

Asian Lady Beetle Update: Sensory Impact of Multicolored Asian Lady Beetles (MALB) on Grape Juice

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Multicolored Asian Lady Beetle (MALB)

- Originally released as biocontrol for aphids
- First established population recorded in 1988
- Northeastern United States
- Eastern Canada



MALB Identification



Problems with MALB



- Release compounds of olfactory significance
- Crop Quality
 - Adult MALB feed on grapes in late fall and are incorporated into harvested fruit
 - Reports: 20 - 50 MALB/cluster
- MALB harvested and included in processing sequence

MALB on Grapes



MALB in Wine



- Study examined impact of MALB on red and white wine aroma (Pickering et al., 2004)
 - Added to wine must at 3 concentrations
 - Found impact of addition on wine quality at 1 MALB/L
 - Specific attributes:
 - Red wine: peanut, bell pepper, asparagus, earthy and herbaceous aromas and flavours
 - White wine: Peanut, bell pepper, and asparagus aroma and flavours

MALB in Grape Juice



- What is the sensory impact of MALB on grape juice?
 - Aroma threshold
 - Specific sensory attributes
 - Consumer acceptance
- WA State major production state for Concord grapes in the United States
 - Minimize losses to Concord Industry

MALB Study Objective

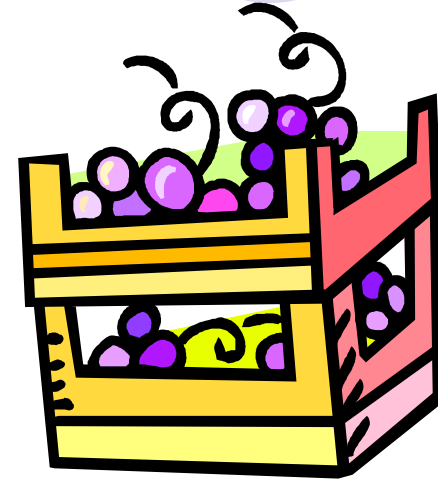


- Examine impact of MALB on Concord and Niagara grape juice quality
 - Determine aroma threshold of MALB in grape juices
 - Describe specific sensory attributes of MALB juices
 - Determine consumer rejection threshold of MALB juice

Experimental Methods



MALB



grapes

Grape juice prepared in triplicate with (treated) and without (control) the addition of MALB

Experimental Methods

- Grape juice preparation
 - Grapes stemmed and transferred to steam jacketed
 - Enzyme added
 - Grape mash was pressed in screw press
 - Resulting juice pasteurized
- Concord: 32 MALB/L
- Niagara: 12 MALB/L

