



Wheat Protein Isolates - Properties and Functionality

Creating Better Solutions...Naturally

Specialty Wheat Proteins

Value-Addition Concepts

- Protein Concentrates
 - Deliver 75% protein
 - Posses a range of extensibility
- Protein Isolates
 - Enhanced protein level
 - Varying ratio of elasticity and extensibility
- Hydrolyzed Proteins
 - Soluble proteins at wide pH range
 - Low-molecular weight

Specialty Wheat Proteins

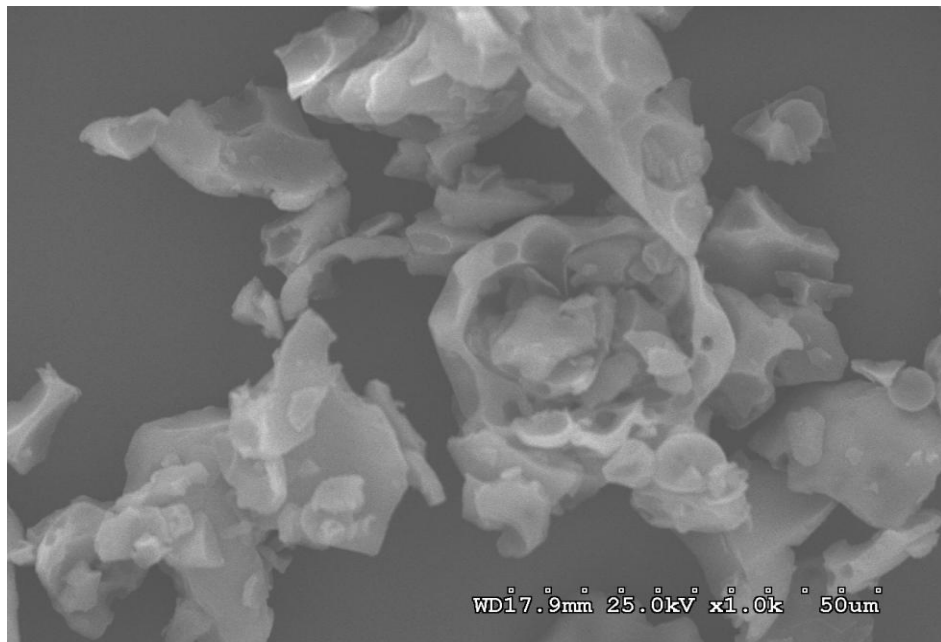
Value-Addition Concepts

- Textured Proteins
 - Taste and texture benefits
 - Variety of size, shape, and color
- Fractionated Proteins
 - Extensible gliadin
 - Elastic glutenin

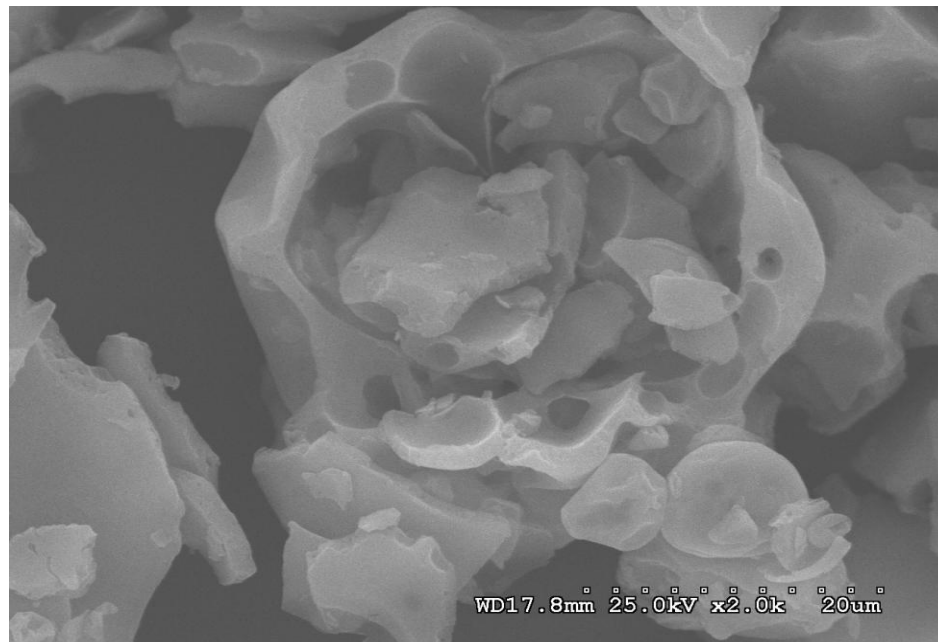
Properties

- High purity wheat protein isolate
- > 90% protein (N x 6.25, d.b.)
- Ash ~ 1%
- More extensible, less elastic (gliadin-like)
- Hydrated pH is acidic (~ pH 4)
- Sulfite-treated (residual sulfite ~ 45 ppm)

