

Fine Cocoa Attributes,

New Fermentations and

By-Products

Bertus Eskes and Dario Ahnert Fine Cocoa Inventors/Consultants



Phenomenal Cocoa & Chocolate Delicacies

The Magie of Reality





My Presentation = My Book

Freely Available at:

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Bertus Eskes, Holland/Brazil

- 1971 2016Geneticist of coffee and cocoa, Brazil/France
Projects in 12 cocoa producing countries
- 2008/09 Initiator of "Cocoa of Excellence (CoE)" competition, France

2001/11



Cocoa Farmer in Bahia

- 2007 Discovers the relationship between pulp flavors and aromas and fine-chocolate attributes
- 2009 *European patent on fermentation of cocoa with aromatic substances ("TropMix" method)*
- 2015/20 Fine flavor Surveys in Peru and Brazil
- 2019 Anima Fermentation Technology
- 2021 Tradima Fermentation Technology
- 2021 "Phenomenal Cocoa" Book



Cocoa and Me: 52 Years of Marriage

"Love is to be Paid for by Love"



1. Flavors and Aromas in Cocoa Fruits

2. New Fermentations

1. 3. New Fine By-Products





Fine Atttributes

1. Fine Cocoa Attributes

Other Sensory Attributes than "Cocoa" Flavor (ICCO)





Origin of Fine Flavor Traits

> Fermentation: Nutty

Pulp: Citric Acid, Sweet, Fresh and Mature Fruit, Floral, Spicy



Fine Flavor Traits Derive 5/6th From the Pulp



Our Objective: Study Cocoa Pulp Flavors and Aromas



These have Been Little Studied so Far



Pulp Flavors and Aromas Determine Fine Chocolate Traits (Eskes et al. 2009, 2012)

- Fine-flavor cocoa countries grow cocoa varieties with *nice pulp*, eg. Trinidad TSH varieties
- Aromatic substances added during fermentations are incorporated into beans and chocolates (TropMix, 2009)



Pulp and chocolate sensory traits of traditional fine-flavor cocoa varieties *are related*



Traditional Fine Flavor Cocoa varieties (4 flavors and 2 aromas)

Variety	Pulps	Chocolates
Criollo	very sweet	caramel
Trinitario	citrus/lemon	fresh fruit
Nacional	jasmine, herbal	floral, herbal
	fruity	fruity
Scavina 6	grape, lilv	raisin. floral



Genetic Pulp and Chocolate traits are related



Oportunities

- 1. Rapid identification of new fine cocoa varieties by evaluation of pulp flavors and aromas (genetic variation)
- 2. Modification of chocolate flavor and aroma by *adding aromatic substances* during fermentation (*naturally induced variation*)





Genetic Variation for Fine-Flavor Cocoas

T.cacao: All that is Good should be Simple





The nose to identify the aroma







The *mouth* to identify the *flavors*







Genetic Surveys

Eight surprising new pulp sensory traits identified in different countries between 2007 and 2012

Example:

« Banana Cocoa » Tree in Trinidad
"This chocolate with intense banana jam flavor
persists long time in the mouth"
(Bertus Eskes)

Expressive Pulp Flavors Become Expressive Chocolate Flavors





Survey of Native Chuncho 2015/16, Cusco, Perú 226 Old Chuncho trees, used for juices







Survey of 48 Brazilian « bulk » varieties









Chuncho and Brazil Pulp Survey Eskes *et al.*, 2018

• 29 Fruit Flavors

citrus, mandarin, tangelo, jack fruit, annona, soursop, custard apple, 5 bananas, grape, green apple, dry apple, roseapple, guava, cranberry, mango, inga, peach, plum, honey, raisin, red mature fruit, red fresh fruit, yellow fresh fruit, fruity, mangosteen



• 14 Aromas (Floral and Spices)

rose, jasmine, lily, floral, heavy floral, spicy, cinnamon, vanilla, mint, yeast, basil, malt, violet and licorice



Peru and Brazil

- 73 Unique Sensory Profiles, eg.
 - tangelo/jasmine, lemon/jasmine, banana, mandarin/jasmine, lily/rose, soursop/rose, mango/rose, roseapple/floral, mint/jasmine, cranberry/rose, nuts/rose, mango; custard apple; lnga; lnga/floral; citrus/yeast; mangosteen, citrus/banana (var. lsla); citrus/rose/jasmine; basil; mint/floral; malt/jasmine; mint/jasmine; nuts; mint/nuts/lily; peach/jackfruit; etc.





