

Calibrated descriptive analysis stabilizes sensory profiles across panels

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July 19, 2005



Session 87-3
New Orleans



DESCRIPTIVE ANALYSIS

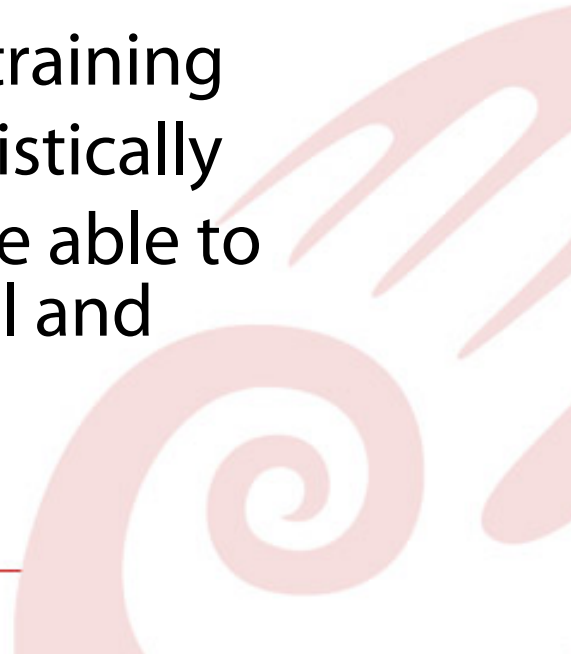
DEFINITION:

- any method to describe and quantify the sensory characteristics of stimuli by a panel of trained assessors.

ASTM Standards 2002, E253 – 02



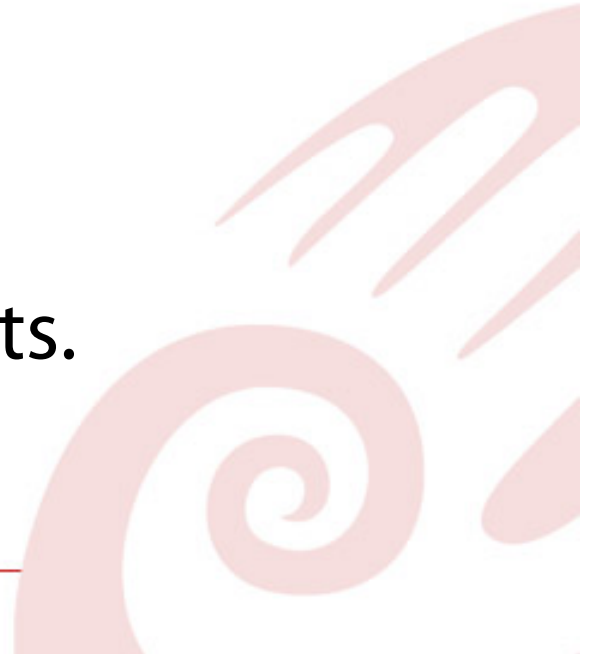
Premises of Sensory Descriptive Analysis

- DA is an analytical method
 - Analysis depends on accuracy & precision
 - Accuracy can be achieved by having calibration standards
 - Precision can be achieved through training
 - Performance may be measured statistically
 - Attributes must be understood to be able to interpret performance of both panel and panelist.
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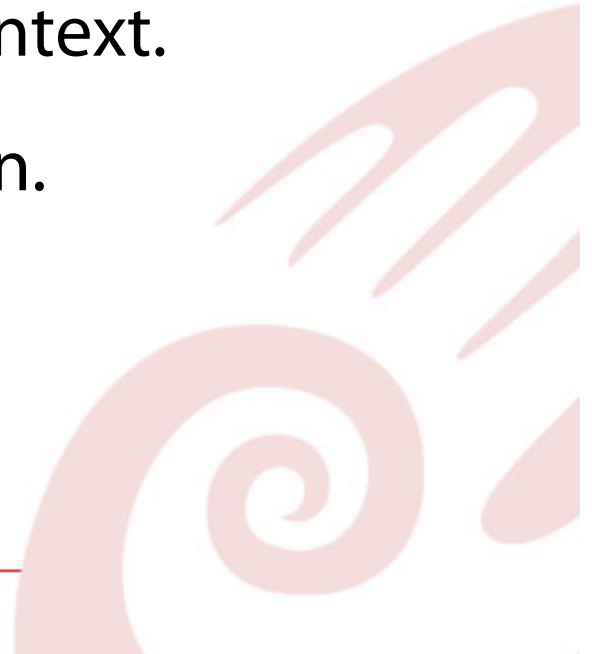
Attribute Identity

ATTRIBUTE CLASSIFICATION		
Specific Standard	Group of Attributes	Verbal or Evocative
A primary reference exists that defines the attribute completely.	A number of examples provide the definition for several related attributes	No specific reference can be used, but the concept can be communicated
Sugar or Salt	Fruit or floral	Barnyard or Diesel

Typical DA Procedure

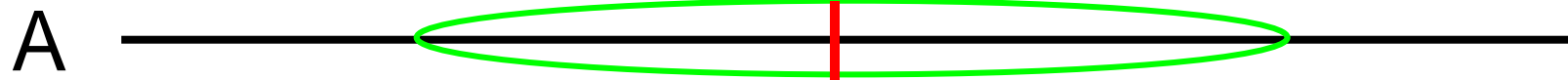
1. Identify the key sensory attributes.
 2. Develop the trained panel.
 3. Develop the ballot.
 4. Measure the attributes.
 5. Analyze and interpret results.
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Calibrated DA Procedure

1. Identify the key sensory attributes.
 2. Develop the trained panel.
 3. Develop the ballot.
 4. Develop attribute targets in context.
 5. Train using feedback calibration.
 6. Measure the attributes .
 7. Analyze and interpret results.
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The White Wine Study