Arise 5000



X 1,000



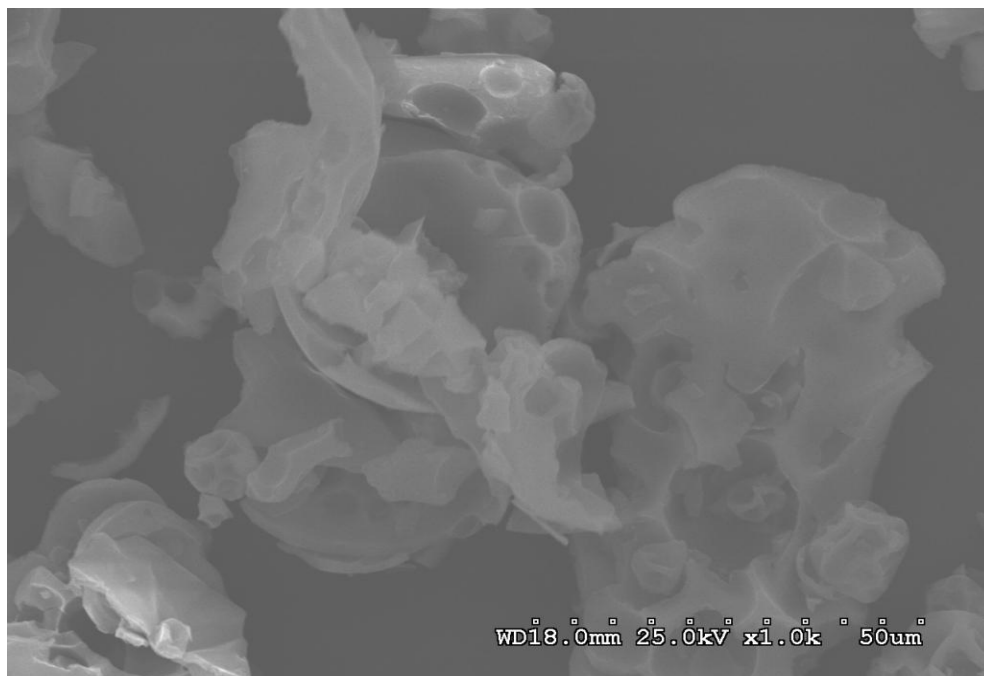
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Wheat Protein Isolate Arise[®] 6000

