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GrainCorp

Benefits of Using Hard White Wheat in Milling

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Facts



- All wheat grown in Australia, Pakistan, India, Turkey & France is white wheat
- There are also certain white wheat varieties grown in the US & Canada
- Wheat grown in most of the other countries in the world is red wheat

Colour



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- Wheat is categorized white or red mainly because of its bran colour. Internally there is also an effect on the endosperm colour as it becomes more creamy and shining
- White wheat is preferred in most of the Asian, Middle Eastern & East African countries due to its end-product perception

RED



WHITE



Hard White Wheat

- **Australia:** APH & AH
- **Canada:** CWHW
- **US :** HW

Hard white wheat from the US is consumed locally while the Canadian white hard is not often exported on the other hand Australian hard white wheat APH & AH are exported on regular basis

APH



- **APH** (Australian Prime Hard) is a hard white wheat that was first segregated in northern NSW in 1957-58 as “premium wheat” on basis of protein content (testing by grower group on receipt & in laboratory)
- Later restricted on basis of variety
- Became Australian Prime Hard 15, 14, 13% protein
- Finally it was called APH1 (>14pro) & APH2 (>13pro)

Growing Regions

- Only grown in Queensland & New South Wales

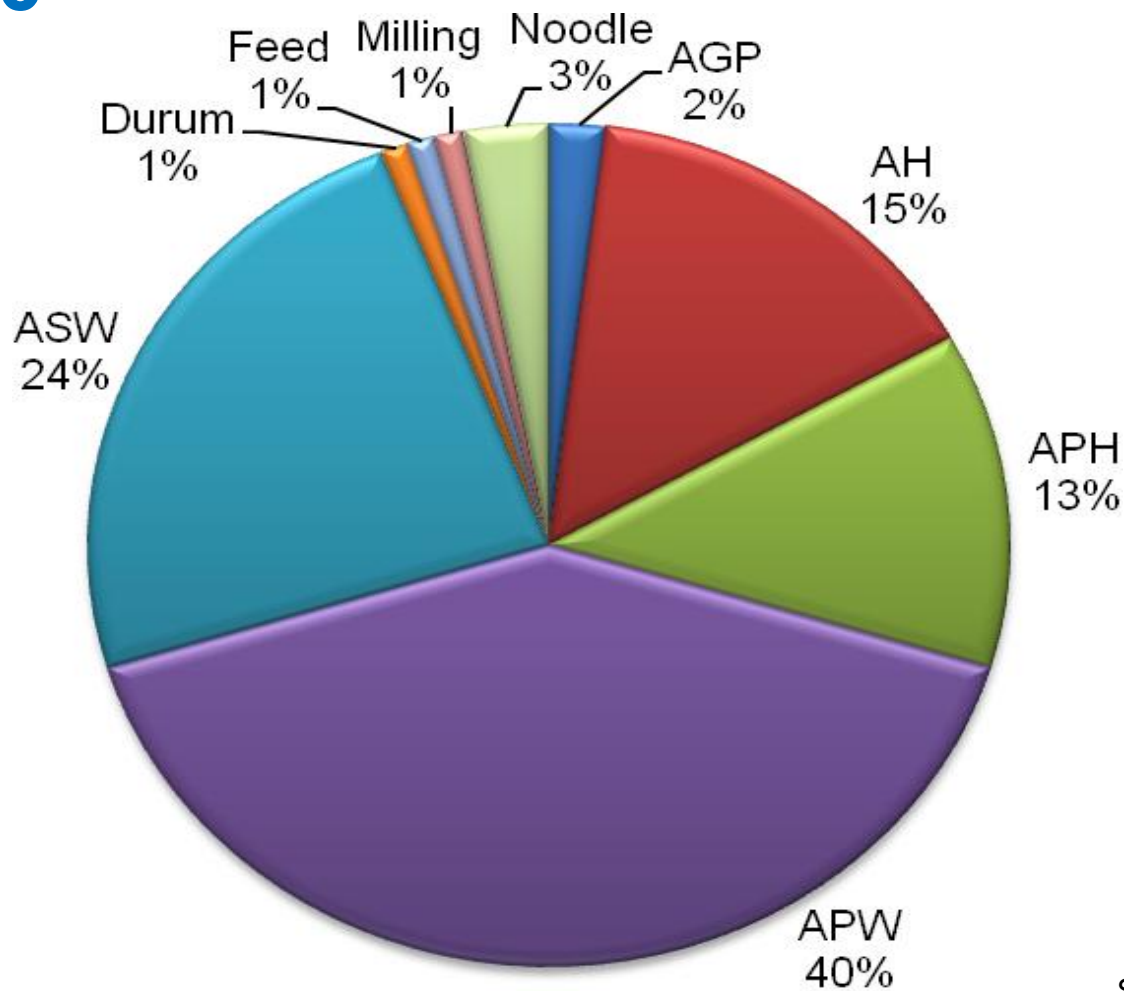


Growing Regions

- Traditionally it is grown in QLD & NSW (**black soils** with higher nitrogen content which is not present anywhere else in Australia)
- Expanded to southern NSW (Port Kembla) in 1997



Export Statistics 2009/10



Source:
WEA

Wheat Varietal Classification



- National classification panel WQA established in 2004
 - Consistent protocols & guidelines developed (multiple years & sites data)
 - Technical experts review data on quality
- Future Developments
 - Use of statistical techniques in data analysis
 - Review of classification regions
