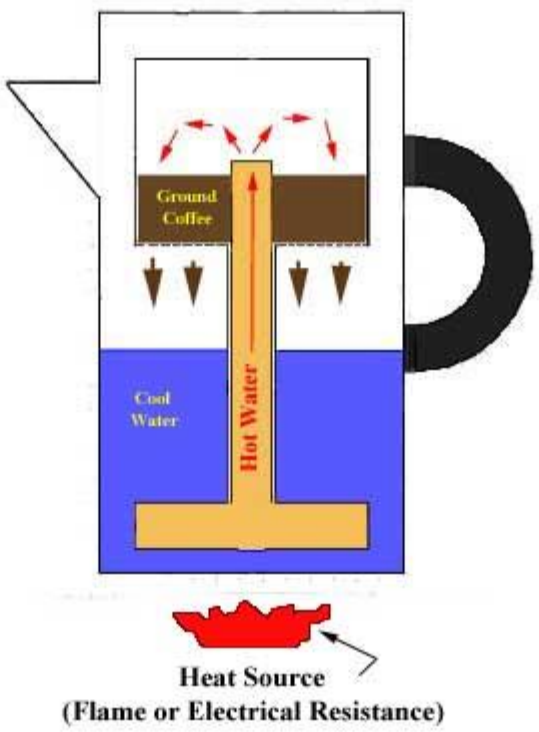
http://www.jitterbuzz.com/coftrip.html

Cafeteira francesa com filtro de pressão
Cafetiere a` Piston



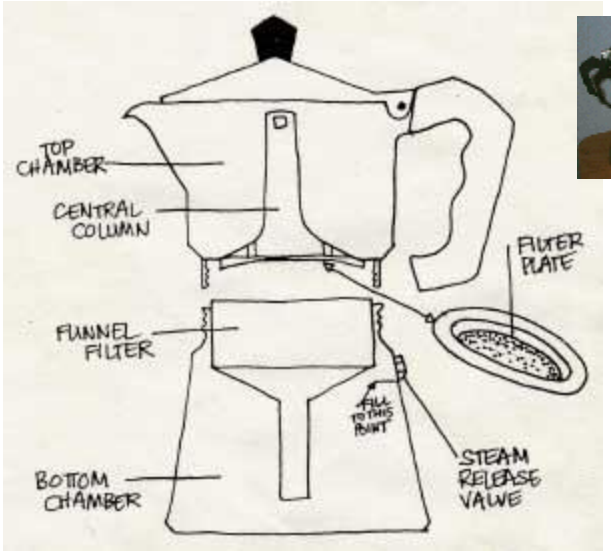
http://www.jitterbuzz.com/coftrip.html

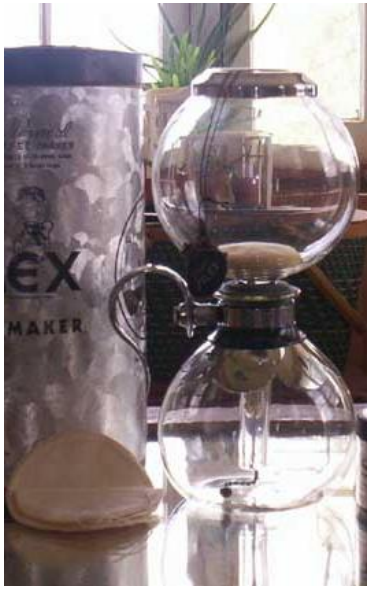
PERCOLAÇÃO

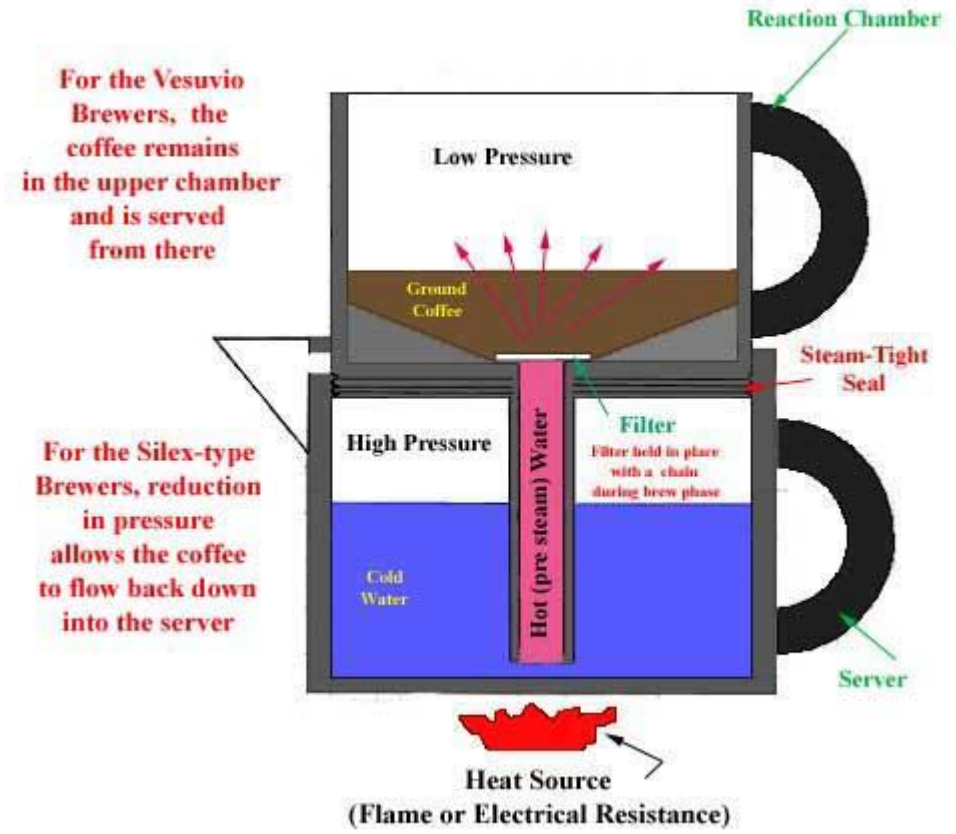


http://www.jitterbuzz.com/coftrip.html

VÁCUO







http://www.jitterbuzz.com/coftrip.htm

Vesuvio, Machinetta ou Moka

http://www.gimmecoffee.com/galleries/brewing_at_home_part_1_moka_po/

PREPARANDO COM A MOCA

A CAFETEIRA MOCA É COMPOSTA DE TRÊS PARTES: A CALDEIRA, NA QUAL A ÁGUA É LEVADA À FERVURA; O FILTRO METÁLICO, QUE SERVE PARA CONTER O CAFÉ MOÍDO FINO; UM RECIPIENTE SUPERIOR, NO QUAL O CAFÉ SOBE NOVAMENTE PARA DEPOIS SER SERVIDO. A ÁGUA PASSA ATRAVÉS DO CAFÉ GRAÇAS À PRESSÃO PROVOCADA PELO VAPOR; O TEMPO DE CONTATO ENTRE ÁGUA E CAFÉ É DE CERCA DE 1 MINUTO E A EXTRAÇÃO CHEGA A 22% DAS SUBSTÂNCIAS CONTIDAS NO CAFÉ.