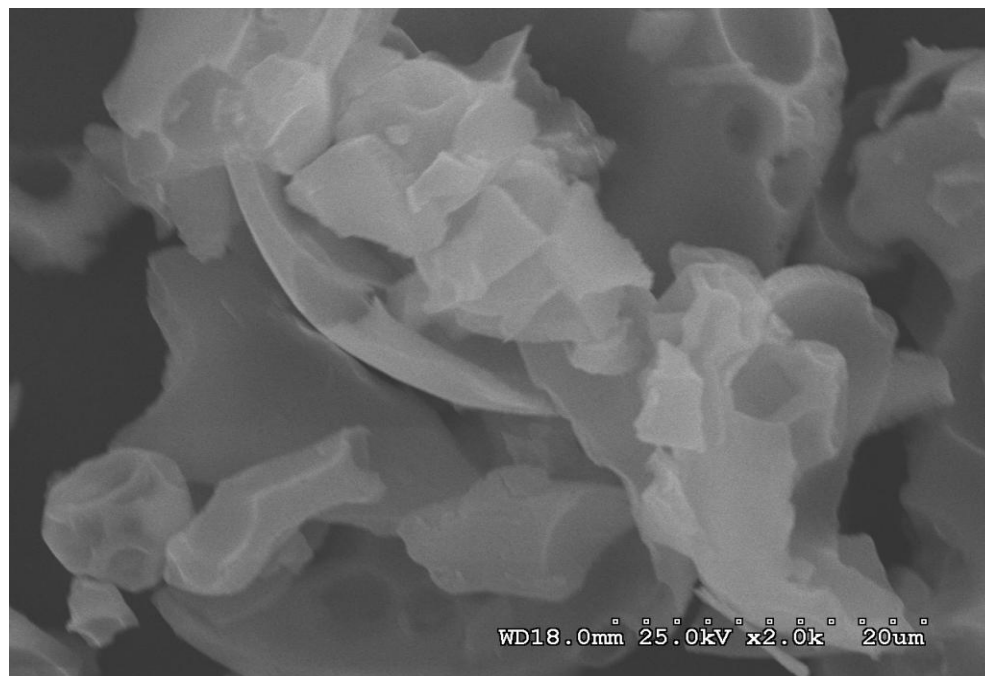
Properties

- Also known as Pasta Power
- High purity wheat protein isolate
- > 85% protein (N x 6.25, d.b.)
- Ash ~ 4%
- More elastic, less extensible compared to Arise[®] 5000
- Hydrated pH is ~ neutral
- Sulfite-treated (residual sulfite ~ 55 ppm)

Arise[®] 6000



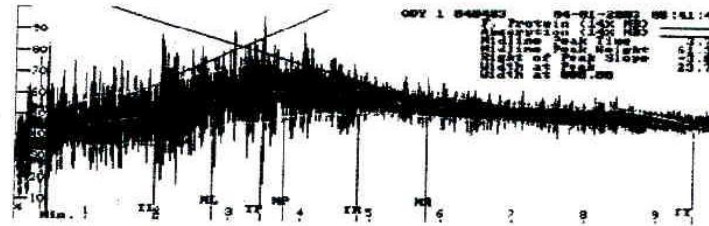
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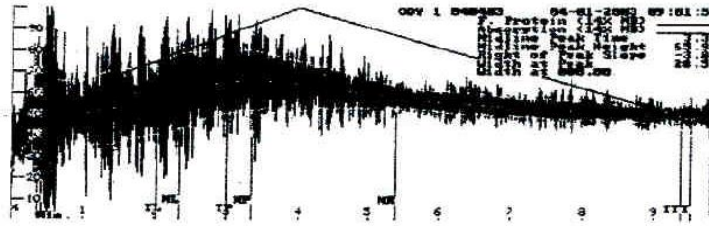
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Mixograph Curves of Wheat Flour Containing Vital Wheat Gluten

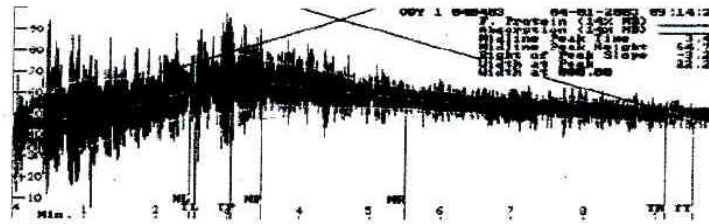
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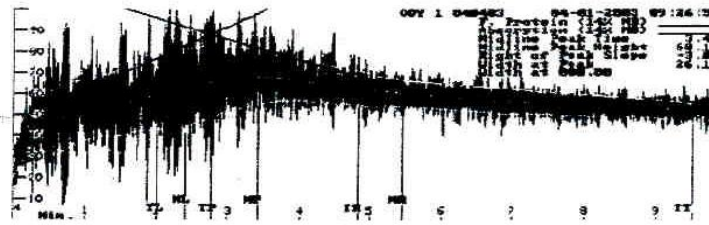
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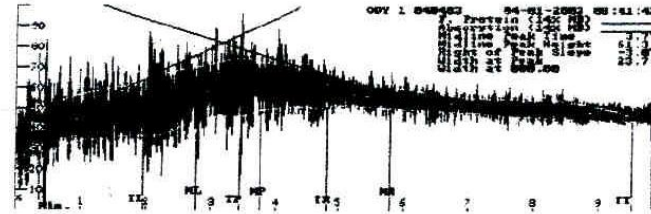
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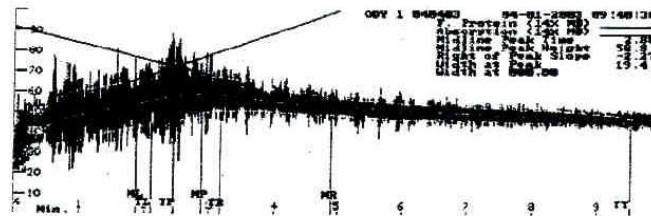