 - APH split into Noodle & Baking
 - APH may be grown in other areas in the future

Major Varieties in APH (% of receival)



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Variety	Queensland	Northern NSW	Southern NSW
Baxter	36	12	
EGA Gregory	12	11	
EGA Wedgetail			7
Ellison			23
Janz		4	22
Kennedy	14		
LPB Crusader	8	8	10
Sunco		7	
Sunlin		6	
Sunstate			12
Sunvale	13	30	14
Sunzell			8

Characteristics

- Clean, dry & white
- High extraction and good flour colour
- Strength
- End product quality (bread, noodles, starch/gluten etc)



Specification

Parameter	Limit	APH
Moisture	max	12.5
Protein@ 11mb	min	13
Test Weight	min	74
Screening	max	5
Falling #	min	350

Data on Quality

- load by load testing
- 500MT composite samples tested at GrainCorp laboratories
- composites by port zone reported in Crop Report

APH vs AH-13

Grade	Attributes
APH	Minimum protein content of 13.0% Hard-grained varieties Prime hard varieties Excellent milling quality High dough strength and functionality
AH-13	Minimum protein content of 13.0% Hard-grained varieties Superior milling quality Good dough strength and functionality

APH vs AH-13

- Typical Quality Comparison

Wheat	AH13	APH2
Test weight (kg/hL)	82	83
Grain hardness (PSI)	14	11
Protein (Nx5.7, 11% mb)	13.5	13.6
Falling number (sec)	448	444
Screenings, 2mm (%)	1.4	1.4
Foreign material (%)	0.2	0.1
Flour extraction (%)	74.2	75.3

APH vs AH-13

- Typical Quality Comparison

Flour	AH13	APH2
Starch damage (%)	7.6	8.5
Wet gluten (%)	34.5	35
Gluten index (%)	86	93
Flour ash (%)	0.43	0.43
Farinogram		
Water Absorption (%)	62	65
Development time (min)	6.7	8.6
Stability (min)	15.3	16.4
Extensogram		
Extensibility (cm) 135 min pull	20.8	22
Maximum Height (BU) 135 min pull	550	580
Area (cm ²) 135 min pull	176	168

APH vs AH-13

- Typical Quality Comparison

Baking test (straight dough)	AH13	APH2
Volume (cm ³)	850	935
Score (%)	85	89
Baking test (Sponge & dough)		
Volume (cm ³)	1350	1420
Score (%)	74	79
Yellow alkaline noodle test - colour		
Raw noodle sheet		
Minolta L (T=30min)	78.8	80.7
Colour stability	13.0	11.3

