

Malt Analysis for the Craft Brewer

Districts, Mid South and Southeast
Joint Technical Conference

11/13/10

Master Brewers Association of the Americas

Dedicated to the technology of brewing.



Five Why's

- Understanding
 - Adaptability
 - Great Beer
 - Happiness
 - Love



What

- Control
- Integrity
- Consistency

- Color
- Extract
- Protein

Cargill Malt Specialty Products Group

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CARGILL MALT

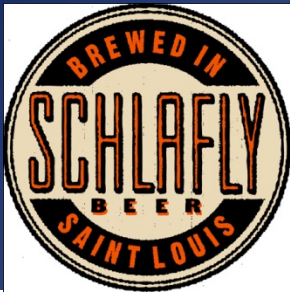
- [Introduction](#)
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Typical Malt Analysis

	Barley Type	Barley Variety	Assortment			H2O	Color	Protein Max.			Extract Dry Min.			D.P. Min.	Alpha	Beta	Mash	Viscosity	Clarity
			7/64	6/64	Thru	%	ASBC	Sol	Total	S/T	FG	CG	F-C Diff.	Dg. Lint.	Amly.	Glucan	Odor	Max	Degree
			Min.	Min.	Max	Max.	Deg. Lov.						Max.		Min.	Max.			Visual
Brewers Malt																			
Schreier Two-Row Pale	Two-Row	Various	60	25	1.5	5.0	1.5 - 2.5	5.5	13.5	50.0	80.0	79.0	1.5	110	45.0	150.0	Aro	1.50	Clear
Schreier Six-Row Pale	Six-Row	Robust	45	40	1.5	4.5	1.5 - 2.1	6.0	13.0	45.0	78.0	77.0	1.5	150	40.0	130.0	Aro	1.50	Clear
Cargill Two-Row Pale	Two-Row	Merit / Stein	60	25	1.5	4.5	1.5 - 2.5	5.5	12.5	45.0	80.0	79.0	1.5	110	45.0	160.0	Aro	1.50	Clear
Cargill IdaPils™	Two-Row	Harrington	70	25	1.5	4.5	1.4 - 1.7	5.0	12.0	50.0	80.0	79.0	1.3	110	50.0	110.0	Aro	1.50	Clear
Cargill Euro Pils	Two-Row	Manley	70	25	1.5	4.5	1.5 - 2.0	5.0	12.5	45.0	80.0	79.0	1.5	125	55.0	160.0	Aro	1.50	Clear
Cargill Special Pale	Two-Row	Metcalfe	60	35	1.5	4.5	3 - 4	5.5	12.0	47.0	79.0	78.0	1.5	100	45.0	100.0	V Aro	1.50	Clear
Cargill White Wheat	Wheat	Soft White Winter	75	20	2.0	4.5	2.6 - 3.2	6.5	12.0	45.0	82.0	81.0	1.5	120	40.0	75.0	Bread	1.50	SI Hazy
Color / Caramel Malt																			
Cargill Munich	Two-Row	Harrington	60	35	1.5	4.5	8 - 11	6.5	12.5	45.0	80.0	79.0	1.5	70	50.0	150.0	Aro		Clear
Cargill Caramel 10	Six-Row	Robust	40	40	2.0	4.5	8 - 15				70.0						V Aro		Clear
Cargill Caramel 20	Six-Row	Robust	40	40	2.0	4.5	15 - 25				70.0						V Aro		Clear
Cargill Caramel 30	Six-Row	Robust	40	40	2.0	4.5	25 - 35				70.0						V Aro		Clear
Cargill Caramel 40	Six-Row	Tradition	40	40	2.0	4.5	35 - 45				70.0						V Aro		Clear
Cargill Caramel 60	Six-Row	Tradition	40	40	2.0	4.5	55 - 65				70.0						V Aro		Dark
Cargill Caramel 80	Six-Row	Tradition	40	40	2.0	4.5	70 - 85				70.0						V Aro		Dark
Cargill Two-Row Caramel 60	Two-Row	Harrington	40	40	2.0	4.5	55 - 65				70.0						V Aro		Dark

* Moravian is a registered trade mark of the Adolph Coors Brewing Company, Golden, Colorado