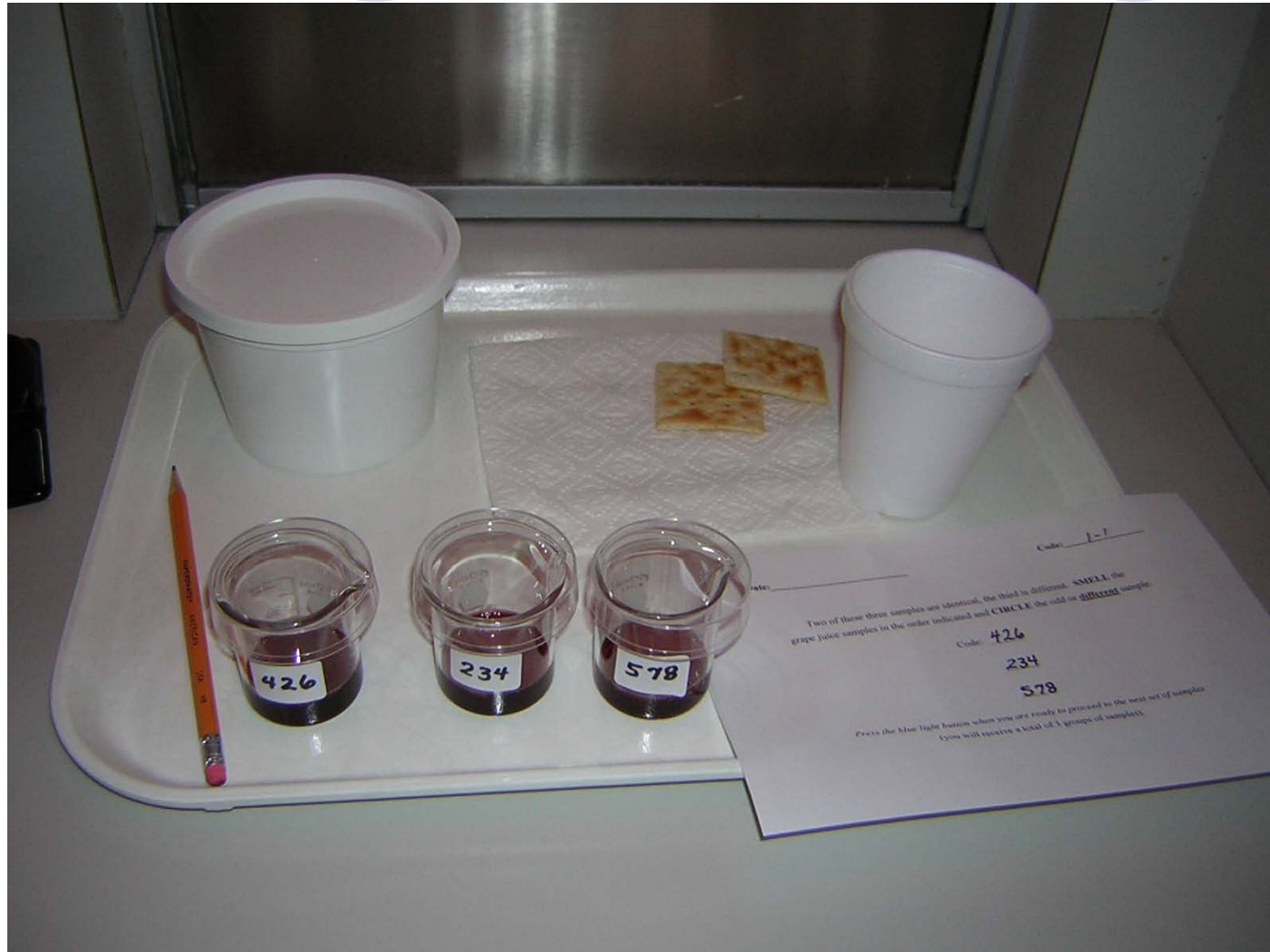


Experimental Methods



- Aroma threshold:
 - 24 untrained panelists
 - Forced-Choice Ascending Concentration series triangle test
 - 3 sample set: 1 sample and 2 reference (blank)
 - Correctly identify the different sample
 - Scale steps:
 - Concord: 0.5 MALB/L, 1.5 MALB/L and 4.5 MALB/L
 - Niagara: 0.06, 0.21, 0.78 and 2.80 MALB/L

Experimental Methods



Experimental Methods

- Trained panel:

- 10 Panelists trained over 8 hours, used 15-cm line scale

- Concord grape juice:

- Aroma and flavour: earthy/musty/dirty, plum, grape, vegetal

- Taste: sweet, sour

- Mouthfeel: astringent, chalky

- Niagara grape juice:

- Aroma and flavour: earthy/musty/dirty, honey, grape, vegetal

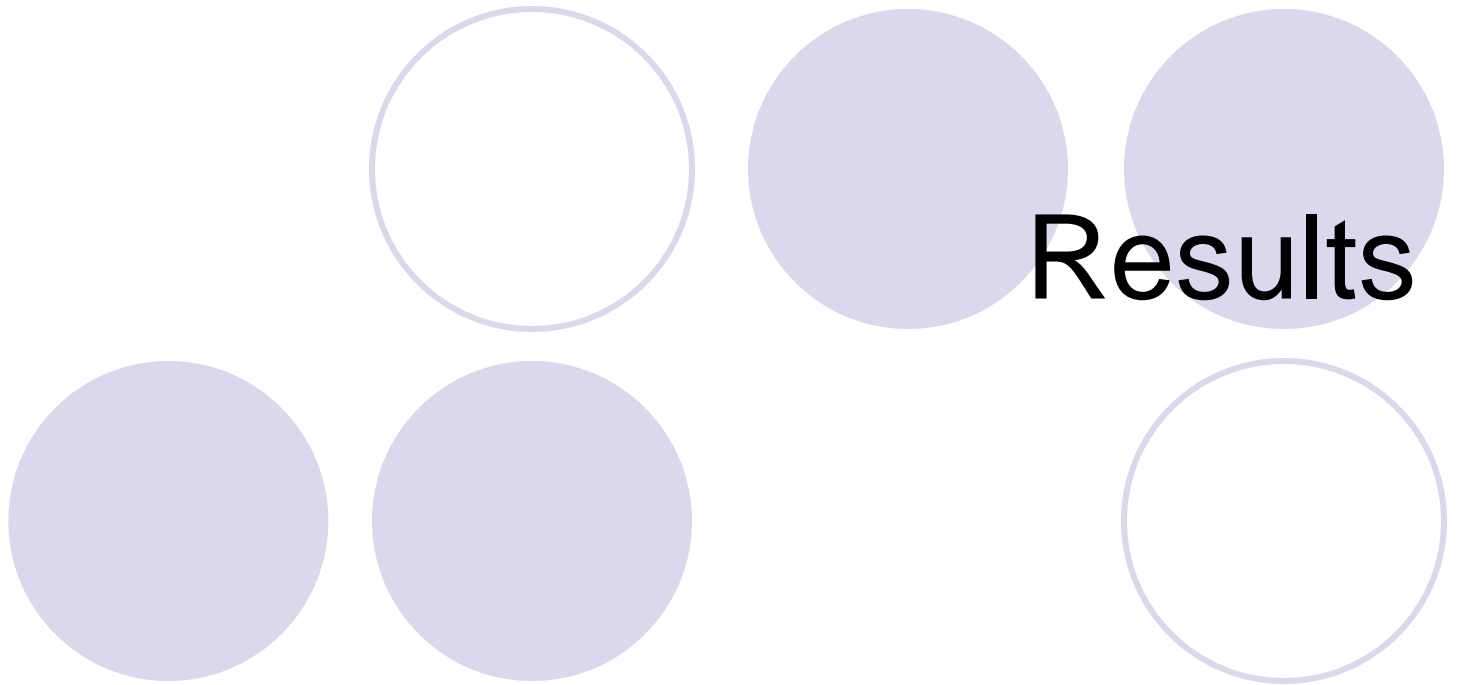
- Taste: sweet, sour

- Mouthfeel: astringent

Experimental Methods

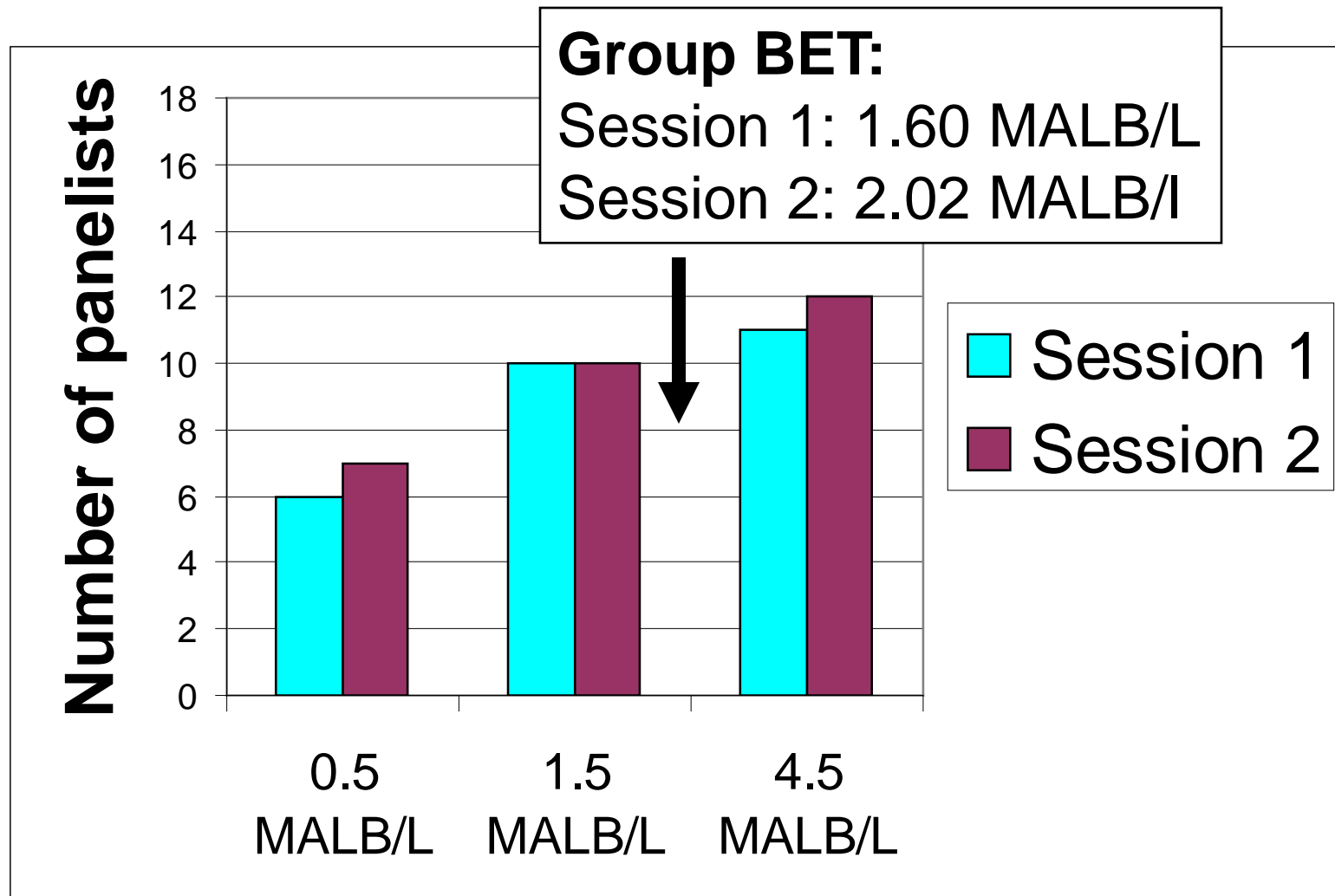
- Consumer rejection:
 - 60 panelists
 - 5 paired samples: 1 control vs. 1 MALB concentration
 - 0, 0.45, 0.9, 1.8, 3.6 MALB/L
 - Evaluated for aroma rejection and taste/flavour rejection