Using Feedback Calibration



- Two panels were recruited and trained to evaluate white wine; one panel was composed of experienced red wine panellists (Panel T), the other of panellists with no experience in sensory analysis (Panel U).
 - Each panel used the Wine Aroma Wheel to develop their own white wine lexicon over 5 days of training sessions of 2.5h each. Panels T and U used 110 and 76 line scale attributes, respectively.
 - Four additional training sessions were used to apply best practices from conventional training and computerized feedback.
 - At the conclusion of training, each panel evaluated the same 20 white wines in triplicate.
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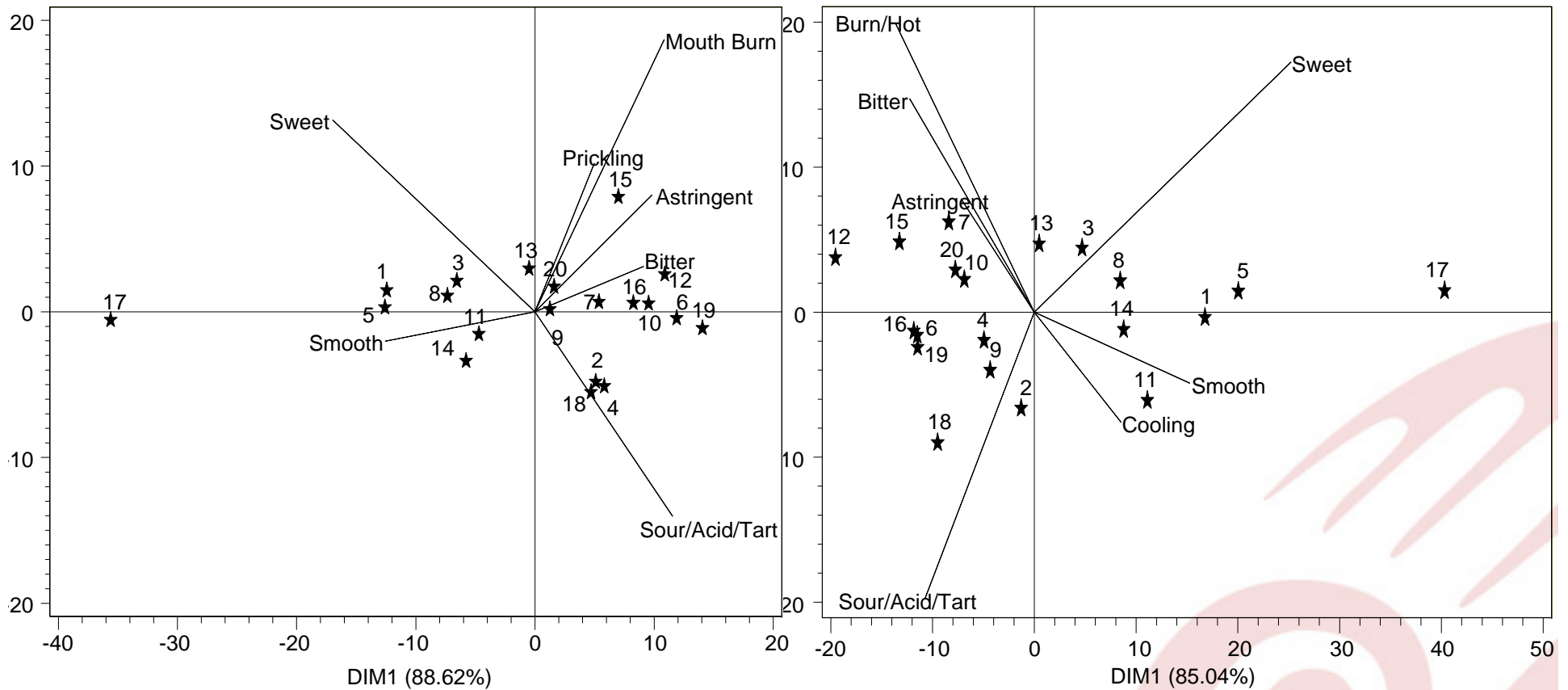
Attribute	Aroma Before Stirring	Aroma After Stirring	Flavor	Attribute	Aroma Before Stirring	Aroma After Stirring	Flavor
Apple	0.2900	0.1268	0.0023	Honey	0.0691	0.0165	0.0015
Green Apple	0.0356	0.2734	0.0060	Butterscotch	0.6294	-	-
Banana	0.0932	0.0172	0.1660	Brown Sugar	0.0592	0.0668	-
Grape	0.3061	0.3535	0.0668	Vanilla	0.0018	0.0004	0.0016
Peach	0.1005	0.0066	0.0004	Alcohol	0.0320	0.0325	0.0000
Pineapple	0.0006	0.0276	0.0016	Pungent (alcohol irritation)	0.0042	0.0061	0.0000
Other Tropical Fruit	0.0001	0.0200	0.0049	Nail Polish Remover	0.4528	0.3172	0.0044
Melon	0.2085	0.1932	0.0011	Solvent	-	0.0139	-
Pear	0.0541	0.0276	0.0000	Asparagus	0.0003	0.0036	-
Lemon Zest	-	0.2509	0.1657	Black Pepper	0.0779	0.0353	-
Rose	0.0805	0.7085	0.7632	Cinnamon	0.0504	0.0016	-
Elderflower	0.0001	0.0007	0.0000	Clove	0.7267	0.1846	-

Attribute	Aroma Before Stirring	Aroma After Stirring	Flavor	Attribute	Aroma Before Stirring	Aroma After Stirring	Flavor
Butter	0.1739	0.3329	0.1685	Rotten Wood	-	0.0028	0.0032
Earthy	0.2578	0.0288	0.0000	Yeast (Bread)	0.0887	0.2089	0.4351
Horsy/Leather	0.0107	0.1867	0.0000	Vinegar	-	-	0.0001
Sulphur (burnt matches)	-	0.0001	-				Taste Mouthfeel
Sulphur (cooked vegetables)	0.0000	0.0035	0.0000	Bitter	-	-	0.0000
Turpentine/Terpenes	0.0613	0.1918	0.2405	Sour/Acid	-	-	0.0000
Mushroom	0.1062	0.2263	0.0151	Sweet	-	-	0.0000
Musty	0.0030	0.0003	0.0000	Astringent	-	-	0.0000
Oak	0.0592	0.1629	0.0004	Mouth Burn (localized)	-	-	0.0000
Wet Wood/Wet Sawdust	0.3874	0.4571	0.1598	Warm (global)	-	-	0.0740
Fresh Cut Wood	0.4286	0.2739	0.4403	Prickling	-	-	0.0001
Burnt Wood	0.0957	0.0043	0.0410	Smooth	-	-	0.0000