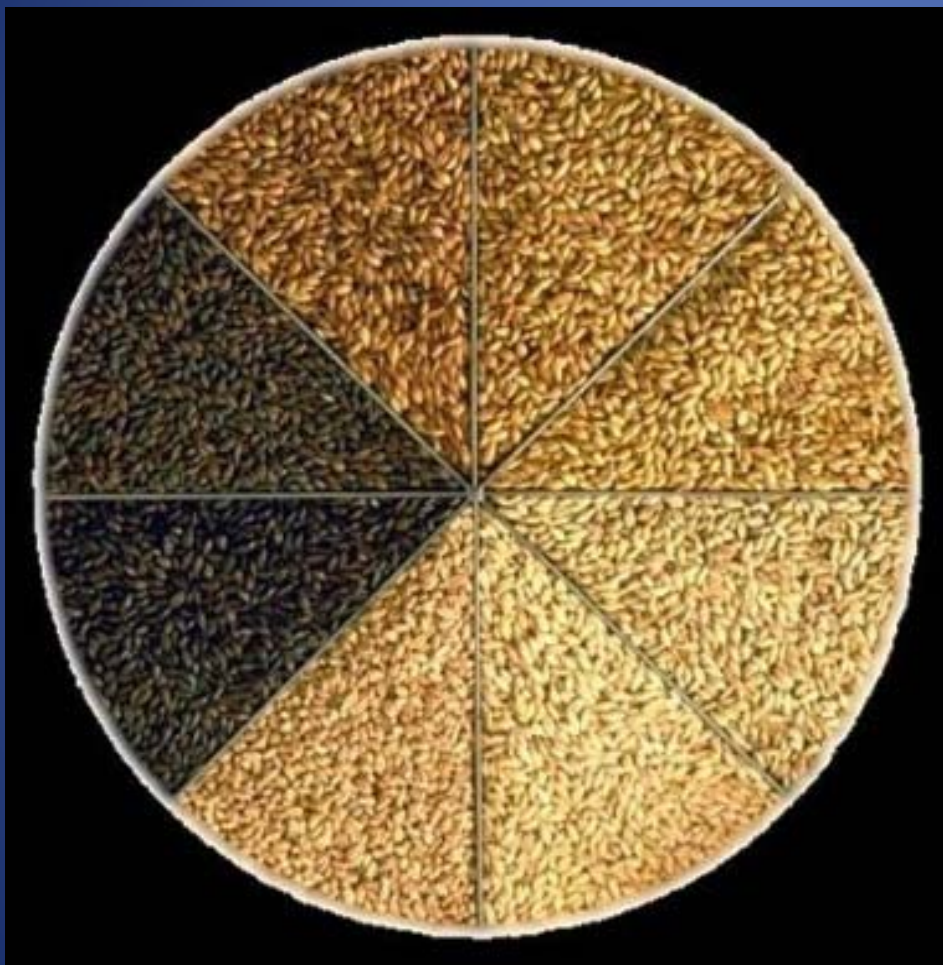




2-Row Pale Analysis

																		Assortment			
Date	Truck	Crop Info	LBs Rec'd	Moist %	FExt db %	F-C %	Color ASBC	Total Malt Prot %	Sol. Prot %	S/T	DP	Alpha	Visc cS	Beta-glucan mg/l	FAN	pH	Bu Wt. Lbs/Bu	On (2.8) 7/64	On (2.4) 6/64	On (2.2) 5/64	thru (2.2) 5/64
8/5	9858	2RP-CAR	7,477	4.4	82.6	1.0	2.30	11.98	5.05	42.2	159	66.0	1.45	88	200	0.00	44.0	59.7	30.3	7.9	2.1
8/5	9858	2RP-CAR	42,423	4.4	82.6	1.0	2.30	11.98	5.05	42.2	159	66.0	1.45	88	200	0.00	44.0	59.7	30.3	7.9	2.1
8/12	112	2RP-CAR	50,060	4.8	82.8	1.1	1.73	11.80	3.20	27.1	160	64.9	1.43	74	191	6.00	44.5	62.8	26.2	8.0	3.0
8/27	133	2RP-CAR	50,080	4.5	81.7	1.0	2.04	11.09	4.43	39.9	150	61.0	1.43	80	194	6.03	44.5	70.6	23.5	4.9	1.0
9/16	21	2RP-CAR	50,980	4.8	80.7	1.1	1.97	12.01	4.84	40.3	147	63.7	1.44	121	197	5.97	44.0	65.6	24.5	7.4	2.5
9/23	2412	2RP-CAR	49,880	4.4	83.2	1.1	1.70	12.00	4.87	40.6	152	61.9	1.43	94	218	6.01	45.5	63.8	27.0	7.8	1.4
10/7	80	2RP-CAR	51,620	4.2	83.1	0.9	1.82	11.09	4.81	43.4	151	58.6	1.45	86	204	6.05	44.5	72.2	23.0	4.0	0.8
10/12	127	2RP-CAR	49,360	4.3	82.5	0.9	1.77	11.99	4.67	38.9	154	65.0	1.44	99	197	6.04	44.0	73.6	21.5	4.2	0.7
10/26	538	2RP-CAR	49,360	4.3	83.0	1.1	1.84	10.82	4.79	44.3	146	64.4	1.49	88	194	5.99	43.5	67.7	23.5	6.8	2.0