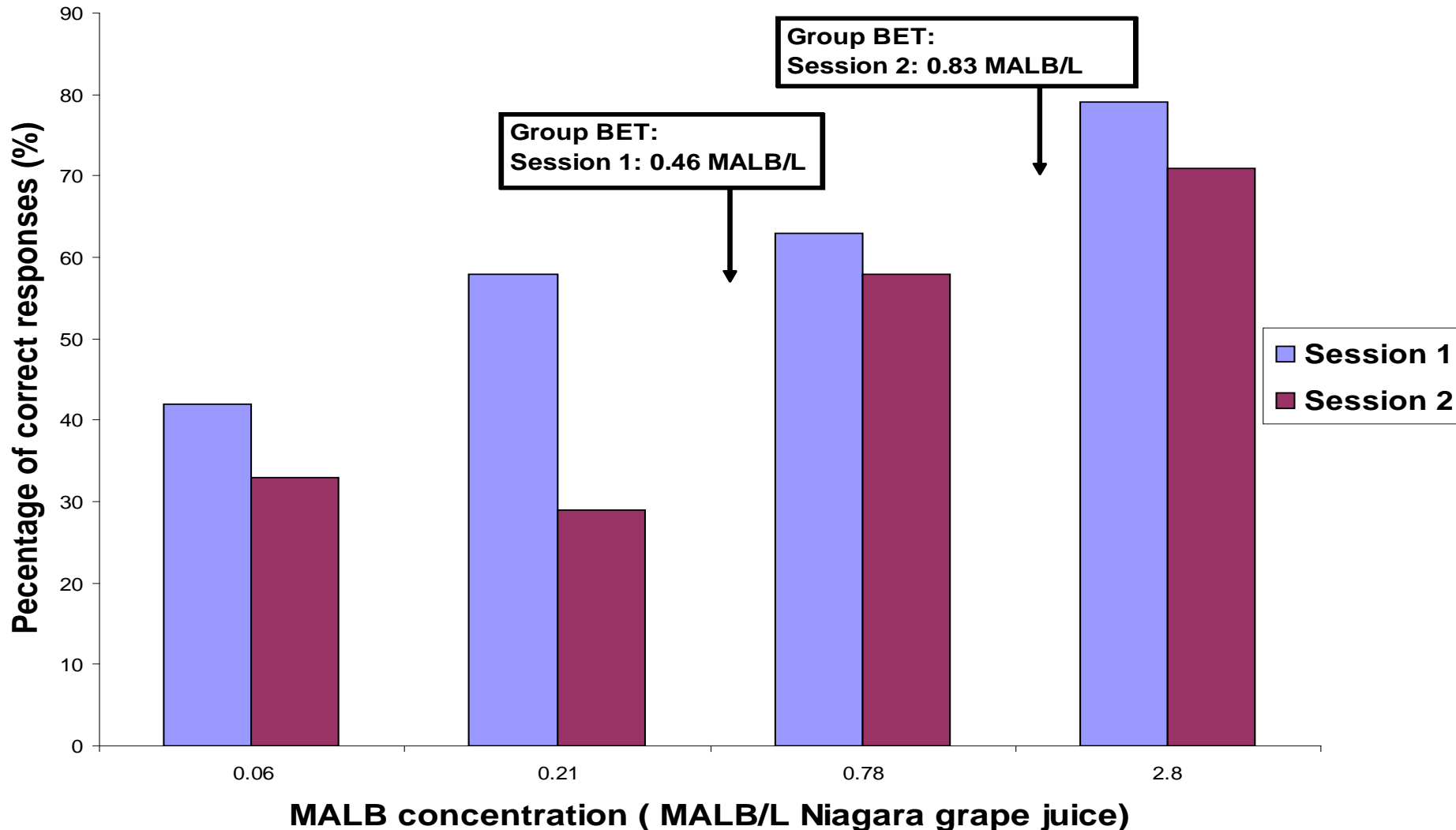


Results

Results: Individual Best Estimate Threshold Expressed as MALB/L Concord Grape Juice



Results: Individual Best Estimate Threshold Expressed as MALB/L Niagara Grape Juice







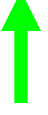
Results: Trained Panel Evaluation

- Concord grape juice

	0	0.45	0.90	1.8	3.6	7.2
Vegetal aroma	2.69 ^a	2.76 ^a	3.57 ^a	3.17 ^a	5.11 ^{ab}	7.17 ^b
Vegetal flavour	2.06 ^a	1.67 ^a	2.73 ^a	2.88 ^a	3.96 ^{ab}	6.42 ^b