Attribute	Aroma Before Stirring	Aroma After Stirring	Flavor	Attribute	Aroma Before Stirring	Aroma After Stirring	Flavor
Apple	0.0128	0.0036	0.0000	Cut Grass	0.1448	0.7807	-
Peach	0.0293	0.4323	-	Mushroom	0.3281	0.3056	0.0076
Melon	0.0764	0.2743	0.0000	Earthy	0.0417	0.3941	0.0000
Pear	0.0210	0.0585	-	Alcohol	0.4657	0.4144	0.0000
Lemon	0.5981	0.3363	0.0127	Pungent (alcohol irritation)	0.0418	0.1966	0.0000
Grapefruit	0.0506	0.0052	0.0098	Nutty	0.2322	0.1428	0.0004
Pineapple	0.6900	0.1904	0.0000	Honey	0.1169	0.0022	
Rose	0.0165	0.0413	0.1706	Caramel	0.0044	0.0721	0.0000
Green Bean	0.0733	0.5398	-	Raisin	-	-	0.0000
Grape	-	-	0.0000	Smoky	-	-	0.0000
Asparagus	0.6106	0.1990	0.0211	Vanilla	0.8331	0.4013	-
Cloves	-	-	0.0000	Resinous/ Terpenes	0.0574	0.0583	-

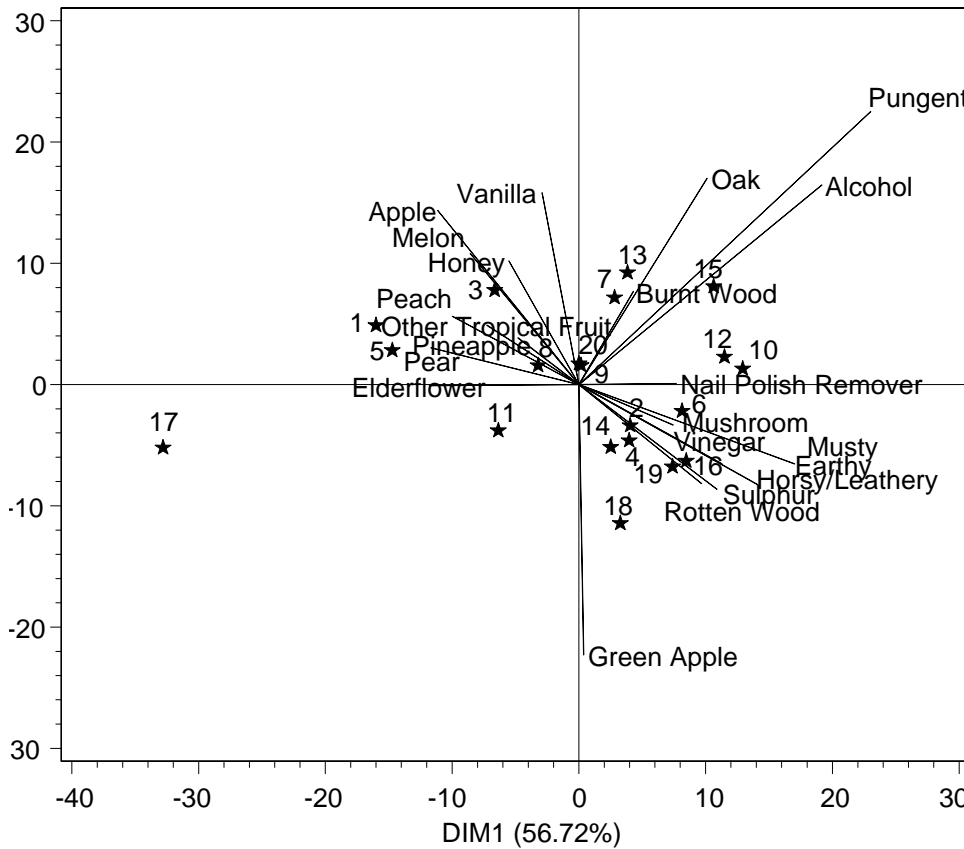
Attribute	Aroma Before Stirring	Aroma After Stirring	Flavor	Taste/ Mouthfeel
Oak	0.1650	0.1567	0.0000	-
Cedar	0.0027	0.0001	-	-
Medicinal	0.2422	0.5369	0.0000	-
Black Pepper	0.8079	0.1214	0.0000	-
Vinegar	-	-	0.0000	-
Sweet	-	-	-	0.0000
Sour/ Acid/ Tart	-	-	-	0.0000
Bitter	-	-	-	0.0000
Astringent	-	-	-	0.0000
Burn/Hot	-	-	-	0.0000
Cooling	-	-	-	0.0000
Smooth	-	-	-	0.0000

