



Suitability of Wheat Flours for Commercial Tortilla Production

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PURE TORTILLA JOY





Objective:

To determine the viability of 6 wheat flour samples (HRS-1, HRS-2, HRS-3, HRS-5, HWS-1 and HWS-2) for use in the commercial tortilla industry. Compare to Mi Rancho control flour.





Expectations of a Tortilla Flour

1. Simple dough forming (short mix times)
2. Easy dough dividing (not sticky)
3. Press easily (balance of elasticity and extensibility)
4. Tortillas that are flavorful with no off color, aroma or flavors
5. Tortillas that are uniform in shape (round +/-0.5IN)
6. Soft and flexible tortillas that roll easily (30-90 day shelf life).
7. Strong tortillas to hold up to heavy fillings
8. Visually appealing
9. Consistency during the milling process is very important





Flour characteristics

Typical Farinogram:

Short development time (5-8 minutes)

Longer stability time (10-20 minutes)

Good absorption (59-62%)

Low MTI (10-25)

Protein: 11-12%

Falling number above 250

Consistency between flour deliveries is most important





Tortilla Preparation Method

1. Same formula for all flours.
2. Mix flour, water salt, fat and other minor ingredients in table-top mixer
3. Form dough balls – 109gm
4. Proof dough balls 12 minutes
5. Press dough to 12IN diameter (heated press)
6. Bake in 3 pass oven (450°F, 375°F, 275°F) 30 sec
7. Finished bake weight 99 gm
8. Cool for 2.5minutes to room temperature
9. Pack into plastic bags and store for 30 days
10. Evaluate over shelf life.





Analysis Methods

- **Qualitative data based on:**
 1. Dough development
 2. Dough strength and stickiness
 3. Dough Machinability (stretches and transfers easily)
 4. Finished Food Sensory testing
- **Quantitative data :**
 1. Flour Analysis (Farinograph, Alveograph, Gluten test)
 2. Color Testing of Tortilla by Hunter Colorimeter
 3. Strength Test of Tortilla (Puncture test by CWC)