Results: Trained Panel Evaluation

- Niagara Grape Juice

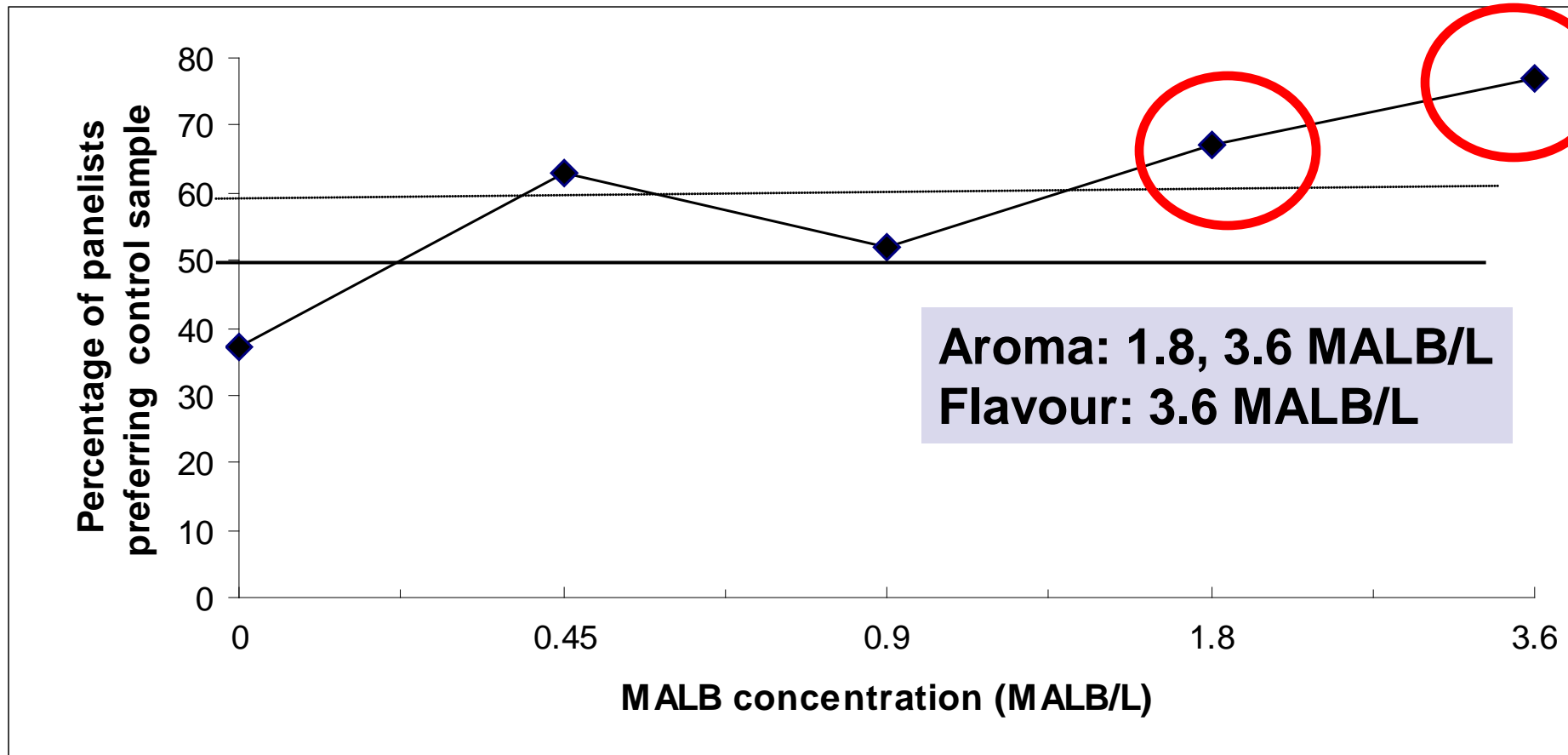
	Attributes	0	0.32	2.92	8.76
Aroma	Honey 	4.29 ^{ac}	3.33 ^{bc}	3.32 ^{bc}	2.35 ^b
	Vegetal 	4.08 ^{ac}	4.85 ^{bc}	5.97 ^b	4.28 ^{ac}
	Earthy 	6.33 ^a	4.88 ^{ab}	6.03 ^a	10.26 ^c
Taste	Sweet 	8.14 ^a	6.19 ^{ab}	6.86 ^{ab}	5.71 ^b
	Sour 	8.19 ^a	8.06 ^a	8.41 ^a	9.64 ^b