TMF – Taste/Mouthfeel NRV 11.8

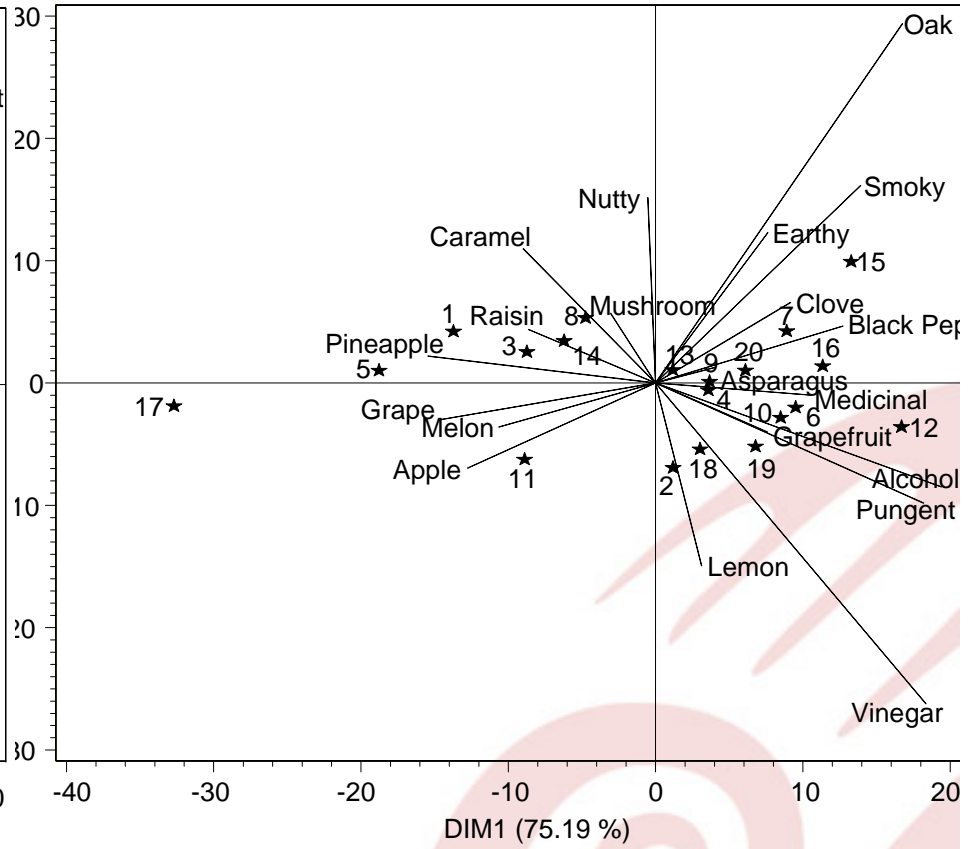

Panel T
Panel U

FLA – Flavor

NRV 11.4

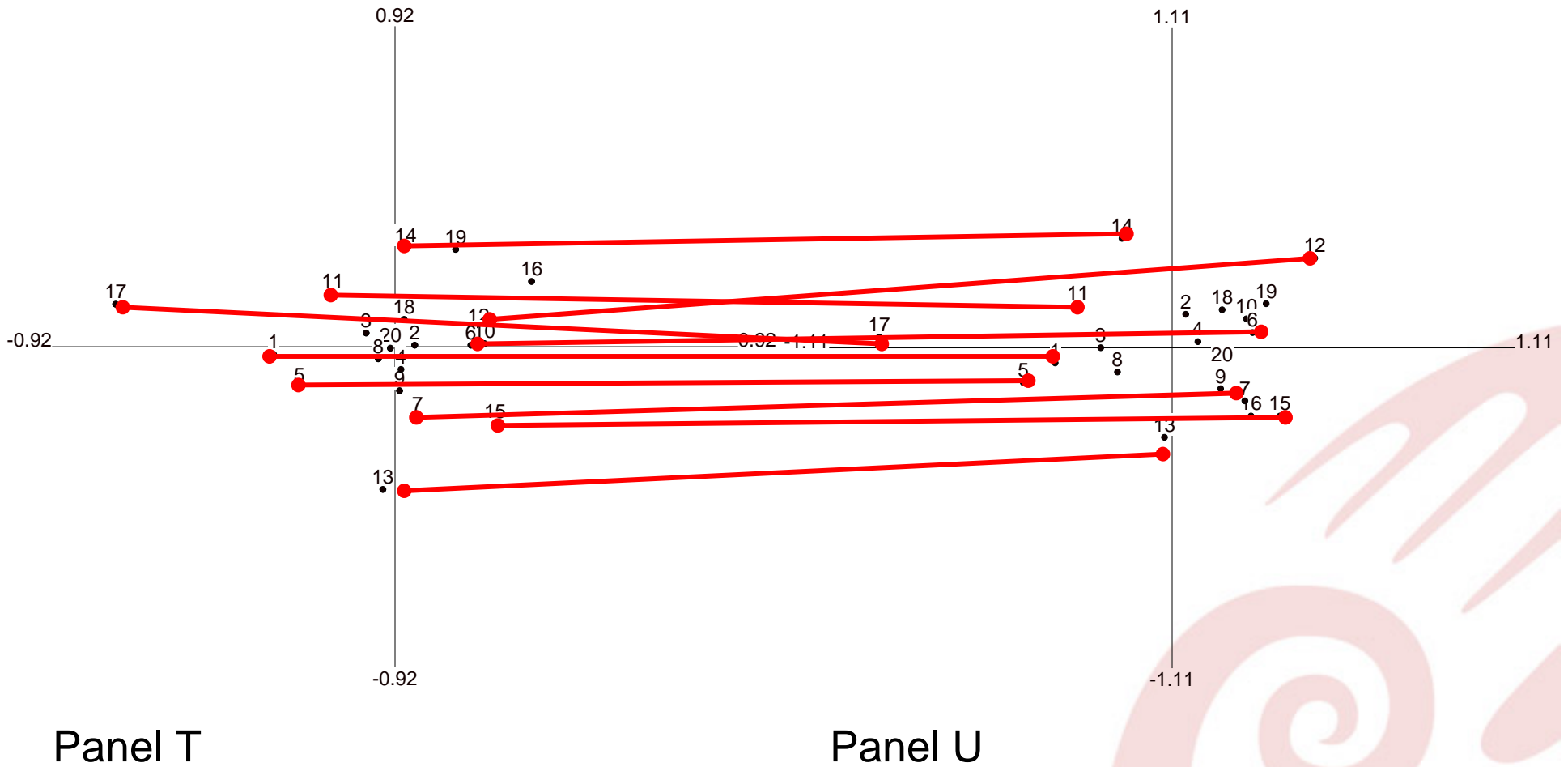