O RESULTADO É UMA BEBIDA DE SABOR ENCORPADO, COM DENSIDADE MÉDIA E AROMA MUITO INTENSO. NORMALMENTE UTILIZAM-SE CERCA DE 6 GRAMAS DE CAFÉ TOSTADO A "MÉDIO" OU "ESCURO" PARA UMA XÍCARA DE VOLUME DE 40-50 MILILITROS.

ALGUMAS REGRAS PARA UM CAFÉ AD HOC

1.USAR ÁGUA FRESCA E LEVE. ÁGUA SALOBRA OU RICA DE CALCÁRIO OU DURA ENFRAQUECEM O SABOR ÍNTEGRO. NÃO USAR ÁGUA FERVIDA.

2.O RECIPIENTE DEVE SER ENCHIDO GENEROSAMENTE COM O CAFÉ MOÍDO E JAMAIS PRENSADO. COLOCAR O PÓ DELICADAMENTE, ELIMINANDO OS GRUMOS. DOSAR CONVENIENTEMENTE AS PROPORÇÕES DE CAFÉ E ÁGUA.

3.NÃO ACELERAR O TEMPO DE PREPARO; EM VEZ DISSO, INICIA-SE COM ÁGUA FRIA, QUE DEVERÁ ESQUENTAR GRADUALMENTE SOBRE A CHAMA. ESPERAR ALGUNS MINUTOS.