Perspectives



> Peru:

Chuncho Used to be « Bulk » Cocoa just 10 Years Ago

Increased Commercial Interest in fine-flavor/aroma Chuncho

Eg. Location with pure Rose Aroma



Perspectives

> Brazil:

- Mainly bulk cocoas with traditional fermentations
- Flavor/aroma diversity of just 48 varieties is 50% of Chuncho
- Need to extend survey
- Potential to produce fine flavor cocoas in Brazil is enormous

Need for a fine-flavor fermentation method to realize potential!





Example of Fine Flavor Selection

Hybrid cocoa in Bahia, Brazil

- 40 trees with divers flavor/aroma profile
- 20 trees with excellent profiles
- **Examples:**

Peach/Lily Acid Apple/Lily Lime/Jasmine Mango/Rose Muscat Grape/Lily Herbal Mango/Cumin









Cocoa Sensory Identity Symbol

Both Mimick Interesting Far-Away Attributes







Cocoa Sensory Associations

Between Sensory Traits

With other Traits





Cocoa Sensory Associations

- Citrus/Jasmine
- Mandarin/Jasmine
 - **Tangelo/Jasmine**



Probability by chance = 0.001 Not accepted at P=0.05



Cocoa Sensory Associations





Cocoa Sensory Associations





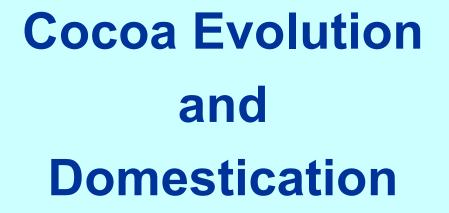
Cocoa Sensory Associations

Normal vs. Soursop Cocoa Beans





How to Explain 43 Fine Flavors and Aromas and 31 mimicked attributes in *T.cacao*?





Evolutionary role of frugivore animals in Cusco, Peru





What is good for one monkey is also good for the other monkey!









Native *Matsigengas* = domesticators that

pre-historically consumed cocoa pulp and beans

in Cusco and sold beans to the *lncas*







Genetic sensory expression of *T. cacao* vs. other fleshy fruit species





Genetic expression of Sensory Traits

Т. сасао	Other fruits
Expresses 73 sensory profiles	<i>Express one sensory profile</i> (an apple is always an apple)
<i>Qualitative Expression of 43</i>	<i>Quantitative Expression of</i>
<i>Traits</i>	one Profile
Simple pleiotropic	<i>Complex</i> inheritance
inheritance	(tomato: 100 QTL)

Selection for fine cocoa varieties is easy!





Phenomenal Cocoa

Hypotheses (Eskes 2021)

- 1. Cocoa maybe SuperNatural, as the Incas that consumed cocoa?
- 2. Sole Scientific Explanation: « T. cacao Loves Human Beings »





Phenomenal Cocoa

Recommendations

- 1. Carry out selection of new varieties for interesting pulp sensory profiles
- 2. Carry out more surveys of pulp sensory traits in many cocoa producing countries
- 3. Relate interesting pulp sensory profiles with chocolate profiles using fine cocoa fermentation methods
- 4. Compare volatiles of cocoa pulp, eg. Rose, with the true Rose volatiles.





Phenomenal Cocoa

Discussion Fine Cocoa Sensory Diversity





Fermentation Methods

New Fine Cocoa Fermentation Methods

TropMix
Anima Child
Anima Adult
Tradima





Fermentation Methods

Objectives New Fermentation Methods

Zero Bitterness, Acetic Acidity and Astringency



Fine Flavors Well Expressed



TropMix: Addition of aromatic substances during fermentation



• EU patent, 2009

- > With Cupuaçu and Soursop
- Excellent chocolates tested in France
- > 100 TropMix fermentations in Brazil (2015-21)
- Regional aromatic products can be valorized in « terroir » chocolates



TropMix

- 1. Fruit pulp or Spices Added
- **2**. Traditional fermentation:

becomes longer, more bitter and astringent

3. Best association of TropMix is with Anima





Example of bulk cocoa Amelonado transformed with TropMix/Anima (Brazil)

Treat- ment	Days	Acidity	Bitter- ness	Astrin- gency	Nutty	Fresh fruit	Mature fruit	Spicy	Floral	Prefe- rence
Farmers control	7	0	3	3	0	0	2	0	0	5
Clove and cinnamon	3	0	3	1	2	0	0	8	5	9
Jackfruit	6	2	1	1	3	3	6	3	0	10
Cupuaçu	4	0	2	1	4	2	6	2	6	10

Large variation induced for fine-flavor traits!