Panel T

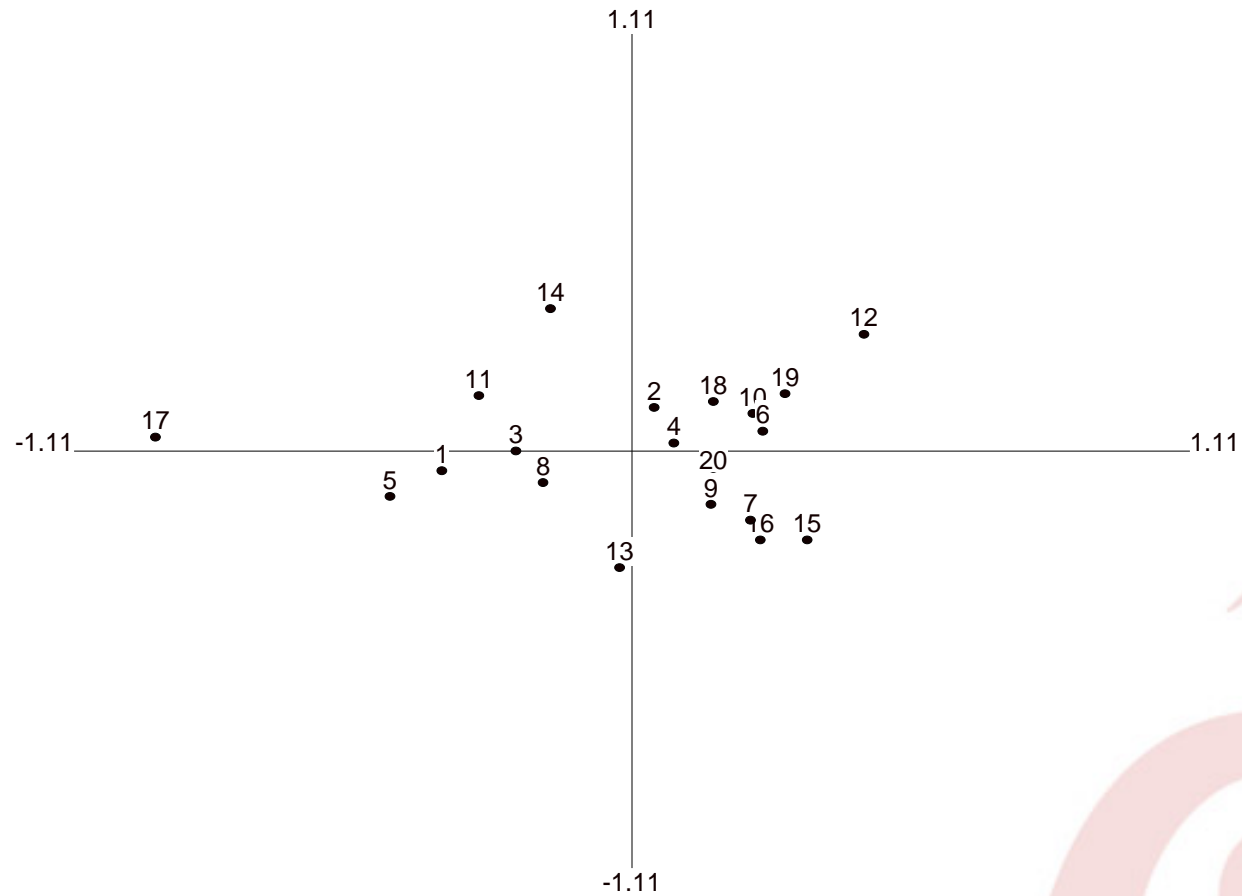


Panel U

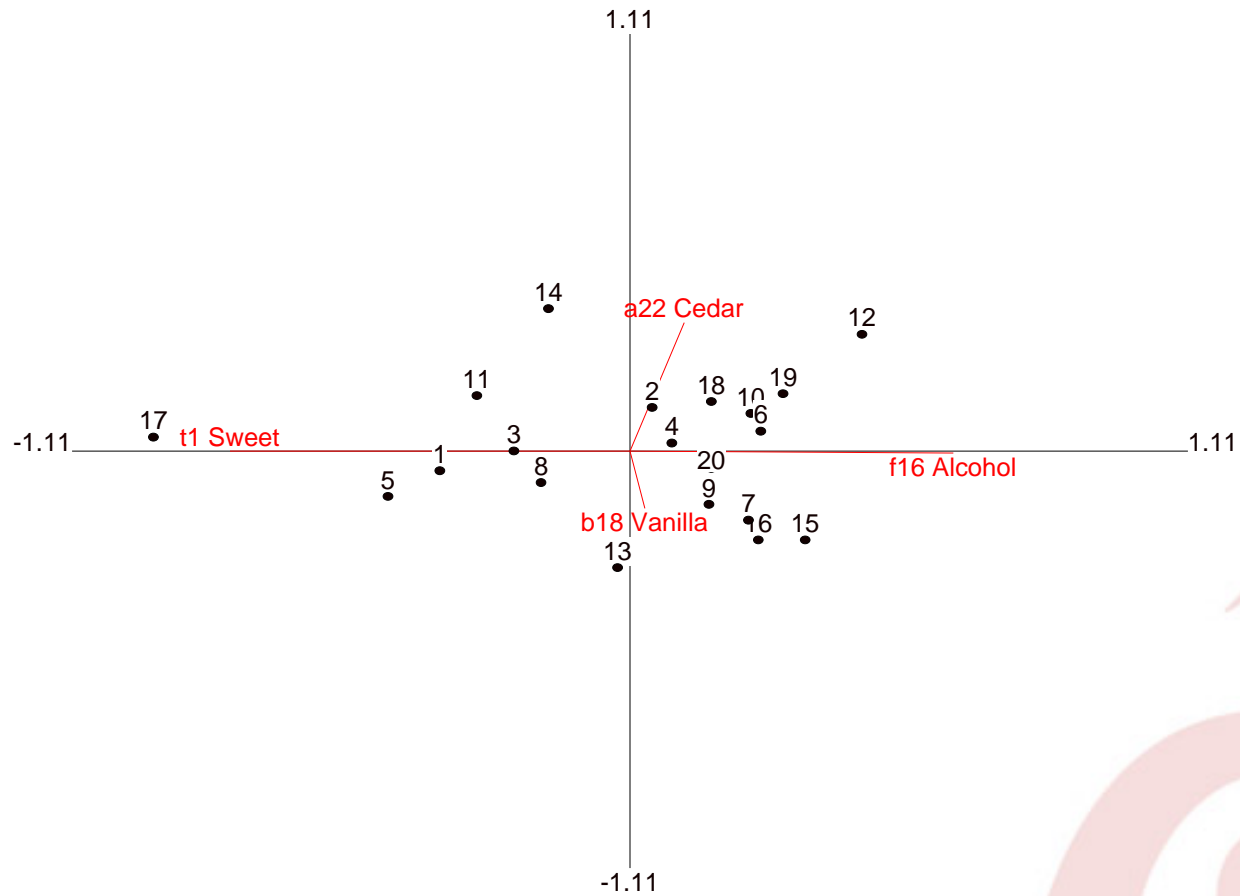
GPA of 20 wines for all attributes



