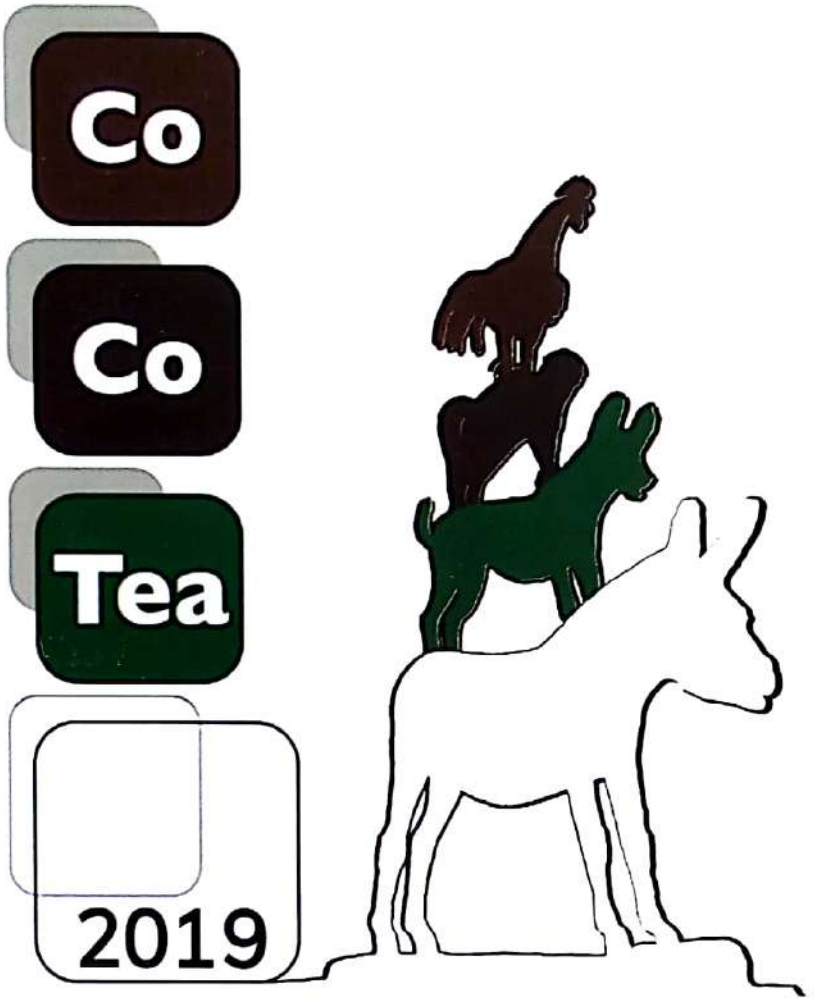
Book of Abstracts



Fifth International Conference on Coffee, Cocoa and Tea

Cocotea 2019

26th to 28th June 2019

Jacobs University, Bremen, Germany

JACOBS UNIVERSITY

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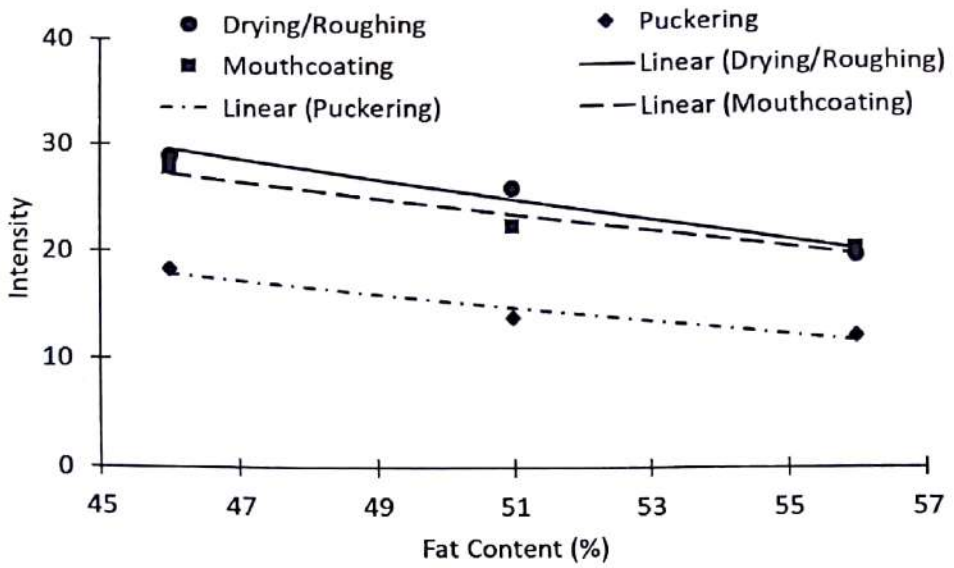

Figure 2: Mean attribute intensity ratings vs. fat content. Attributes shown have significant linear trend by regression analysis.