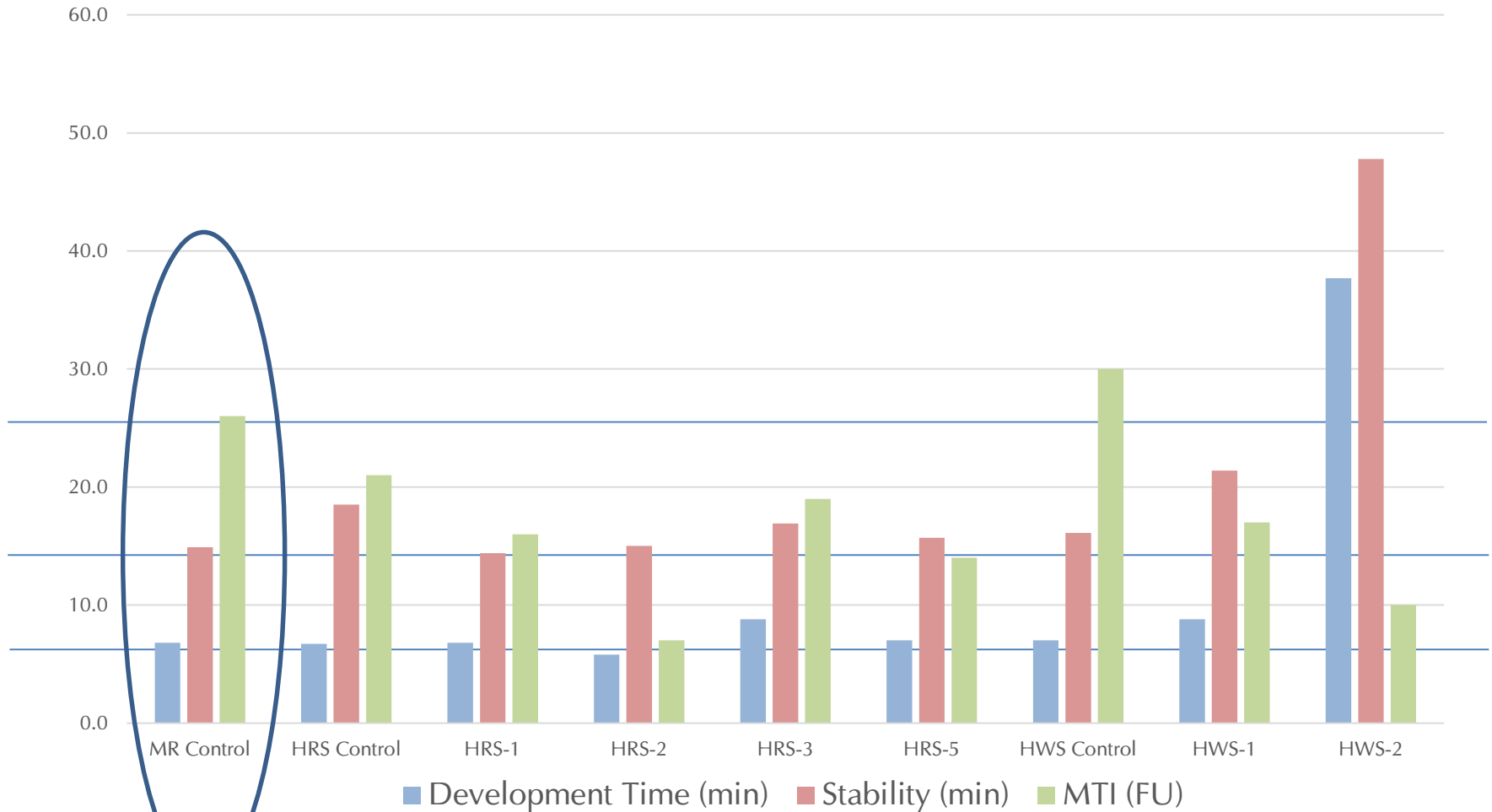
CWC Farinogram

SAMPLES ID#	ABSOR. %	Development Time (MIN)	Stability (MIN)	M.T.I. (FU)
MR Control	62.1	6.8	14.9	26
HRS Control	63.9	6.7	18.5	21
HRS-1	66.2	6.8	14.4	16
HRS-2	60.6	5.8	15.0	7
HRS-3	62.9	8.8	16.9	19
HRS-5	65.0	7.0	15.7	14
HWS Control	65.4	7.0	16.1	30
HWS-1	62.2	8.8	21.4	17
HWS-2	62.1	37.7	47.8	10