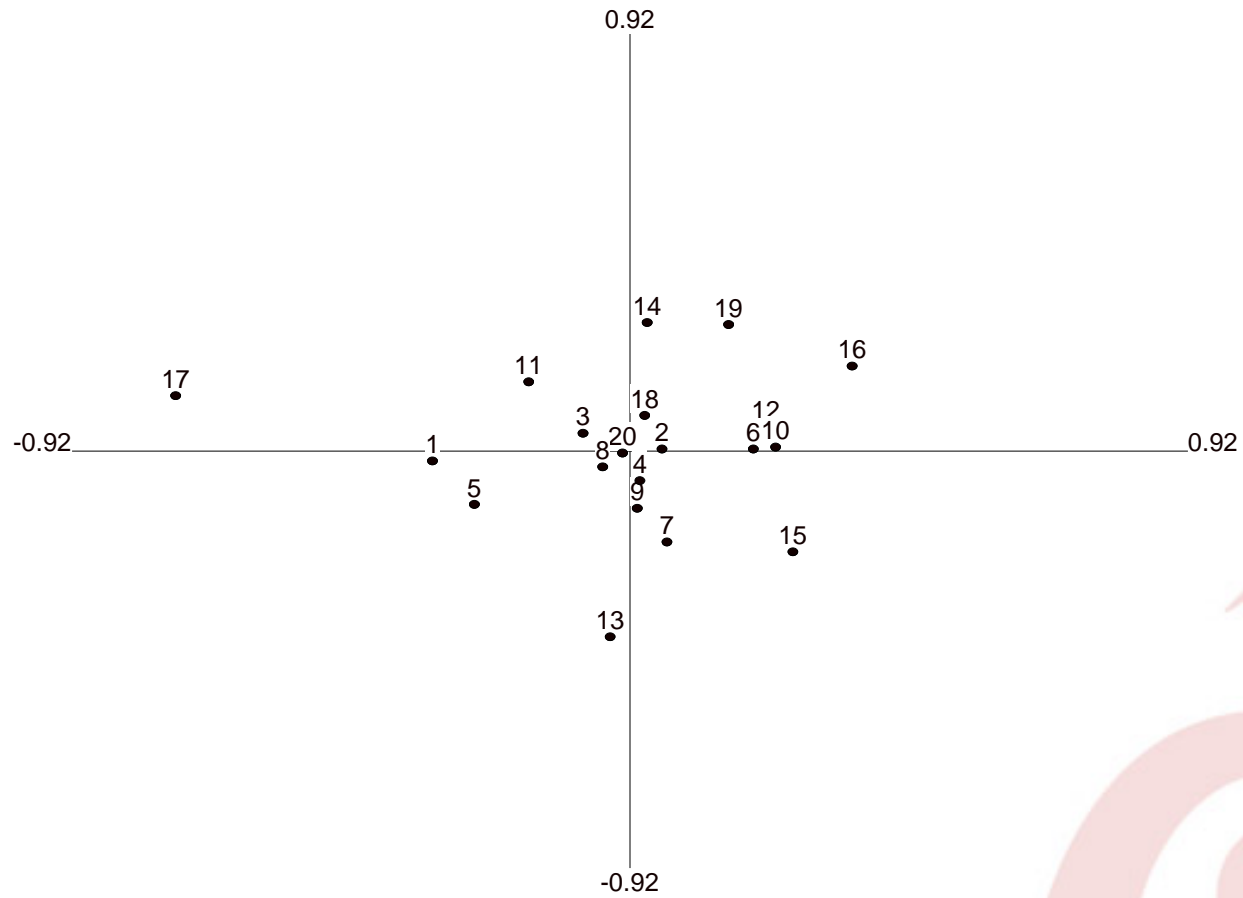
GPA Group Average : dimension 1 versus 2



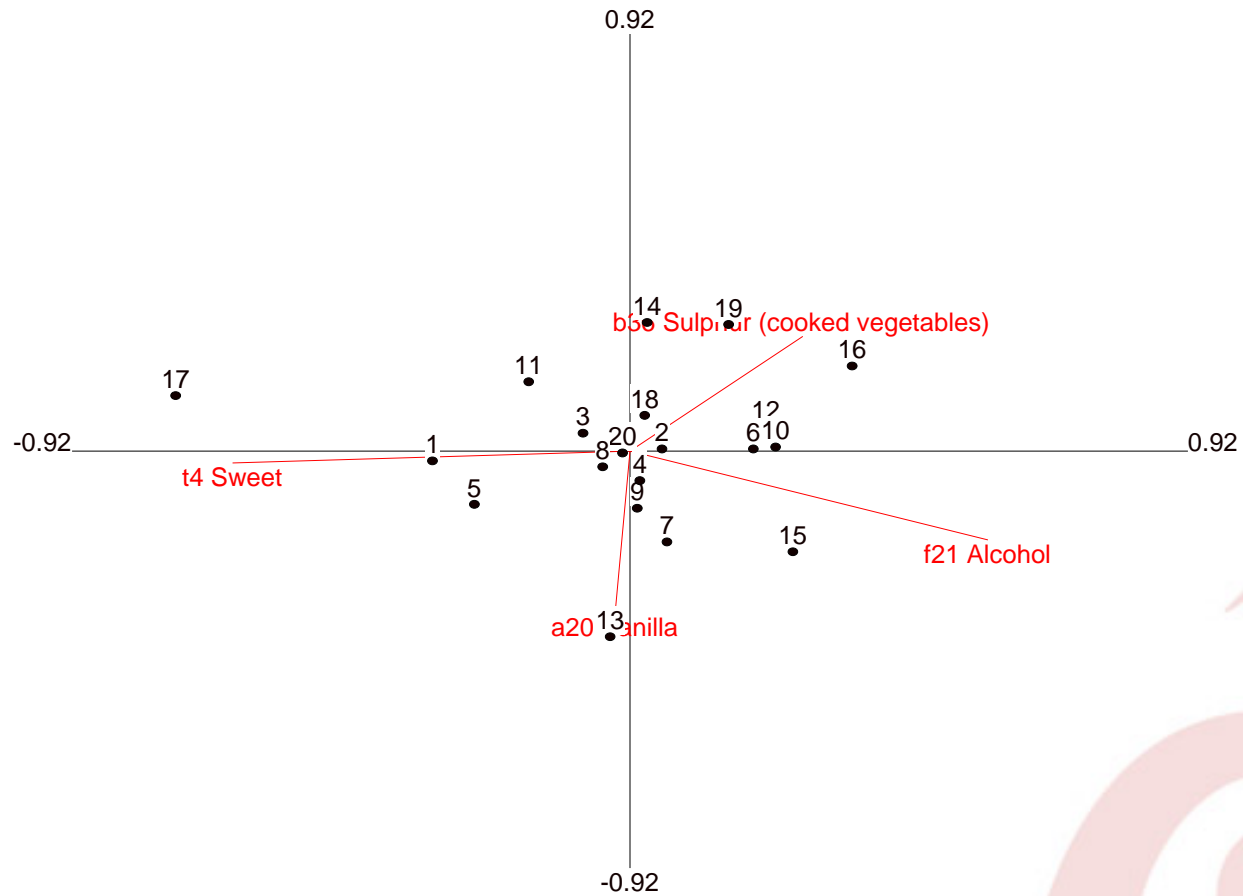
GPA Group Average : dimension 1 versus 2