References:
[Reference1] M.R. Bajec; G.J. Pickering, (2008), Astringency: Mechanisms and perception, Critical Reviews in Food Science and Nutrition, 858-875, https://doi.org/10.1080/10408390701724223
[Reference2] B.J. Lyman; B.G. Green, (1990), Oral astringency: Effects of repeated exposure and interactions with sweeteners, Chemical Senses, 151-164, https://doi.org/10.1093/chemse/15.2.151
[Reference3] C. Dinnella; A. Recchia; H. Tuorila; E. Monteleone, (2011), Individual astringency responsiveness affects the acceptance of phenol-rich foods, Appetite, 633-642, https://doi.org/10.1016/j.appet.2011.02.017
[Reference4] I. Lesschaeve; A. Noble, (2005), Polyphenols: factors influencing their sensory properties and their effects on food and beverage preferences, The American Journal of Clinical Nutrition, 330S-335S, https://doi.org/81/1/330S

Cocoa Poster 04

Application of Napping and SensoGraph procedure on sensory characterization of raw chocolate and cocoa beans

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Raw chocolate is a new type of chocolate produced from minimally-processed ingredients and using temperatures below 42°C during the all transformation processes, comprising fermentation and drying and avoiding the roasting step. It is made from raw-processed cocoa beans and cold pressed cacao butter. Also, several "raw" sweeteners, such as coconut sugar, agave or maple syrups, xylitol or stevia, may be used as replacers of cane or beet sugars that are not allowed.
The aim of this work was to define the sensory characteristics of nine cocoa beans (three raw, three traditionally fermented, dried but unroasted, and three roasted) and eight chocolates (four raw and four traditionally produced) from different origin applying two Projective Mapping procedures: Napping and its geometric counterpart SensoGraph[1]. With these techniques, it is possible to perform a fast sensory profiling based on a consensus map integrated by weighted connections between samples. Sensory analyses were performed by nine trained tasters during two sensory sessions. The results were preliminary subjected to a Multiple Factor Analysis in order to highlight the sensory profile of each sample. Significant differences for chocolates and beans according to their origin and treatment were obtained. The fifty identified sensory descriptors were divided into fifteen classes. The descriptors with a high sample discriminant capacity were spicy, fermented and dried fruits. The sample tablecloth positions provided by each taster were later clustered using the Gabriel graph and then merged into a single map using the algorithm of Kamada and Kawai, which provides relationships between samples. The results have underlined the interconnections between samples helping to understand the relation between the sensory profile and ingredients and/or process and/or origin inside the samples. In particular, the origin was a prominent factor in the sample discrimination while the treatment (raw or traditional) proved to be a weak factor.

References: [1] Orden et. al., (2019), Food Quality and Preference, 1-9, 72

Application of Napping and SensoGraph procedure on sensory characterization of raw chocolate and cocoa beans

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Introduction

Raw chocolate is a new type of chocolate produced from minimally-processed ingredients and using temperatures below 42°C during the whole transformation process, comprising fermentation and drying and avoiding the roasting step. It is made from raw-processed cocoa beans and cold-pressed cacao butter. Also, several "raw" sweeteners such as coconut sugar, agave or maple syrups and xylitol or stevia may be used as replacers of cane or beet sugars, which are not allowed.

The aim of this work was to define the sensory characteristics of nine cocoa beans (three of which were raw, three traditionally fermented -dried but unroasted- and three roasted) and eight chocolates (four raw and four traditionally produced) from different origins, applying two Projective Mapping procedures: Napping and its geometric counterpart SensoGraph.