CWC Farinogram Results





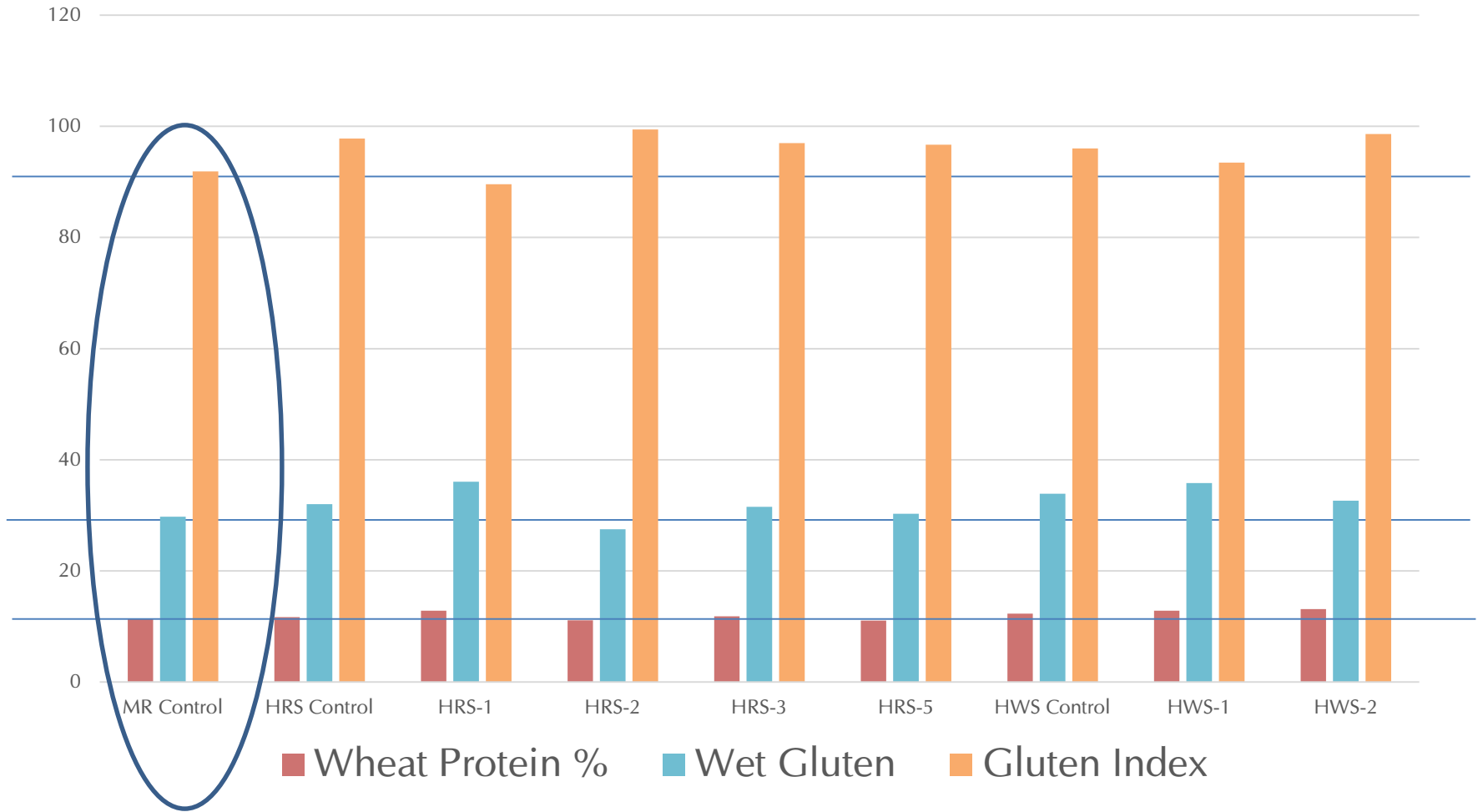
Flour Analysis by CWC

SAMPLES ID#	FLOUR ANALYSIS					
	FLOUR PROTEIN (14% m.b.)	MOIS %	ASH (14% m.b.)	WET GLUTEN % (14% MB)	GLUTEN INDEX	FALLING NO. (SEC)
MR Control	11.4	12.90	0.57	29.77	91.90	409
HRS Control	11.67	13.72	0.51	32.00	97.82	398
HRS-1	12.85	13.98	0.44	36.04	89.57	418
HRS-2	11.11	13.85	0.48	27.50	99.46	306
HRS-3	11.85	14.05	0.47	31.52	96.99	363
HRS-5	11.07	14.08	0.51	30.28	96.69	421
HWS Control	12.29	13.76	0.52	33.91	96.03	306
HWS-1	12.85	13.56	0.52	35.82	93.49	400
HWS-2	13.12	13.62	0.51	32.66	98.63	412