APH-Uses

- Good for Noodles
 - 30 years research on noodle making quality, noodle color & varietal development
- Good for Bread TOO!!
 - Nationally funded research work to improve baking quality
 - Characterise & compare APH varieties for sponge & dough bread making quality
 - National standard methods developed for sponge & dough, long fermentation & rapid dough test bakes
 - Molecular markers identified for bread making quality in Australian germplasm (use in breeding)

Uses

Uses

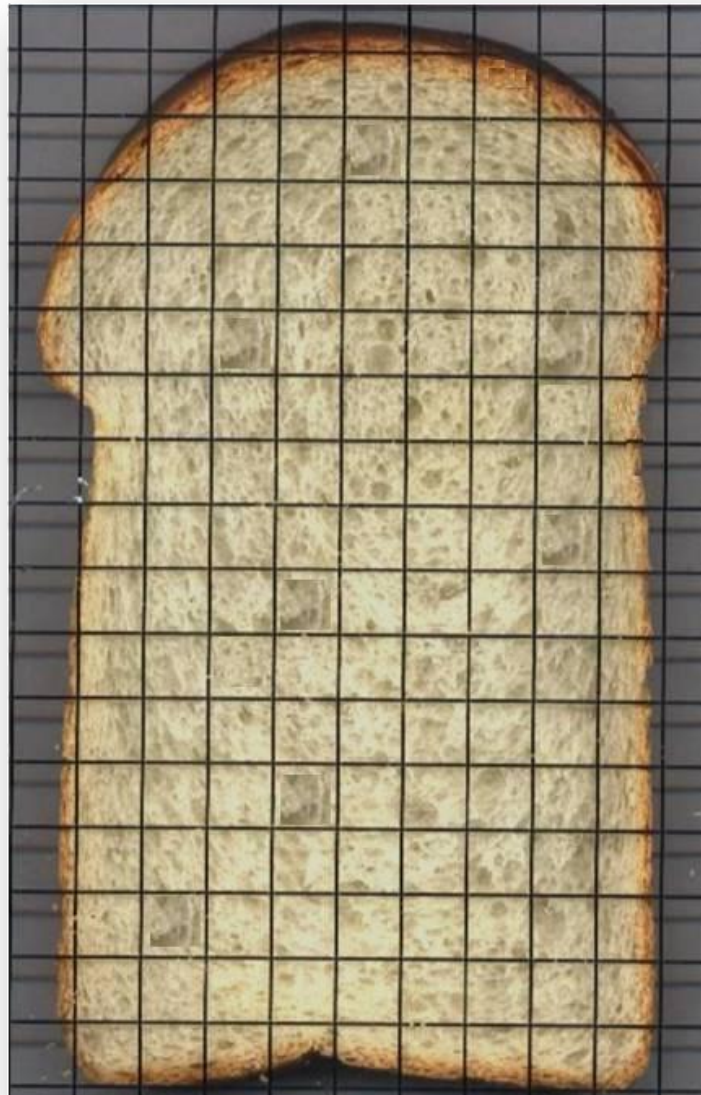
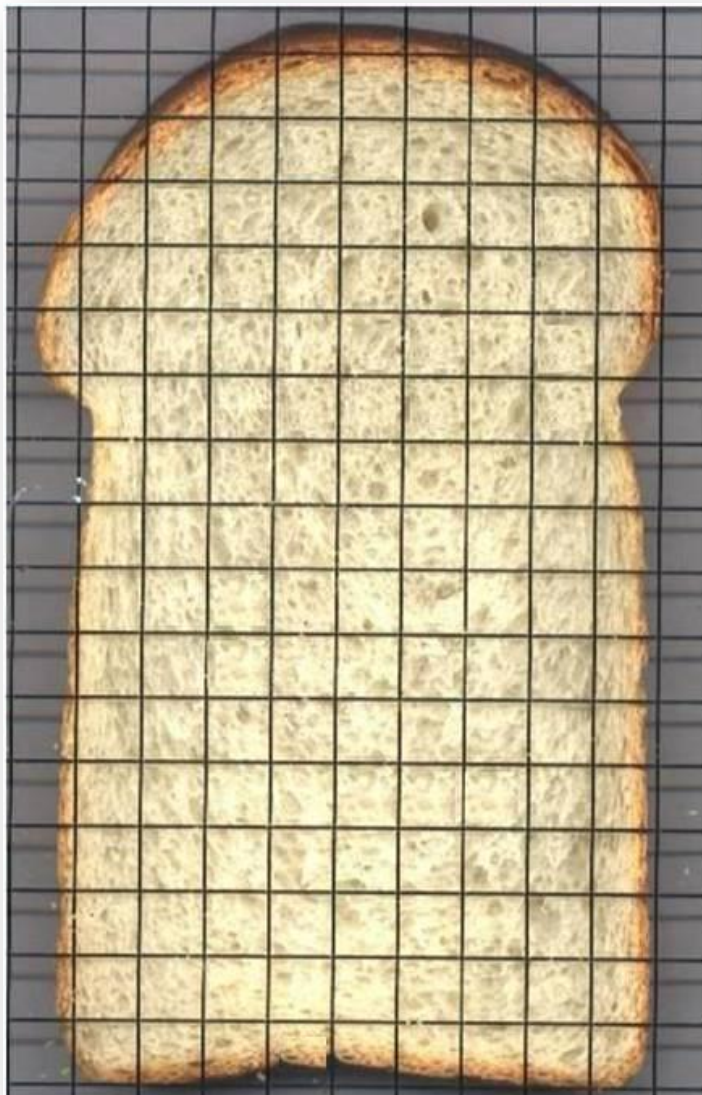
- Ramen noodles
- Specialty breads
- Hamburger buns
- High protein flours
- Gluten production
- Blending