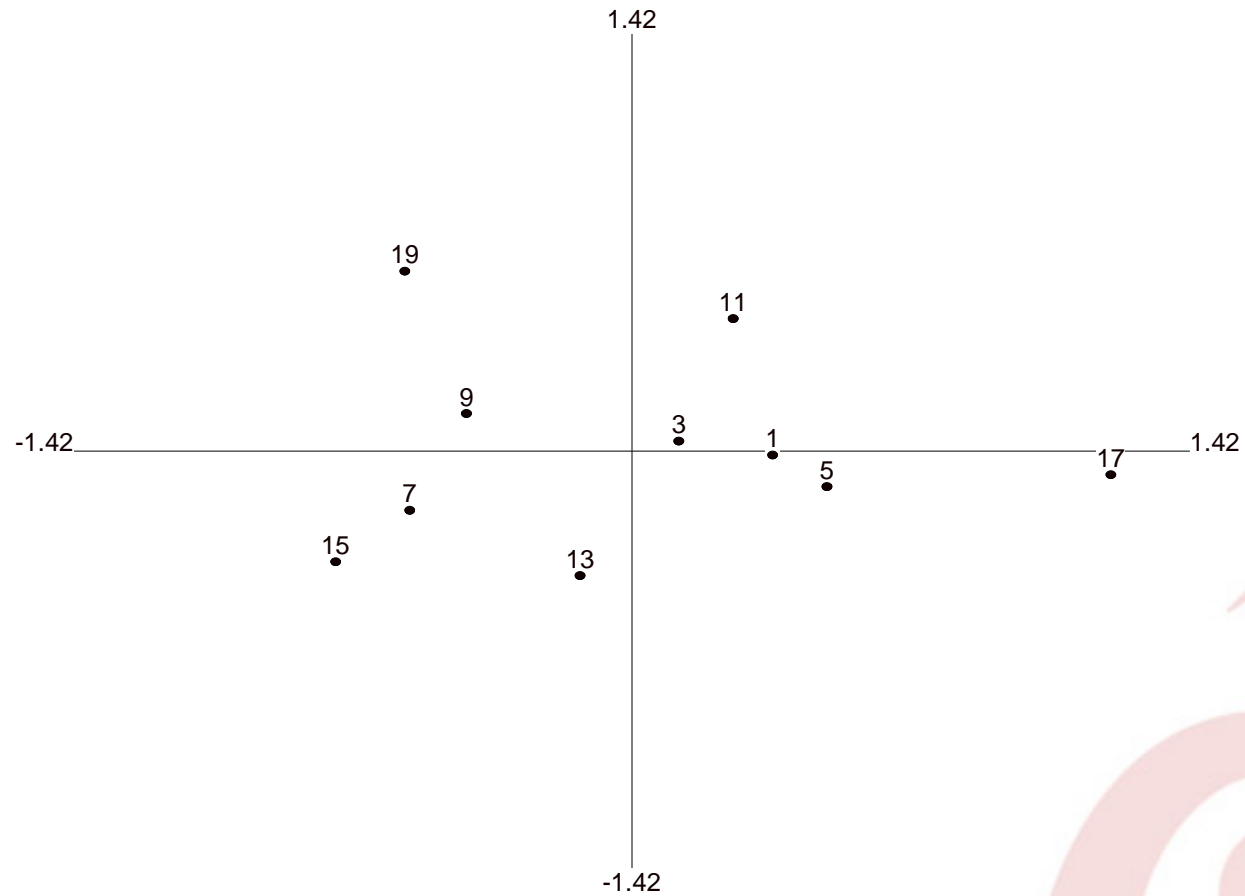
GPA Group Average : dimension 1 versus 2



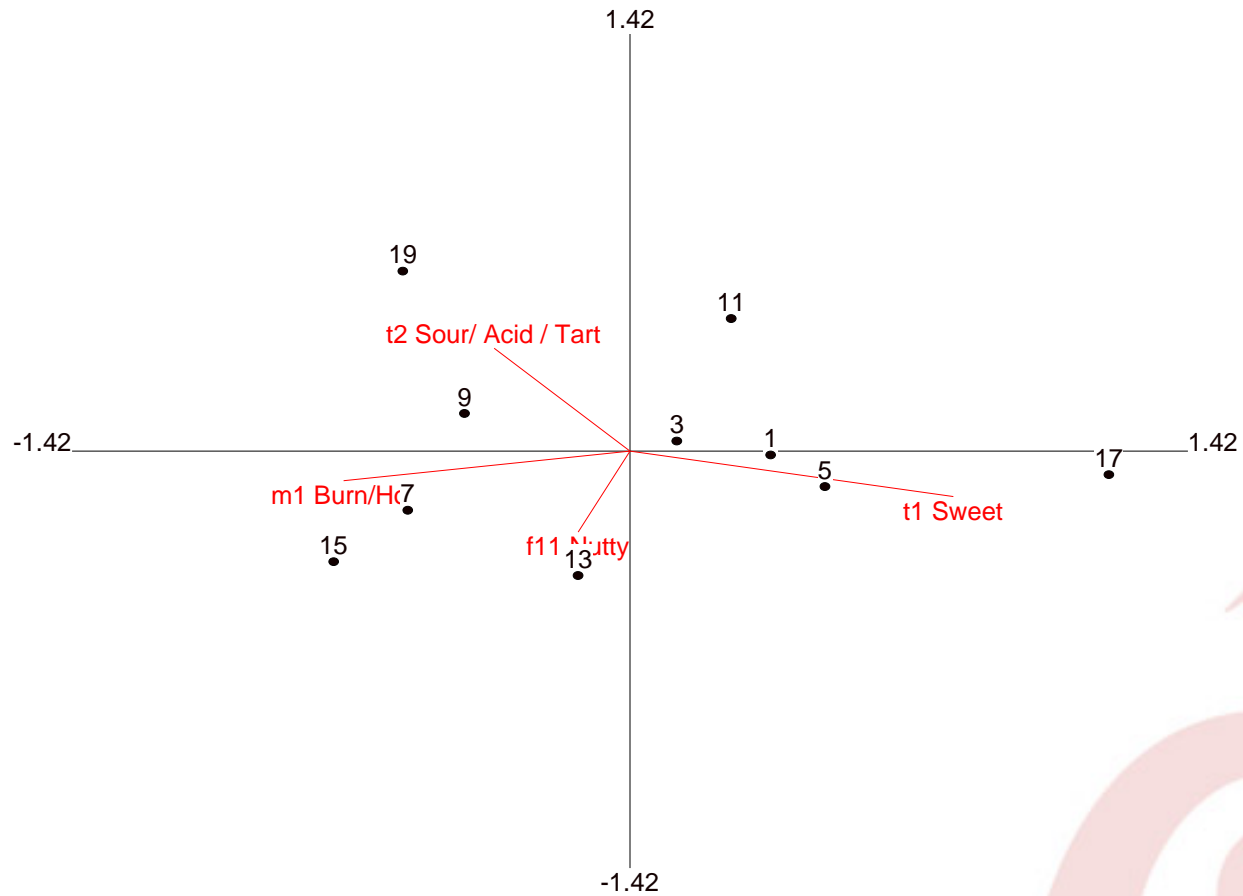
GPA Group Average : dimension 1 versus 2