Protein Quantity and Quality



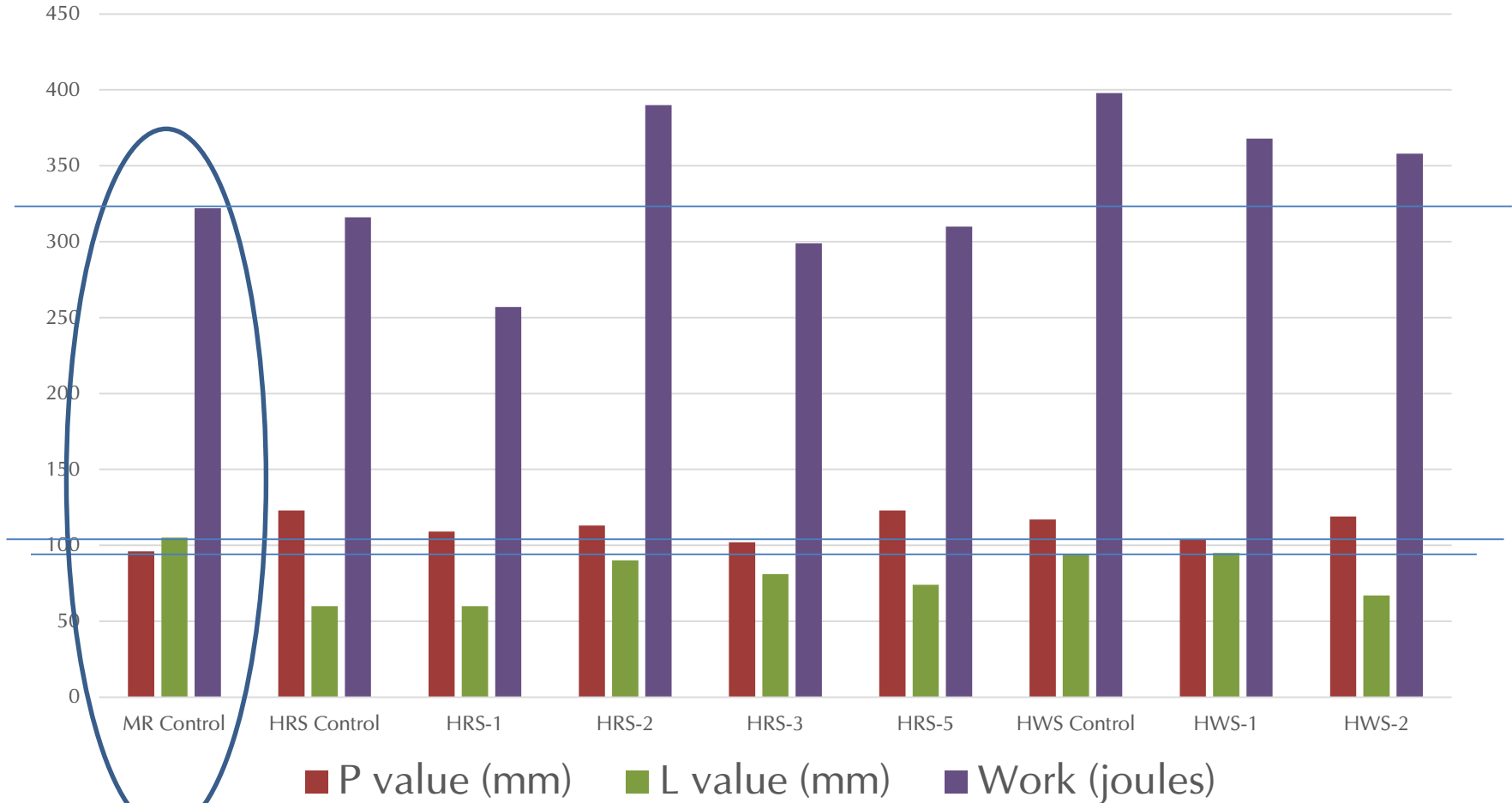


Alveograph Results

SAMPLES ID#	P(mm)	L(mm)	W(joules)	P/L
MR Control	96	105	322.00	0.91
HRS Control	123	60	316.00	2.05
HRS-1	109	60	257.00	1.82
HRS-2	113	90	390.00	1.26
HRS-3	102	81	299.00	1.26
HRS-5	123	74	310.00	1.66
HWS Control	117	94	398.00	1.24
HWS-1	104	95	368.00	1.09
HWS-2	119	67	358.00	1.78