Amedei loved the Cupuaçu TropMix



Example of bulk Vietnam cocoa varieties flavored with Durian pulp (Cambodja)

***I *** ③ ● ♥ ● * ● * * 0 / 46% ■ 13:05	Treat- ment	Days	Acidity	Bitter	Astring.	Cocoa	Nutty	Sweet	Fr. fruit	Mat.fruit	Floral	Prefe- rence
WHEN CACAO AND DURIAN	Durian	4	4	0	1	4	6	6	10	3	4	10+ +
ARE TOINING FORCES		<pre>+</pre>										



TropMix Potential

 Unlimited Variation for Flavors and Aromas
Large potential for Regional « Terroir » Products



But TropMix

Not accepted in international cocoa competitions!

While 80% of Fine Chocolates

Have Inclusions or Flavorings!



This means Injustice to the

Farmers!



ValRhona Double Fermentation « Invention » (2016)

- = TropMix Fermentation at 4 Days!
- Passion Fruit and Oranges (2016)
- > No Reference to my Patent, but
- At Least Shows Commercial Validity of TropMix

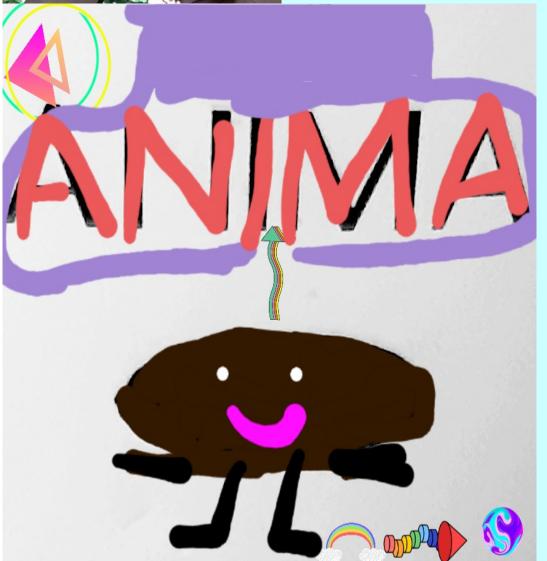


Other New Fermentation Technologies

(Experimental/Commercial)







"Anima" (= Soul, Spirit of the Forest)

Fermentations



"Anima Child"

2015-2018





Protocol of my First Anima Fermentation (2015)

- Small Boxes
- Three Steps: 1 Before and 2 During
 - **Fermentation**



- Steps: 1-2 Preference Points (0-10 scale)
- Total 9-10 points
- Traditional Control = 5 points



CoE Award: 2017

Limitation: Good for Small Quantities Only

Less than 12-16 litre boxes for adequate aeration





Anima Adult Fermentations

"Anima Adult"

2018





Adult Anima

Fermentations (2015)

- Small, Medium and Big Boxes
- > Two Steps: Before and During
 - **Fermentation (Aerobic)**
- One and 3 Preference Points
- Total 10 points





SuperNatural Cocoa

Anima Duration of Fermentation

Tw		81	91	91	101	101	101	119	117	127	121	13¶	13¶	14¶	15¶	Þ
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9=	a	α		42¤		42¤		30¤		72hg	a	æ	n	æ		¤
10¤	α	a				44¤					86h¤	¤	æ	x		¤
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Adult Anima Fermentations

Uniform Anima Beans

- * No bitterness nor astringency
- Little blooding
- * 95% cotyledon openings
- * All uniform taste
- * 100% Fermented
- * PH 6-6,2
- * Need protection against mold (with vinegar)



Discussion Anima Technology

- ► The *Anima* fermentations counterdict secular *dogmas* of cocoa fermentation!
- The Aerobic Condition is the Main Fermentation Step
- End of Fermentation is Determined by *Tasting* in stead of the *Cut-test*
- Cheap and Simple Method