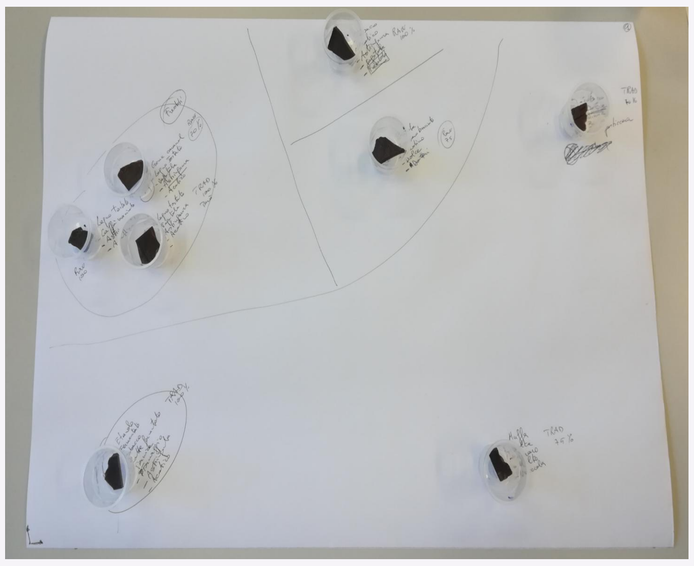
Materials and Methods

Projective mapping positioning was carried out by nine trained tasters during two sensory sessions.

The nine cocoa beans and the eight chocolates were simultaneously presented to each judge, who was requested to lay out the products on a paper tablecloth (40 cm*60 cm) in such a way that two products were very near if they seemed identical and that two products were distant from one another if they seemed different (Fig. 1). The tasters were allowed to retaste the samples and to change their position if needed. After Napping, it was requested to the participants to add terms describing the samples on their Napping tablecloth according to "Ultra Flash Profiling" (UFP) approach. There was no specific direction given to the participants to describe the samples. Multiple factor analysis (MFA) was performed to obtain a consensus configuration of the samples through the simultaneous processing of all the maps from individual consumer. The terms generated from UFP were analyzed first by computing the frequency at which each term was employed for each product. Then, the number of terms was reduced by grouping the ones with similar meanings (Fig. 1). The frequencies of terms occurrence were collected in a contingency table which was added as supplementary variable in the MFA. The terms were thus not included in the construction of the MFA factors but projected in the product. The recently proposed method SensoGraph was also used to process the tablecloths. For each product, the (X,Y) coordinates were collected and compiled in a table (18 columns*9 rows for cocoa beans and 18 columns*8 rows for chocolates). The sample tablecloth positions provided by each taster were later clustered using the Gabriel graph and then merged into a single map using the algorithm of Kamada and Kawai, which provides relationships between samples.

Results and Discussion

The descriptors with a high sample discriminating capacity were spicy, fermented and dried fruits. With PCA it was possible to discriminate traditional cocoa beans (D, E, F) from raw beans (A, B, C) and roasted beans (G, H, I). Generally the origin of cocoa beans also seems to be an important factor that contributes to the discrimination (D, E, G and H from Equador; F and I from Perù). Similar discrimination was also observed for chocolate. In this case, the concentration of cocoa also resulted significant (C, D, G, H at 100%; B, E, F at 75%). Sample A clustered with raw cocoa at 100% because this chocolate was produced without sugar addition. A low discrimination was obtained for raw chocolate (A, B, C, D). The SensoGraph graphic for chocolates (Fig. 3) showed clear groups A-D-H, F-G, B-E, and C, while no clear groups appeared for beans.



Sour	Astringent	Bitter	Biologic	Caramel	Cheesy	Spicy	Vegetable
Sour	Tannic	Bitter	Wet wool	Caramel	Cheese	Spicy	Hay
Citric acid	Astringent		Earthy		Yogurt	Liquorice	Cut herb
			Mould		Lactic	Tobacco	Herb
			Wet earthy		Cheesy	Ash	Vegetable
			Cardboard			Chocolate	Straw
			Olive in brine			Aromatic	
			Chloridric acid			Balsamic	
			Mushroom			Wood	
			Cortex			Coffee	
			Olive				

Cereal	Sweet	Fermented	Floral	Dried fruits	Fresh fruits	Vanilla
Malt	Sweet	Fermented	Jasmine	Coconut	Ananas	Vanilla
Bread		Acetic	Floral	Dry abricot	Abricot	
		Ethanol	Honey	Dried fruits	Citrus	
		Solvent			Banana	
		Rancid oil			Red fruits	
		Yeast			Fresh	