4.A CAFETEIRA É COLOCADA NO FOGO BAIXO E COM A TAMPA ABERTA. POR ISSO É BOM COLOCAR UMA PROTEÇÃO NO BICO POR ONDE SAI O CAFÉ.

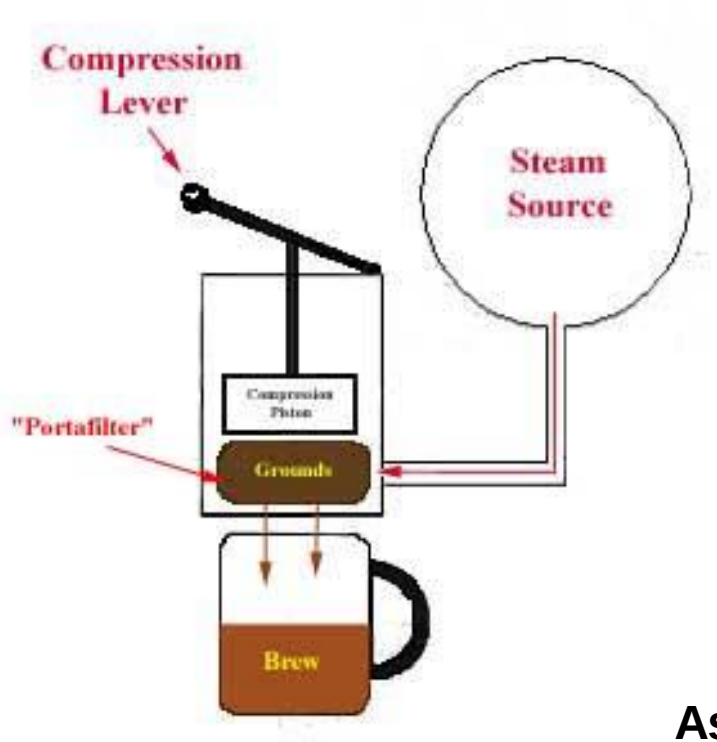
5.RETIRAR A CAFETEIRA DO FOGO QUANDO O CAFÉ ESTIVER PRONTO. A BEBIDA NÃO DEVE JAMAIS FERVER, POIS ADQUIRIRIA UM SABOR DESAGRADÁVEL. PORTANTO, AFASTAR A CAFETEIRA DO FOGO ALGUNS INSTANTES ANTES QUE A CAFETEIRA TERMINE DE ESGUICHAR O CAFÉ.

6.TOMAR O CAFÉ MUITO QUENTE, ASSIM QUE ESTIVER PRONTO: É O MOMENTO MAIS INDICADO PARA APROVEITAR O AROMA E SABOR DE FORMA PLENA. O CAFÉ QUE SOBRAR DEVE SER CONSERVADO NA GELADEIRA, PARA MANTER MELHOR AROMA E SABOR.

7.LIMPAR COM ATENÇÃO A CAFETEIRA A CADA VEZ EM QUE ELA FOR USADA; NÃO ENXAGUAR COM SABÃO OU DETERGENTE — SOMENTE COM ÁGUA FERVIDA. A LIMPEZA DO FILTRO DEVE SER FEITA COM MUITO CUIDADO. ANTES DO USO É ACONSELHÁVEL DEIXAR FERVER COM POUCO CAFÉ AS CAFETEIRAS NOVAS OU AS QUE NÃO SÃO USADAS HÁ MUITO TEMPO.

http://www.lavazza.com/corporate/br/coffeculture/customs/Facciamolo_Moka

EXPRESSO



As máquinas devem permitir a operação com pressão de 9 atmosferas (atm) e temperatura de 90º C, entre 25 a 30 segundos.