Bread Crumb Colour



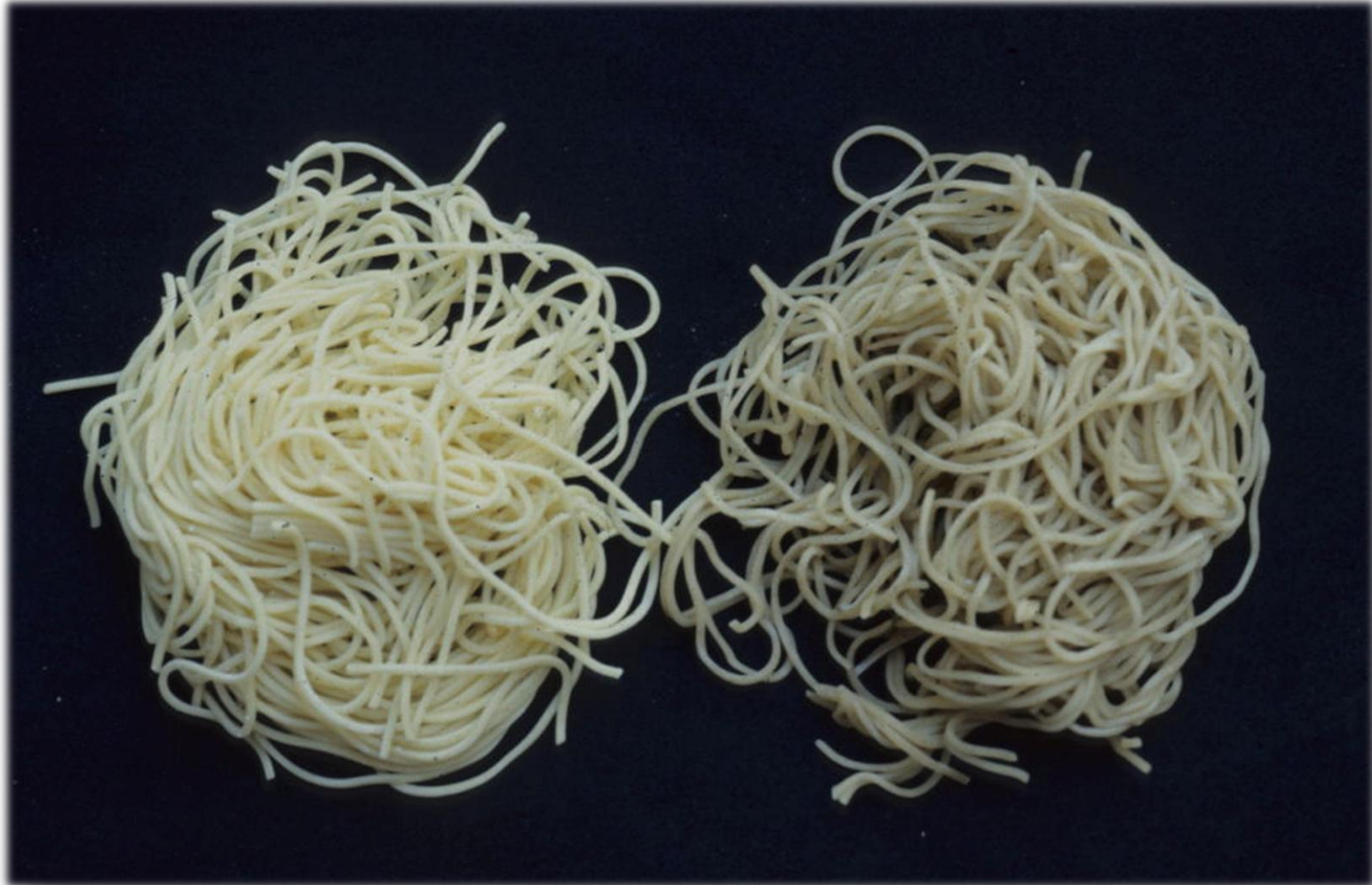
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Noodle Colour