Alveograph





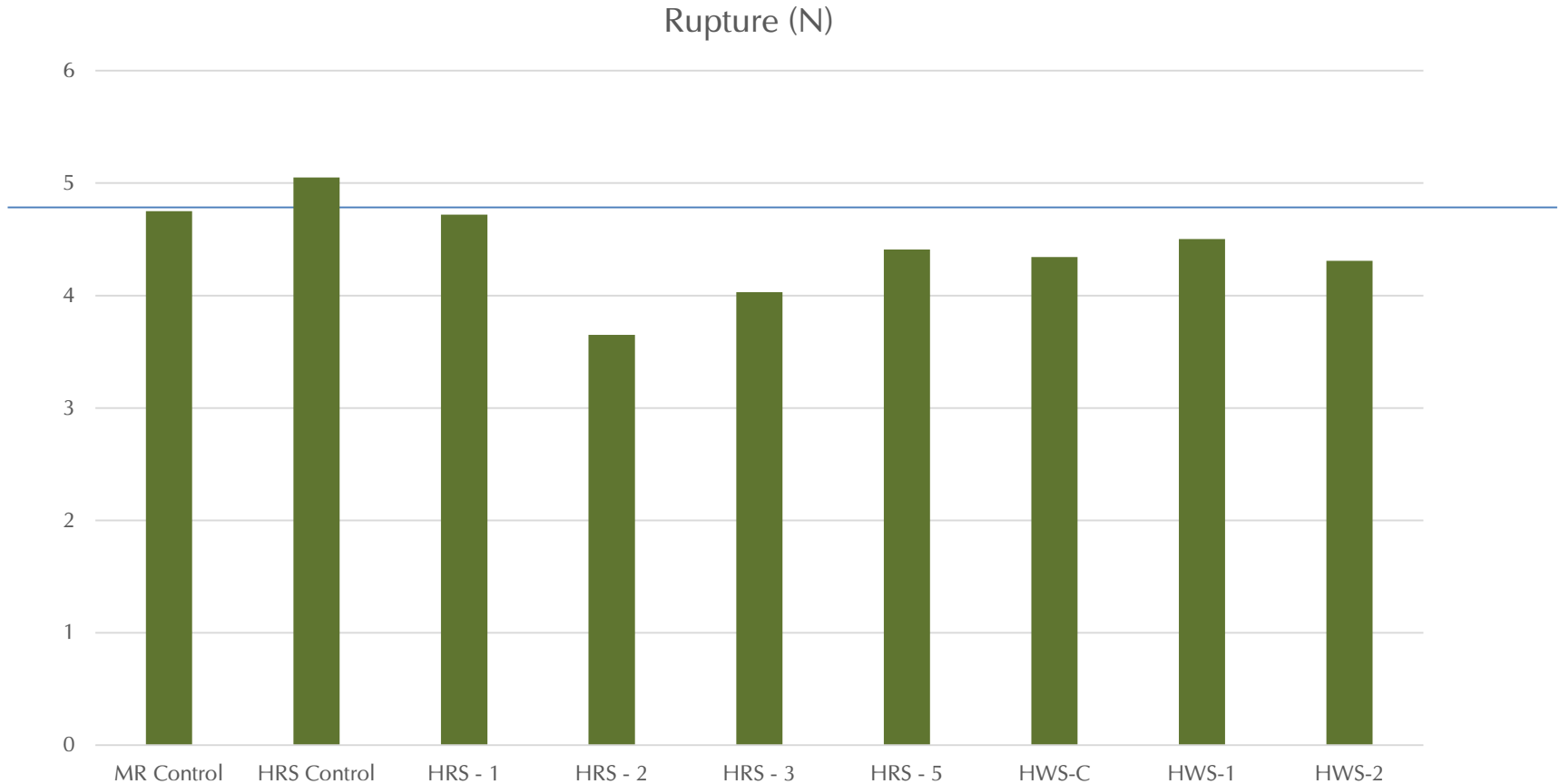
Physical Test of Finished Tortilla by CWC Day 7

Sample #	MR Control	HRS Control	HRS - 1	HRS - 2	HRS - 3	HRS - 5	HWS-C	HWS-1	HWS-2
Rupture (N)	4.75	5.05	4.72	3.651	4.029	4.409	4.343	4.503	4.31
Extensibility(mm)	11.062	12.302	12.869	10.781	9.47	11.185	12.445	12.623	13.693
Work(N*mm)	46.575	57.422	57.516	35.212	41.473	52.695	49.97	54.063	55.385