Adult Anima Fermentations

Adult Anima Beans Compared to Control

Treat- ment	Days	Acidity	Bittern.	Astring.	Honey	Nutty	Fresh fruit	Mature fruit	Floral	Aftertaste	Prefe- rence
Farmers control	7	3	4	3	0	0	0	2	0	5	5
Anima Amelo- nado	3	0	1	0	4	4	3	3	3	8	9
Anima CCN51	4	3	2	1	3	4	6	2	3	9	9
Anima CEPEC	4	0	1	0	5	5	0	8	5	10	10+





Other Anima Assessments

"I hated chocolate. But Anima is fantastic"

(First Anima chocolatier in Africa, 2021)



"The most balanced chocolate I ever tasted. Can be universally pleasing to any palate" (Young chocolatier in Brazil, 2023)



Anima Potential

Anima fermentations transform bulk cocoas into fine-flavor cocoas!



Worldwide potential for cocoa quality improvement is unlimited!



Commercial Features of Anima

- More than 200 Experimental and 500 Commercial Anima fermentations done in Brazil
- Anima chocolates made by Domori sold better
 - than 9 other fine cocoa origins in France (2020)
- Anima International: Brazil, Peru. Colombia,
 - Ivory Coast, Cameroon, Cambodja and Thailand







Cocoaian Company Abidjan (2022)

- ► 200 Farmers
- ► 100% Anima
- Produces chocolate and other cocoa

products in Abidjan

► Sells to Belgium





Anima Awards

Two Brazil Two Peru Two Paris



Adult Anima Fermentations

Anima Recommendations

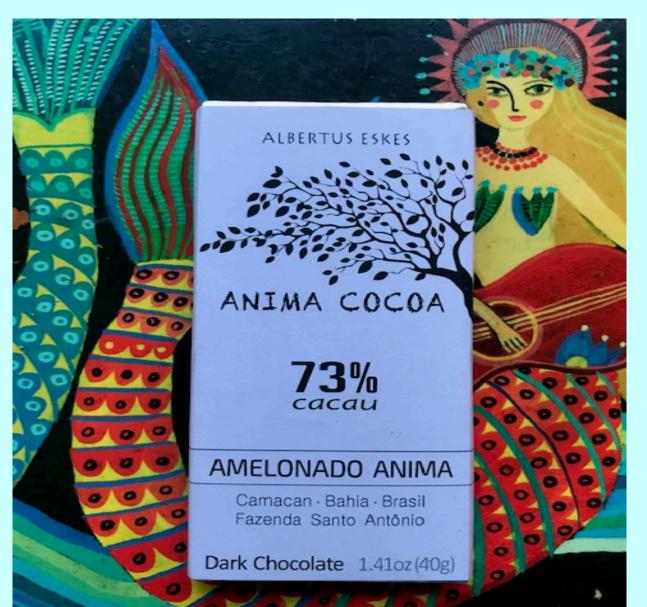
- Associate Anima with local or regional processing because Anima beans can become stressed by travelling (is being studied)
- Regional Anima-TropMix excellent approach for exploring "terroir" effect







The End of the Beginning of Anima





Anima Alternative: Tradima Fermentations

(Traditional x Anima)





Tradima Steps

- > 5-7 days pod storage
- Traditional Fermentation (3-4 days)
- Additional Fermentation Step
 - (reduces acidity and bitterness)





Examples of Tradima

Treat- ment	Days	Acidity	Bittern.	Astring.	Honey	Nutty	Fresh fruit	Mature fruit	Floral	Aftertaste	Prefe- rence
Farmers control	7	3	3	3	0	0	0	2	0	5	5
Tradima 1	6	2	3	1	4	4	4	4	8	9	9
Tradima 2	5	2	0	0	4	4	0	6	5	9	9
Tradima 3	6	0	1	0	6	6	0	8	6	10	10





Tradima Technology

- ► 100% without acidity and bitterness
- Fine cocoa traits are well expressed (eg. fruit, floral)
- Quality comparable to Anima