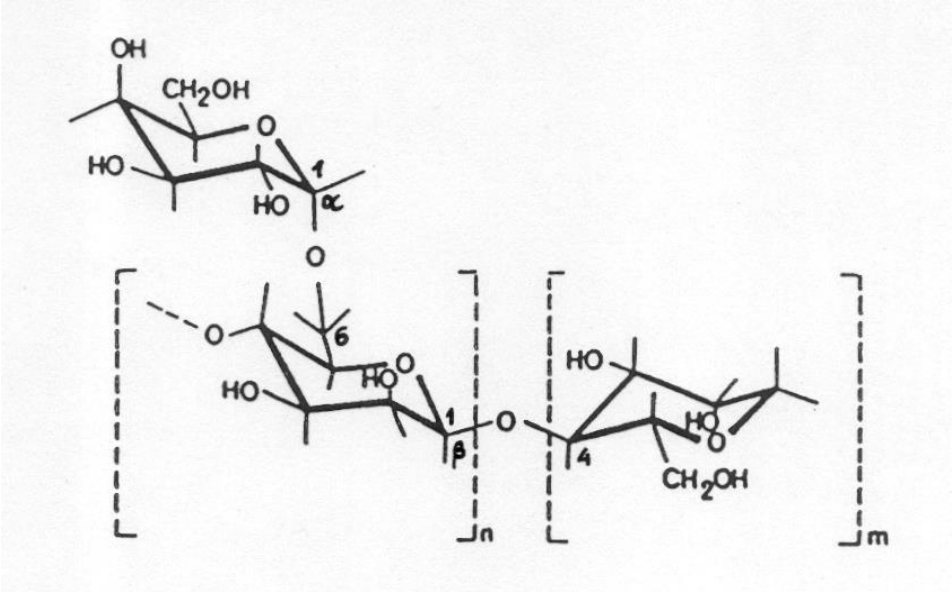
http://www.jitterbuzz.com/coftrip.html

O café expresso é concentrado – 7 gramas de pó para até 50 ml de água – de aroma e sabor intensos com um bom corpo e persistência no paladar, coberto por um denso creme cor de aveia (castanho claro) em toda a superfície da chávena cuja espessura deve estar entre 3mm e 4mm.

http://www.easy-coffee-recipes.com/espresso-coffee.html

A estabilidade da espuma do café expresso está relacionada com a quantidade de polissacarídeos extraídos. Os polissacarídeos do café expresso são maioritariamente galactomananas (2/3) e arabinogalactanas (1/3). A origem botânica do café assim como o grau de torra influenciam a quantidade de galactomananas que são extraídas para a bebida, estando a presença de galactomananas na bebida relacionada com a maior a estabilidade da espuma.

As galactomananas são constituídas por uma cadeia principal de resíduos de β-D-manose unidos por ligações glicosídicas (1→ 4), aos quais se ligam, como cadeias laterais simples, resíduos de α-D-galactose através de ligações (1→ 6).



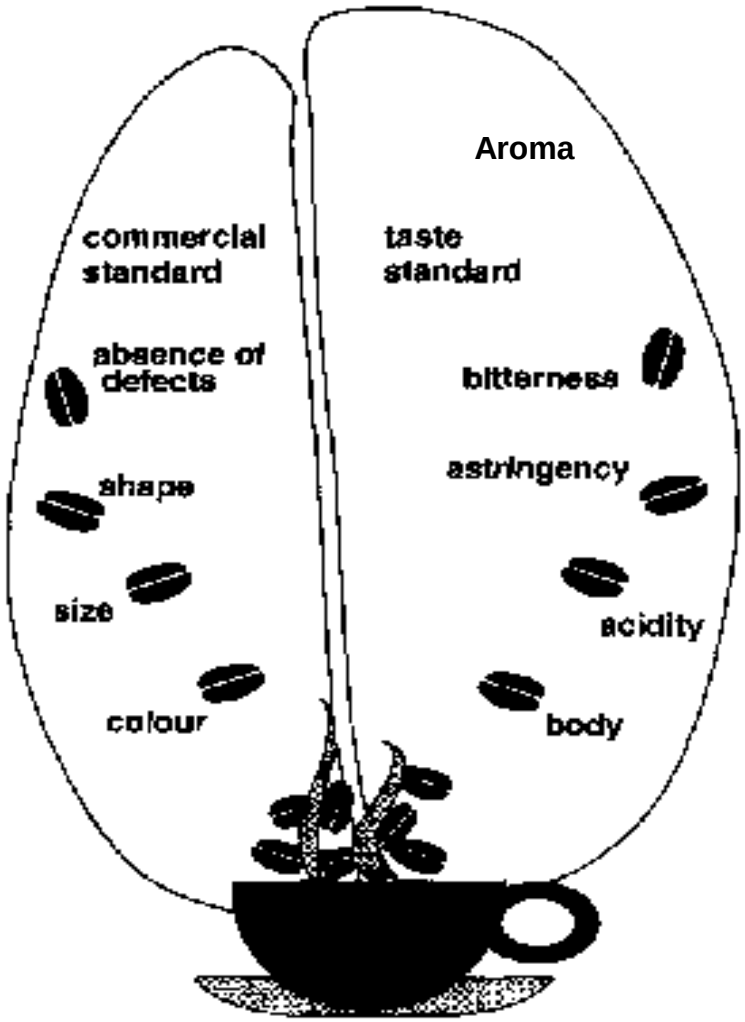
http://www.cienciaviva.pt/docsforum/espumadecafe.pdf