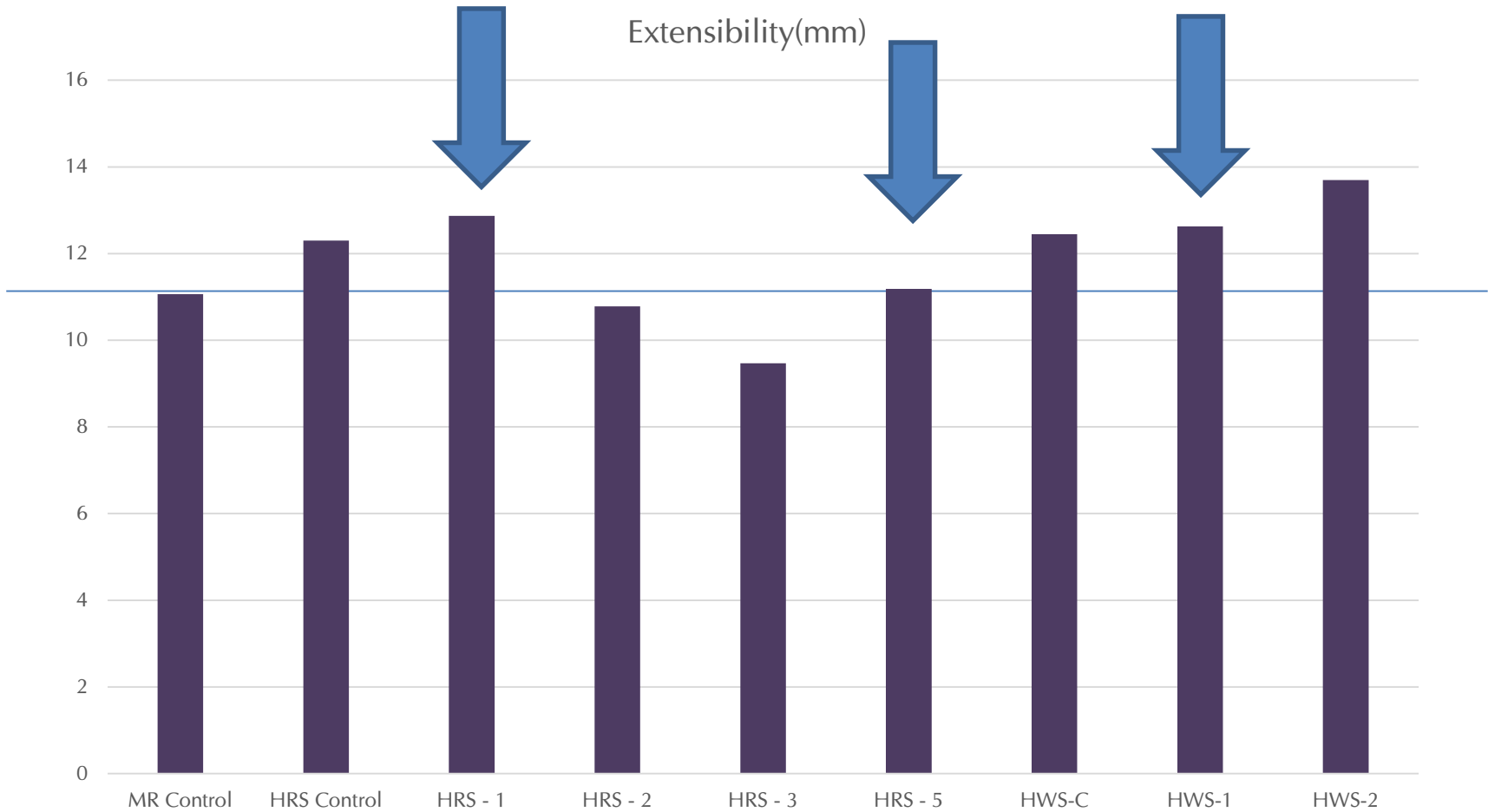




Puncture Test at 7 Days



Extensibility (mm)