Recommendations Tradima Fermentations

Use Tradima for small and large scale companies

More resistant to transport stress and mold formation

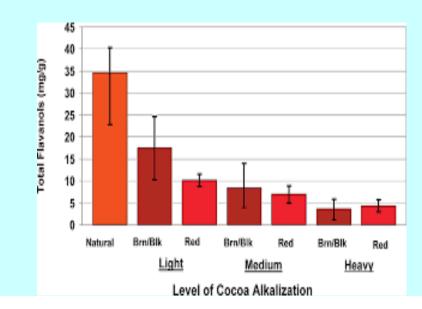




Anima and Tradima Fermentations

Recommendations

Large scale Anima and Tradima makes Dutching unnecessary, obtaining more savory and 400% more healthy industrial cocoa products







Anima and Tradima Fermentations

Recommendations

- Numerous research projects are needed to explain the *chemical and sensorial* bases of Anima and Tradima quality traits.
- These should include studies of beans during fermentation, after fermentation, after drying and after storage.
- So far, only one student in Cameroon is planning his PhD study (Patrick Fokem)





New Cocoa Path





The End of the Glacial Cocoa Era:

- Warm Cocoa Stimulated the Mayas
 - By Drinking its Hot Chocolates
 - Aromatic Cocoa Pulp and Beans
 - Were Savored by the
 - Matsigengas" in Cusco
 - Female Cocoa Beans Dominated
 - **The Male Coca Leaves**
 - Consumed together by the Incas
 - These are Warm, Savory and Love Traditions





It was the Spanish that initiated the Path

- Of Chilling Down Cocoa
 - Mixing it with Milk
 - Mixing it with Sugar
- Destroying its Original Spirit
 - **They Produced Cocoa Beans**
- In "Dead" Boxes without Air
 - Suffocating Her
 - Killing Her Soul





With so much SufferingShe became



- Glacial, Bitter and Astringent
 - And lost Her Fine Flavors
 - Treated with Lack of
 - Understanding
 - For Five Centuries





- The Genocide of
- Cocoa Beans Continues
- Suffocating Her Massively
 - Inside and Outside
 - Concentration" Boxes



- And then Treated by the "Dutching" Process
 - **To Eliminate the Consequences of**
 - Cocoa Sufferings
 - **To Eliminate most of Her Beauties**
 - Including Antioxidants
- **Creating a Chemical "Frankenstein" Product**
 - That Nothing has in Common
 - With Her True Nature
 - **Gracious, Docile, Savory, Aromatic**
 - And Healthy







Finally,

- Another Dutch Invention
- Respecting Her True Nature
 - Is now Illuminating the
- Light at the End of the Tunnel
 - Of Her Massacre







- She is Reviving
- Performing Her Path Back
- **From the Past to the Future**
 - From the Traditions
 - Of the Matsigenkas,
 - Of the Incas and
 - Of the Mayas
 - That were the First
- **To Worship the Cocoa Goddess**





Docile, Savory and Aromatic A "SuperNatural" Being That Cures Many Diseases And Feeds the "Anima" Of the Human Being The Most Perfect Being in the World!



Fermentation Technologies

Discussion

Fermentation

Technologies





Three Recently

Invented Cocoa



By-Products

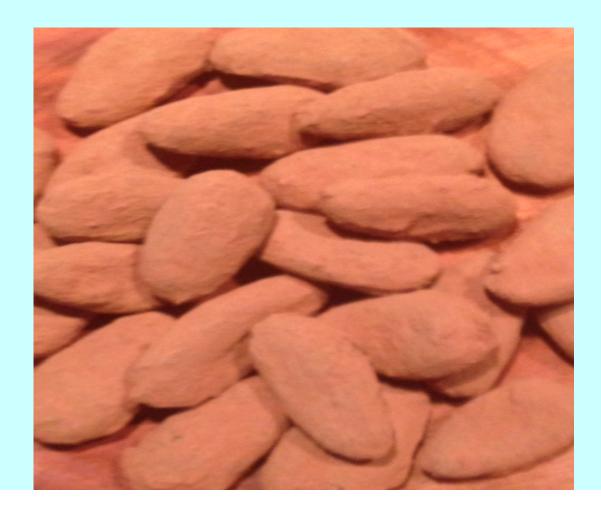
CacaoNuts CacaoNutlates Cocoa Perfume



Objective: More Farmers Income



1. CACAONUTS







By-Products

CacaoNuts Factory



- Two Hours Drying at 50-60 Degrees
- Add Cocoa Powder
- Shelf Life 2 Years in Frig and 6-12 Months at Room Temperature