BICA: Beba isto com açúcar

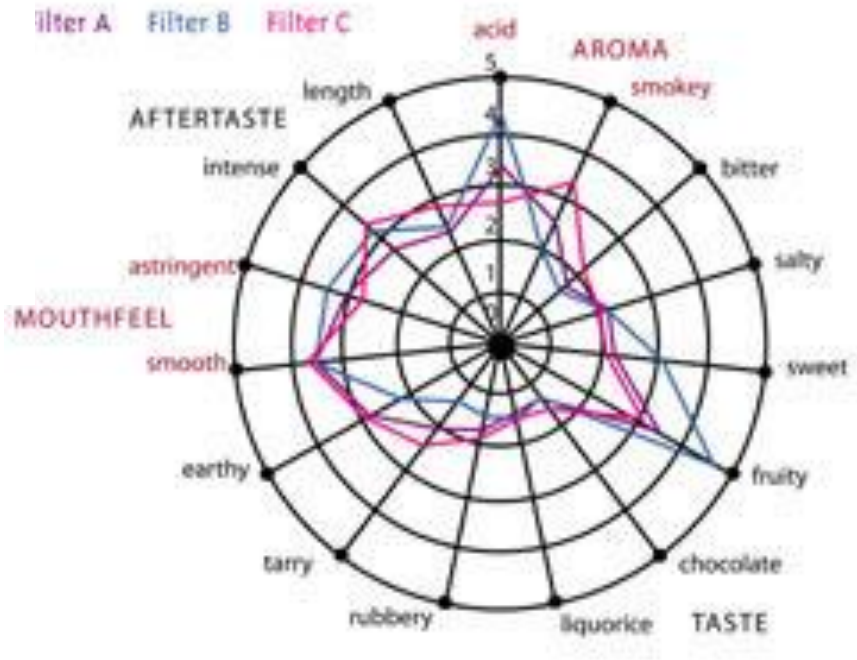
A maioria das pessoas que toma café diariamente ignora quais são as substâncias que estão presentes no café e pensa que o café contém apenas ou principalmente cafeína. Grande engano. O café possui apenas 1 a 2,5 % de cafeína e diversas outras substancias em maior quantidade. E estas outras substâncias podem até ser mais importantes do que a cafeína para o organismo humano.O grão de café (café verde) possui além de uma grande variedade de minerais como potássio, magnésio, cálcio, sódio, ferro, manganês, rubídio, zinco, cobre, estrôncio, cromo, vanádio, bário, níquel, cobalto, chumbo, molibdénio, titânio, e cádmio; aminoácidos como alanina,arginina, asparagina, cisteína, ácido glutâmico, glicina , histidina, isoleucina, lisina, metionina, fenilalanina, prolina, serina, treonina, tirosina, valina; lipídeos como triglicerídeos e ácidos graxos livres, açucares como sucrose, glicose, frutose, arabinose, galactose, maltose e polissacarídeos. Adicionalmente o café também possui uma vitamina do complexo B,a niacina (vitamina B3 ouvitamina PPde "Pelagra Preventing" do inglês) e em maior quantidade que todos os demais componentes, os ácidos clorogénicos, na proporção de 7 a 10 %, isto é 3 a 5 vezes mais que a cafeína.Após a torra, os ácidos clorogénicos formam diversos quinídeos que possuem vários efeitos farmacológicos, como aumento da captação de glicose (efeito antidiabético), acção antagonista opióide (efeito anti-alcoolismo e inibidora da recaptação da adenosina (efeito benéfico na micro circulação).

http://sites.google.com/site/adegaacacio/coisas-do-cafe

What bean makes a "good cup of coffee" ?



Graph: Jutta Fritsch



http://www.matthewalgie.com/find_out/lab-dealing.html