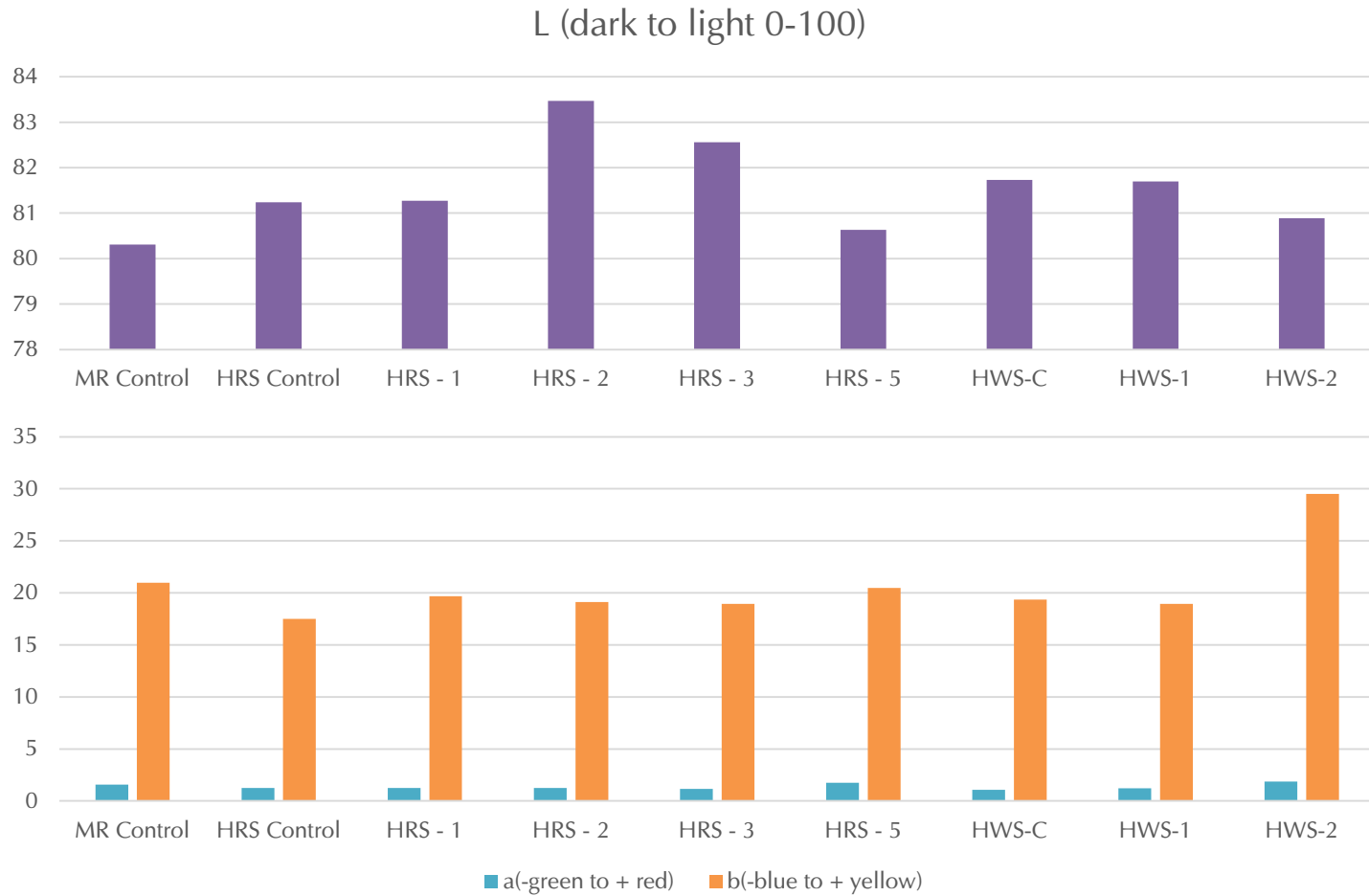


Mi Rancho Color Measurements

Sample #	MR Control	HRS Control	HRS - 1	HRS - 2	HRS - 3	HRS - 5	HWS-C	HWS-1	HWS-2
Color Hunter Color L*a*b									
L (dark to light 0-100)	80.31	81.24	81.27	83.47	82.56	80.63	81.73	81.7	80.89
a(-green to + red)	1.58	1.25	1.25	1.26	1.17	1.74	1.06	1.22	1.88
b(-blue to + yellow)	20.98	17.5	19.69	19.13	18.93	20.47	19.36	18.93	29.51



Hunter Color Numbers





Dough comparison- Qualitative

SAMPLES ID#	Dough Observations (Qualitative)		
	Dough Handling	End-Product Performance	Overall Acceptability
HRS Control	Somewhat sticky(8)	Good (8)	8
HRS-1	Dough Soft (8)	OK lost 5 online(6)	7
HRS-2	Not sticky(7)	(2) due to mold	2
HRS-3	Somewhat sticky(7)	Good (8)	8
HRS-5	Firm Dough(7)	Good(8)	8
HWS Control	Nice(8)	Good(8)	8
HWS-1	Somewhat soft(8)	Good(8)	8
HWS-2	Nice dough(8)	(2)due to color	2
Mi Rancho Control	Not sticky(9)	Good (9)	9





Top Contenders

Sample	Flour						Tortilla					
	Flour Protein %	Absorption%	Devlpmt time (min)	Stability	MTI	P value (mm)	L Value (mm)	Rupture Force (N)	Extensibility (mm)	Work (N.mm)	Hunter L number	Performance
MR-C	11.4	62.1	6.8	14.9	26	96	105	4.75	11.062	46.575	80.31	9
HRS-1	12.85	66.2	6.8	14.4	7	109	60	4.72	12.869	57.516	81.27	7
HRS-5	11.07	65.0	7.0	15.7	14	123	74	4.409	11.185	52.695	80.63	8
HWS-1	12.85	62.2	8.8	21.4	17	104	95	4.503	12.623	54.063	81.7	8

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Conclusion

Based on results of all qualitative and quantitative results, we suggest **HWS-1** as a comparable flour to Mi Rancho control and could possibly be used as a tortilla flour.

1. Farinogram results very similar to Mi Rancho control.
2. Rupture Force and Extensibility were comparable to control
3. Color was bright and attractive
4. Dough strength and machinability were favorable
5. Finished food met all handling expectations versus control





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