By-Products

CacaoNut Features

- ➢ 100% Cocoa
- > 0% Bitterness and Astringency
- Savory with Nutty and Fresh Pulp Taste
- Whole Fruit Product
- 100% + Polyphenols than B2B Chocolate
- 100% + Fibers than in Chocolate







2. CacaoNutlates = CacaoNuts as Chocolates

2.1. 100% CacaoNuts

2.2. 50% CacaoNuts 50% Chocolate





Phenomenal Cocoa





CacaoNuts (dry fruit) and CacaoNutlates (balanced chocolate profile)

Treat- ment	Citric Acid	Bittern.	Astring.	Сосоа	Nutty	Sweet	Fresh fruit	Mature Fruit	Floral	Prefe- rence
Cacao Nuts	4	1	0	2	6	3	8	3	6	9
Chocolate 70%	0	3	2	7	3	4	0	4	0	7
Cacao- Nutlates	3	2	0	4	4	4	7	4	5	10



CacaoNuts and CacaoNutlates

- * Special Unique Taste Comes from the Pulp (Fruity and Floral)
- * Can be Marketed for Fine Chocolate and Health Consumers
- * Potential New Commodity Segment!

Extra Income for Farmers!



3.Cocoa Perfume







Cocoa Perfume Factory

GacaoNuts and CacaoNutlates

Special Unique Taste Comes from the Pulp (Fruity and Floral)

> Can be Marketed for Fine Chocolate and Health Consum

> Potential New Commodity Segment!

Extra Income for Farmers



Alcohol + Aroma



Cocoa Perfume

- Collected from Emptied Husks
- With 95-100% Alcohol
- ► 300 Husks = 1 Liter Product
- Two Hours Man Labour
- **3 % Fixator**
- ► 6 Months Maturation

NB. One liter of true Rose Perfume Needs 1500 kg of Rose petals



Phenomenal Cocoa





Persistance on the Skin

Chanel 5: 12 hrs

Cocoa Rose "Perfume": 12 hrs !!!!

Cocoa Jasmine "Eau de Perfume": 6 hrs





Potential Market Value

- * Attractive Product for Consumers
- * Craft Cocoa Perfume can be expected to sell in Perfume and Chocolate Shops





Potential Market Value for Farmers

- * 50 ml of Eau de Perfume: 20 USD
- * One liter = 400 USD



* **Two hrs of collecting = potentially** valued at least at **100 USD**



Conclusion

New by-products have potentially great market value:

* CacaoNuts * CacaoNutlates * Cocoa Perfume



Potentially increased sustainability for the farmer



Caipirinha Fenomenal

Ultimo pero no la Peor Invención:

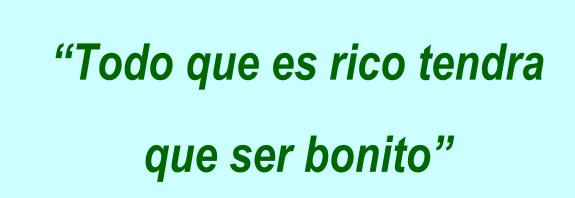






Caipirinha Fenomenal

Mescla de 2-4 Frutas em Vez Solo uma Fruta







Caipirinha Fenomenal Composición: 1/2/3 "Todo que es Bueno deberá ser Simples"



Uma Dosis: 2-4 Frutas Espremidas Dos Doses: Cachaça, Wodka o Agua Tres Doses: Hielo Triturado con la mana





Caipirinha Fenomenal

Algunas Combinaciones

- 1/2 Limón verde + 1/3 Guyaba +1/2 limón dulce
 - 1/2 Limón verde + 1/2 Limón dulce
- 1/3 Limón verde + 1/3 Limón dulce + 1/3 Maracuyá
- 1/3 Limón verde + 1/3 Mandarina + 1/3 Maracuyá
 - 1/3 Limón verde + 1/3 Tangerina Ponkan+
 - 1/3 Maracuyá
 - 1/2 Limón verde + 1/2 Mandarina
 - 1/3 de Limón verde + 1/3 de Anacardo + 1/3 de Maracuyá

Azúcar según preferencia



Caipirinha Fenomenal

Cheers

Santé

Prosit

Salud

Phenomenal Cocoa & Chocolate Delicacies

The Magie of Reality





Remember

Presentation, Protocols and My Book are Freely Available at:

albertuseskes @ gmail.com



Phenomenal Cocoa

THANKS