Mixograph Curves of Wheat Flour Containing Arise[®] 5000

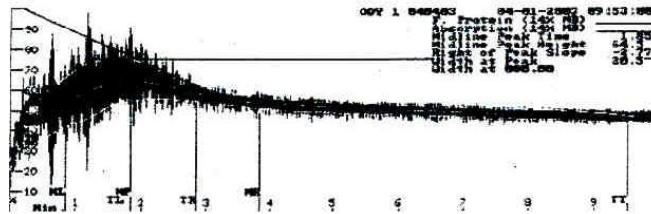
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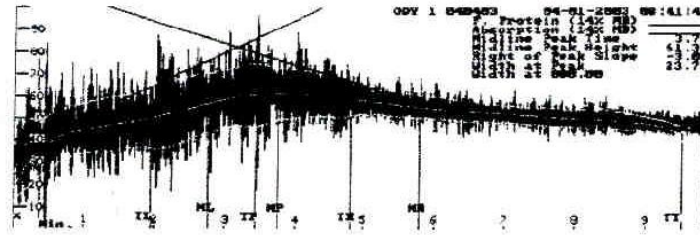
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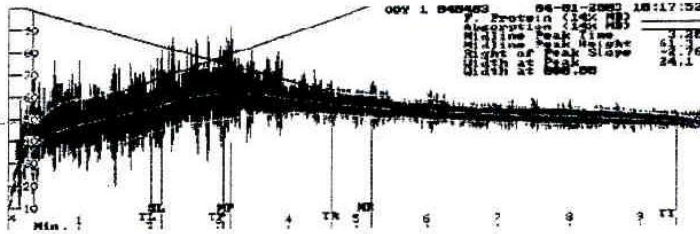


Mixograph Curves of Wheat Flour Containing Arise[®] 6000

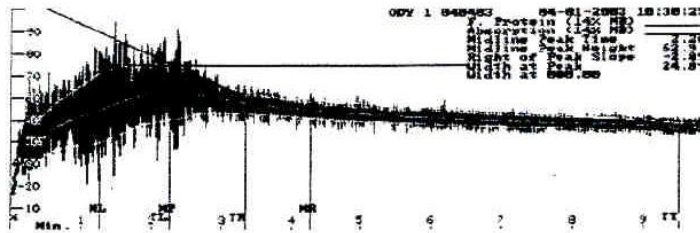
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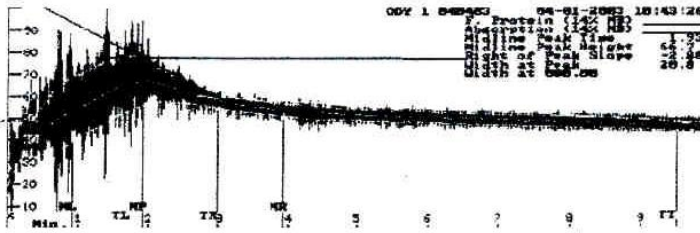
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Extensograph Data of Wheat Flour with Added Arise[®] 5000 and Arise[®] 6000

	Extensibility, cm		
	<u>45 Min.</u>	<u>90 Min.</u>	<u>135 Min.</u>
No Additive	14.4	9.3	8.1
0.5% Arise [®] 5000	15.5	9.7	9.5
1.0% Arise [®] 5000	17.3	10.1	10.2
1.0% Arise [®] 6000	15.3	11.1	8.3
1.5% Arise [®] 6000	17.8	11.1	9.4



Alveograph Data of Wheat Flour with Added Arise[®] 5000 and Arise[®] 6000

	<u>Resistance to Extension, mm</u>	<u>Extensibility, mm</u>
No Additive	121	79
0.5% Arise [®] 5000	116	90
1.0% Arise [®] 5000	114	97
1.0% Arise [®] 6000	117	88
1.5% Arise [®] 6000	119	87



Shared Benefits of Arise[®] 5000 and Arise[®] 6000

Shared Benefits	Arise [®] 5000	Arise [®] 6000
Increases dough extensibility	√	
Increases water absorption of dough	Comparable	Comparable
Decreases dough mixing time	√	
Slackening effect on the dough out of the mixer; recovers to optimum	Comparable	Comparable
Increases loaf volume of bread		√
Good internal structure (grain and crumb firmness)	Comparable	Comparable
Increases flour tortilla diameter and rollability score	Comparable	Comparable
Improves shelf-life of flour tortillas	√	
√ Indicates greater benefit		