Figure 1. Paper tablecloth with samples and terms generates from UFP

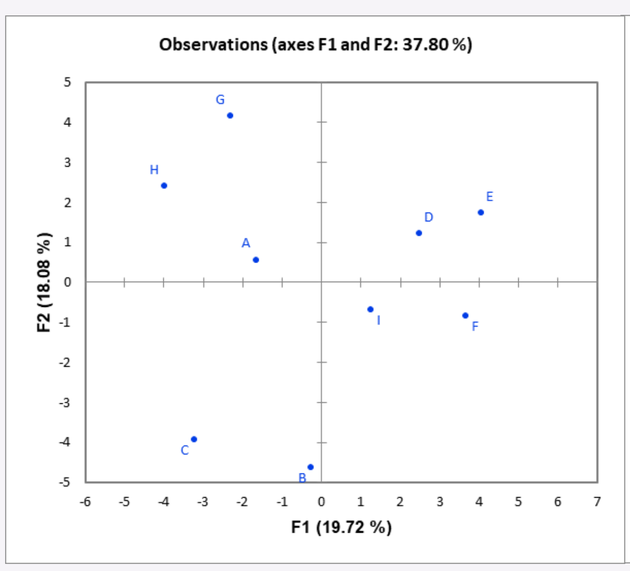


Figure 2. PCA score plots for cocoa beans (left) and chocolate (right) samples

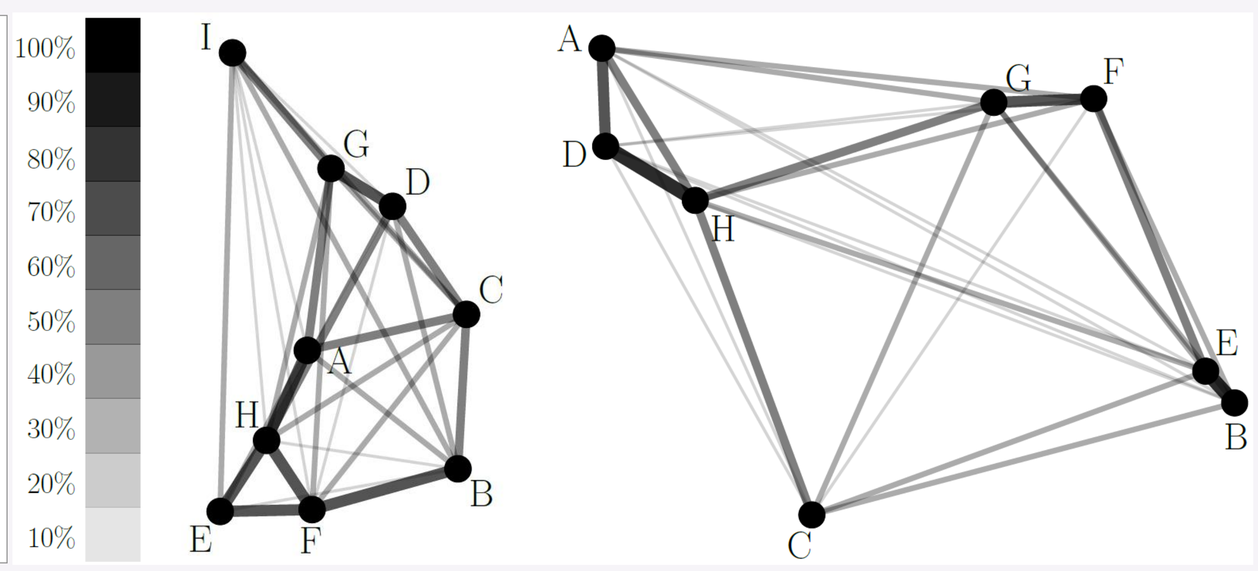


Figure 3. SensoGraph plots for cocoa beans (left) and chocolate (right) samples

Conclusions

The results have underlined the interconnections between samples, helping to understand the relationship between the sensory profile and the ingredients and/or the process and/or the origin inside the samples. In particular, the origin was a prominent factor in sample discrimination while the treatment (raw or traditional) proved to be a weak factor.

JACOBS UNIVERSITY

FIFTH INTERNATIONAL CONFERENCE ON COCOA COFFEE AND TEA 2019

CERTIFICATE OF ATTENDANCE

Olga Rojo-Poveda

attended and presented a poster at the Cocoa, Coffee and Tea Conference 2019

from 26.06 to 28.06.2019 in Bremen, Germany.

Prof. Dr. Nikolai Kuhnert (Conference Chariman)
Jacobs University Bremen gGmbH