GPA Group Average : dimension 1 versus 2



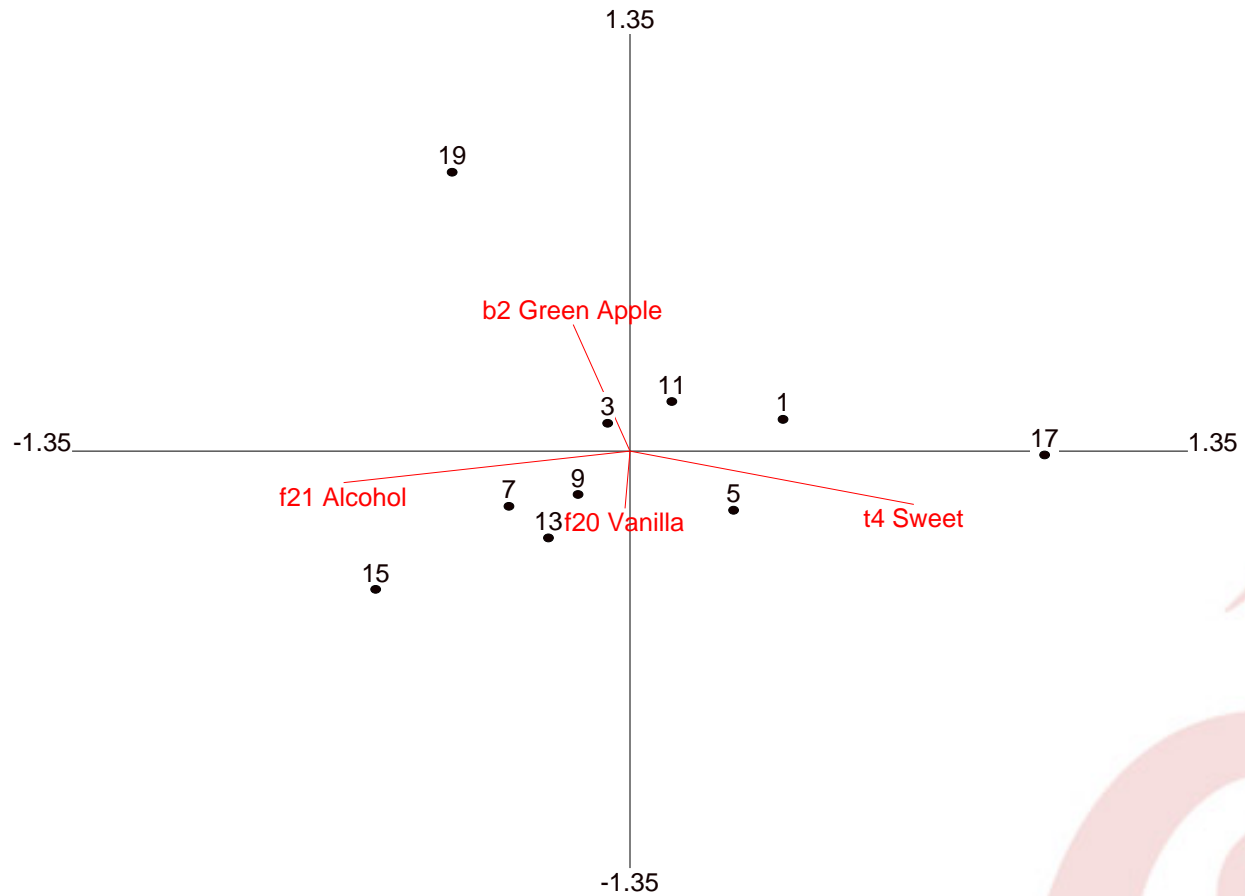
GPA Group Average : dimension 1 versus 2



GPA Group Average : dimension 1 versus 2

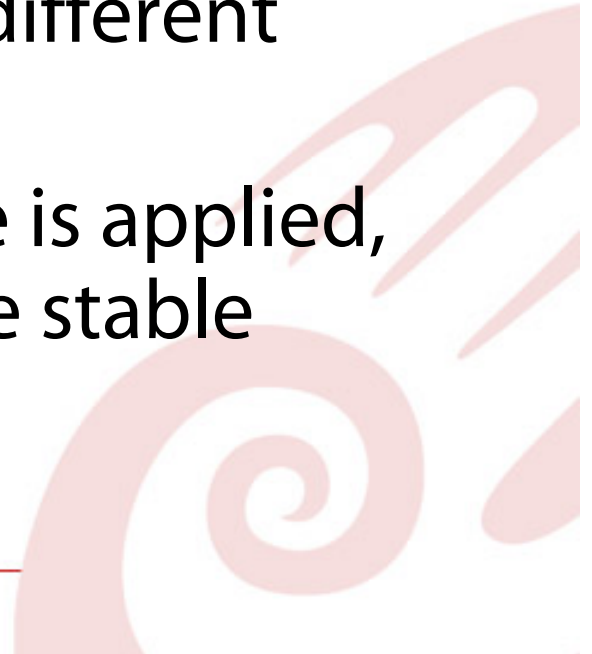


GPA Group Average : dimension 1 versus 2





Conclusions

- Calibration provides a training method that permits separate panels to produce valid comparable results.
 - This method may be applied to geographically and temporally different panels.
 - Providing good sensory practice is applied, results of descriptive analysis are stable across panels and over time.
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Acknowledgements

NRC– IRAP

Vincor International

LCBO

Karen Phipps

Isabelle Lesschaeve

John Castura

Amanda Bartel

Pascal Schlich

Compusense Panelists