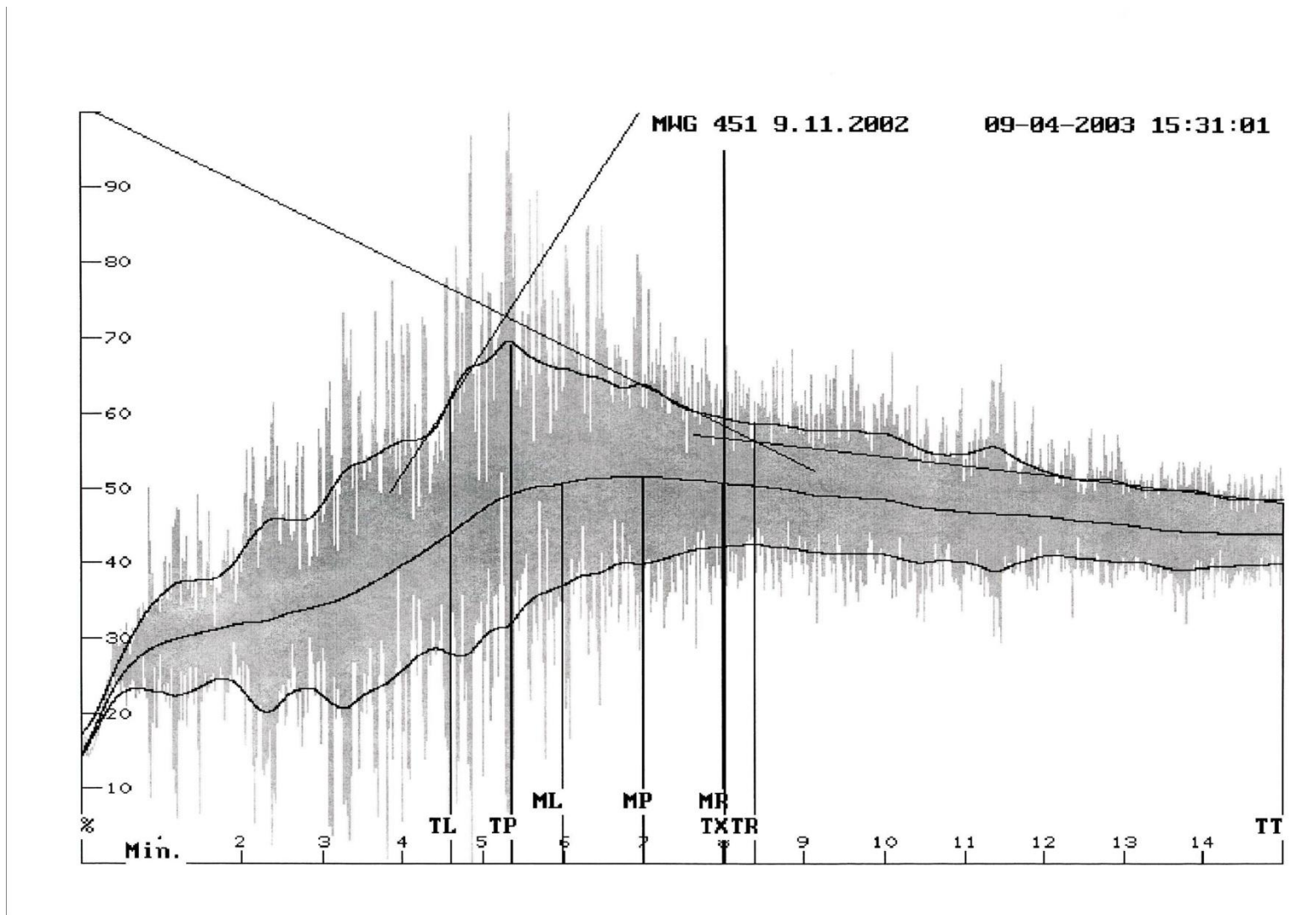


Wheat Protein Isolate Arise[®] 8000

Properties

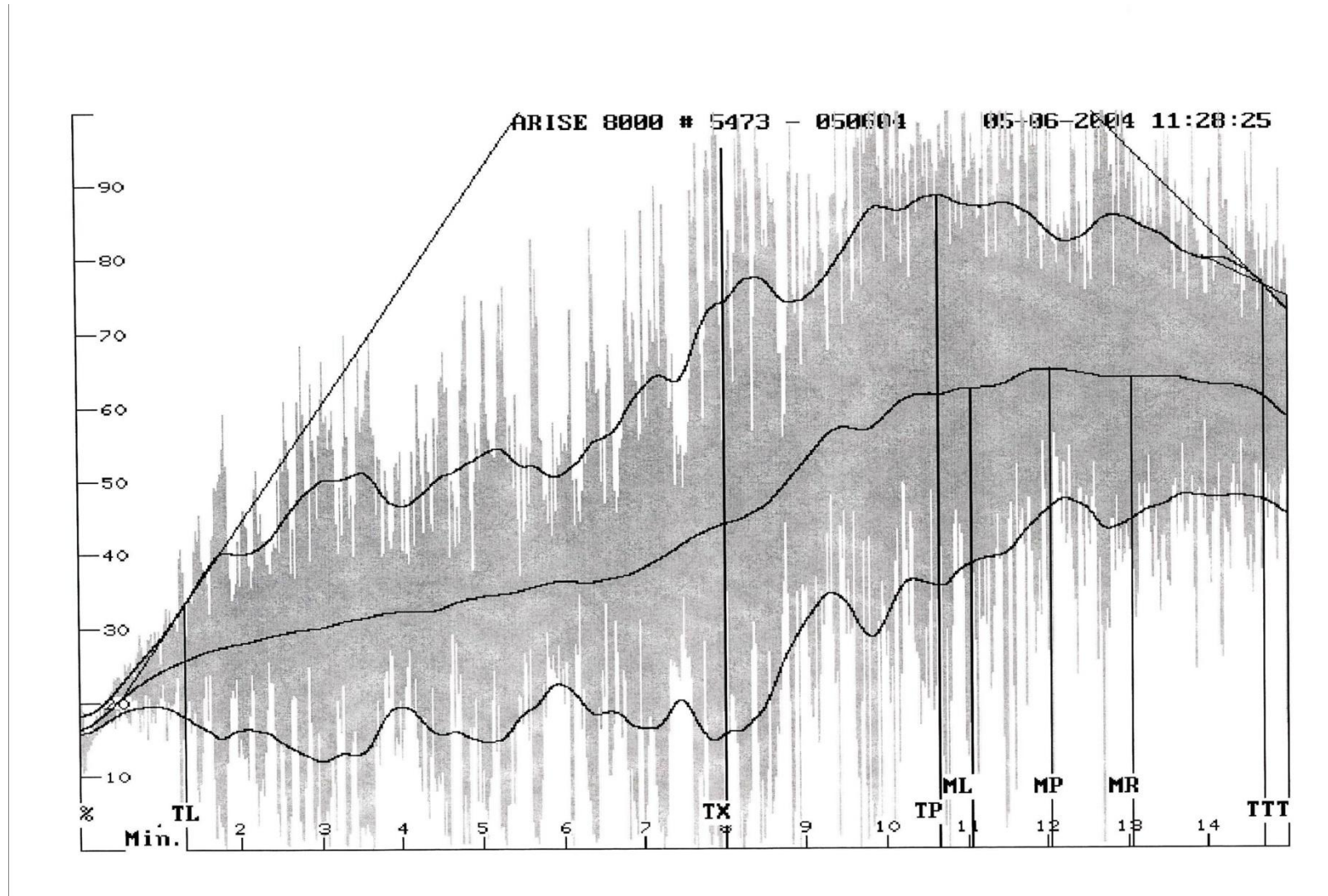
- High purity wheat protein isolate
- > 90% protein (N x 6.25, d.b.)
- Ash ~ 1%
- More elastic, less extensible than vital wheat gluten
- Hydrated pH is ~ neutral
- Sulfite-free

Vital Wheat Gluten Lot 451





Arise[®] 8000 Lot 5473



Creating Better Solutions...Naturally



Extensibility (Extensograph) of Wheat Flour with Added Arise[®] 8000

	Extensibility, cm		
	45 Min.	90 Min.	135 Min.
No Additive	14.4	9.3	8.1
1% Arise [®] 8000	13.4	10.5	8.8
3% Arise [®] 8000	13.7	9.0	8.2
5% Arise [®] 8000	13.3	8.7	8.1