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Hard White vs Hard Red

“Blend & Cost”

Blend & Cost



Blend Comparison	Blend-1		Blend-2		Cost advantage using APH
Wheat Type	Medium Red Wheat	APH	Medium Red Wheat	Other Hard Red Wheat	
Costing					
FOB Price \$	\$250	\$380	\$250	\$380	
Blend %	53%	47%	55%	45%	
Protein (11%mb) %	11.0%	13.0%	11.0%	13.4%	
Total Screening %	6.0%	2.5%	6.0%	4.0%	
Moisture Content %	12.0%	11.0%	12.0%	13.0%	
Clean Wheat %	94.0%	97.5%	94.0%	96.0%	
Dry Basis Wheat %	88.0%	89.0%	88.0%	87.0%	
Net Wheat %	82.7%	86.8%	82.7%	83.5%	
Clean Dry Wheat \$	\$302	\$438	\$302	\$ 455	
Cost of Wheat \$	\$160	\$206	\$166	\$ 205	
Individual Wheat Cost \$	\$160	\$206	\$166	\$ 205	
Total Wheat Cost \$/mt		\$366		\$371	\$5

Milling Performance



Milling Performance	Blend-1		Blend-2	
Temper Level %	15.0%	15.0%	15.0%	15.0%
Moisture Gain kg	35.3	47.1	35.3	23.5
Milling Loss %	1.5%	1.5%	1.5%	1.5%
Clean Tempered Wheat kg	1,020	1,031	1,020	1,008
Extraction %				
Patent Flour %	71%	77%	71%	75%
Other Flour %	7%	5%	6%	5%
Bran %	22%	18%	23%	20%

Gross Margin



Product Quantity kg	Blend-1	Blend-2
Blend Gluten %	29	29
Total Patent Flour kg	757	738
Total Other Flour kg	62	56
Total Bran kg	206	220
Total Products kg	1,025	1,015
Product Prices	\$/kg	\$/kg
Patent Flour \$/kg	\$0.40	\$0.40
Other Flour \$/kg	\$0.30	\$0.30
Bran \$/kg	\$0.15	\$0.15
Value of Products \$/mt	\$352	\$345
Gross Margin mt	\$41	\$37

Conclusion

- APH is a premium quality hard white wheat having the following advantages while milling:
 - Low moisture
 - High protein
 - Low screenings
 - High milling extraction
 - Low ash
 - High water absorption
 - White bran colour
 - Creamy endosperm colour