Results: Trained Panel Evaluation

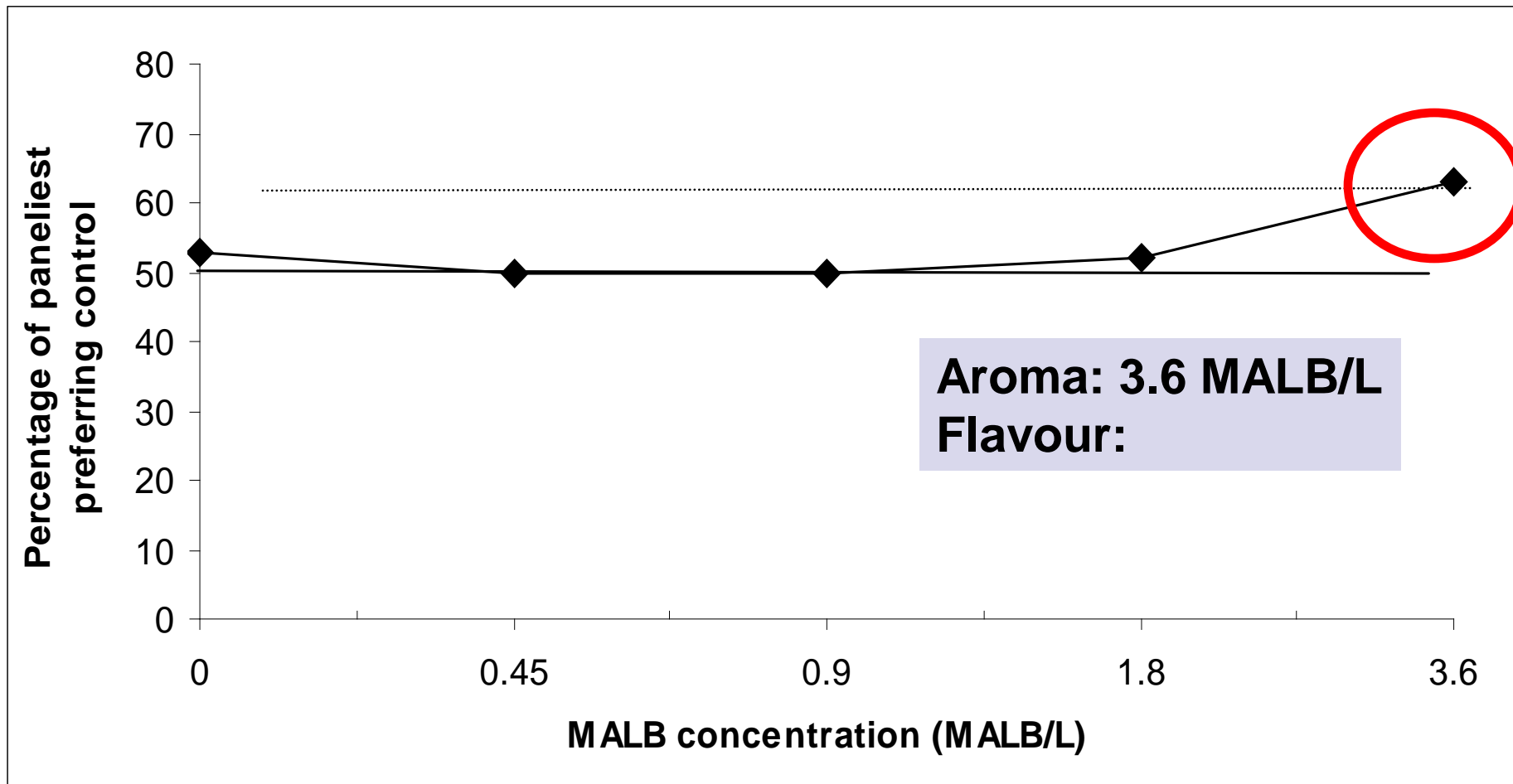
- Niagara Grape Juice

	Attributes	0	0.32	2.92	8.76
Mouthfeel	Astringent ↑	6.70 ^{ac}	7.49 ^a	7.78 ^{bc}	8.71 ^{bc}
Flavour	Honey ↓	5.6 ^{ae}	5.30 ^{ce}	5.81 ^{ae}	3.14 ^b
	Grape ↑	4.78 ^{ac}	3.89 ^{bc}	6.47 ^{ac}	5.28 ^b
	Vegetal ↑	2.64 ^{ac}	3.41 ^a	3.61 ^{bc}	4.11 ^b
	Earthy ↑	4.20 ^{ac}	5.19 ^c	5.19 ^{cd}	7.37 ^b

Results: Consumer Rejection of MALB Concord Grape Juice



Results: Consumer Rejection of MALB Niagara Grape Juice



Conclusions

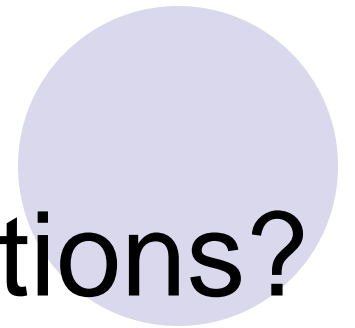
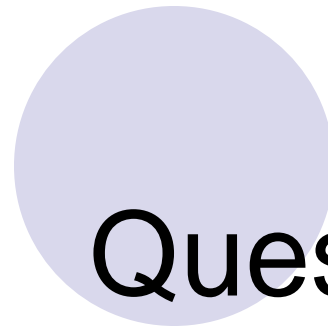
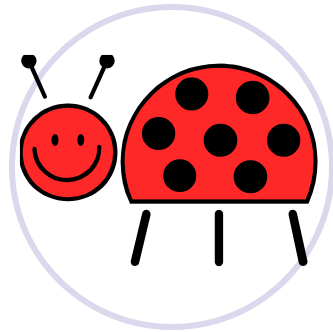


- Presence of MALB impacted the grape juices differently
- Presence of MALB more noticeable in Niagara grape juice (lower threshold)
 - Corresponded to greater number of sensory differences in Niagara (trained panel)
- But MALB Niagara juice not as objectionable as MALB Concord juice



Conclusions

- MALB taint may interact differently with compounds in the juices
- Results may be used to set tolerance values
 - MALB tolerance in Niagara juice may be higher than Concord



Questions?