Resistance to Extension (Extensograph) of Wheat Flour with Added Arise[®] 8000

	Resistance to Extension, EU		
	45 Min.	90 Min.	135 Min.
No Additive	625	770	880
1% Arise [®] 8000	810	1000	930
3% Arise [®] 8000	765	1015	970
5% Arise [®] 8000	775	1030	1040



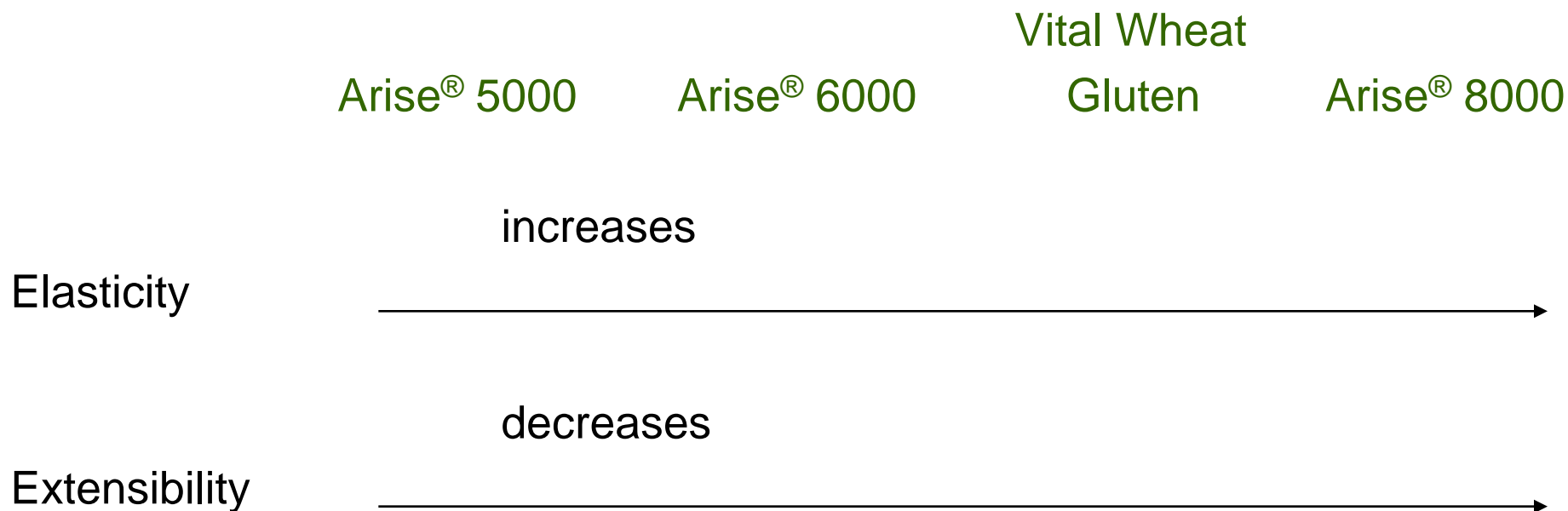
Alveograph Data of Wheat Flour with Added Arise[®] 8000

	Resistance to Extension, mm	Extensibility, mm
No Additive	121	79
1% Arise [®] 8000	129	68
3% Arise [®] 8000	142	76
5% Arise [®] 8000	167	79



Wheat Protein Isolates

Summary of Hydrated Properties



Key Points

Arise[®] 5000

- High purity wheat protein isolate
- Most extensible, least elastic wheat protein isolate
- Water dispersible/soluble
- Decreases dough mixing time
- Increases dough extensibility
- Improves dough machineability
- Decreases proof time
- Increases bread volume
- Increases diameter and shelf-life of flour tortillas
- Cost reduction in bread making

Key Points

Arise® 6000

- High purity wheat protein isolate
- More elastic, less extensible than Arise® 5000
- Decreases dough mixing time
- Increases dough extensibility
- Improves dough machineability
- Increases bread volume
- Cost reduction in bread making
- Increases diameter and shelf-life of flour tortillas
- Increases firmness of pasta
- Reduces cooking loss of pasta
- Egg white replacer in retorted pasta

Key Points

Arise[®] 8000

- High purity wheat protein isolate
- Most elastic, least extensible wheat protein isolate
- Label friendly