Carving up the Pie



- ❖ Moisture Content
- ❖ DBFG % Extract
- ❖ Fine / Course difference
- ❖ Color ASBC (SRM)
- ❖ Total Protein
- ❖ Soluble Protein
- ❖ Soluble Ratio (S/T)
- ❖ Diastatic Power
- ❖ Alpha
- ❖ Viscosity
- ❖ Beta Glucan
- ❖ FAN
- ❖ pH
- ❖ Bushel Weight
- ❖ Assortment



- **Moisture**
 - Ideally under 4%
- **DBFG % Extract**
 - Lab result, look for 78% or greater.
- **Fine / Course Difference**
 - Well-modified malts are about 1%
- **Color ASBC / SRM**
 - Standard Research Method / °Lovibond
 - Watch for large variances from suppliers.

- **Total and Soluble Protein (Nitrogen)**
 - \sim 10 -12% Total
 - $>$ 12% may lead to runoff and haze issues.
- **T/S ratio (SNR or Kolbach index)**
 - Indicates modification. Look for 35 to 40%
- **Diastatic Power (°Lintner / WK)**
 - Enzymatic strength / response to mashing
- **Alpha (DU) Look for 40 to 50 DU**
 - Measures amylase / Dextrinizing Units

- **Viscosity and β -Glucan (cP, Centipoise)**
 - Predictor for run-off. \sim 1.5 or less
- **FAN**
 - Yeast growth and health, 100-200 mg/L
 - Too much adversely affects higher alcohols
- **pH (ranging from 5.5 to 6.0)**
 - Use to adjust liquor pH in Mash Kettle.

- **Bushel Weight (1K kernel weight)**
 - Indicates barley size and plumpness, 42-44#
- **Assortment (Size matters)**
 - Percentages through sieve openings
 - Affects milling consistency
 - Indicates modification and yield

Malt and Ingredients

Grain	Manufacturer	Lbs in Inventory	As of	Supplier	Type	Size	Current Price
▶ Cargill Munich	Cargill	1400	8/12/2010	Cargill	Malted Barley	50lb	
Pauls Chocolate	Pauls Malt LTD	1265	8/12/2010	Cargill	Malted Barley	25kg	
Pauls Roasted Barley	Pauls Malt LTD	1100	8/12/2010	Cargill	Malted Barley	25kg	
Aromatic	Dingemans	550	8/12/2010	Cargill	Malted Barley	50lb	
Flaked Oats	Gilbertson & Page	495	8/12/2010	Cargill	Flaked Grain	25kg	
Caravienne(Cara 20)	Dingemans	330	8/12/2010	Cargill	Malted Barley	25kg	
2 Row Cara-Pils	Briess	250	8/12/2010	Briess	Malted Barley	50lb	
Brown Sugar	Domino	200	8/12/2010	International Foods	Sugar	50lb	
Rye Flakes	Briess	50	8/12/2010	Briess	Flaked Grain	25lb	
Flaked Barley	Briess	0	8/12/2010	Briess	Flaked Barley	25lb	
Toasted Flaked Barley	Gilbertson & Page	0	8/12/2010	Cargill	Flaked Barley	25kg	
Oat Flakes	Briess	0	8/12/2010	Briess	Flaked Grain	25lb	
120L Carmel	Briess	0	8/12/2010	Briess	Malted Barley	50lb	
2-Row	Scheier	0	8/12/2010	Cargill	Malted Barley	50lb	
2-Row Brewers Malt	Briess	0	8/12/2010	Briess	Malted Barley	50lb	
2-Row Chocolate Malt	Briess	0	8/12/2010	Briess	Malted Barley	50lb	
40L Carmel Briess	Briess	0	8/12/2010	Briess	Malted Barley	50lb	
60L Carmel Briess	Briess	0	8/12/2010	Briess	Malted Barley	50lb	
6-Row	Briess	0	8/12/2010	Briess	Malted Barley	50lb	
Aromatic Briess	Briess	0	8/12/2010	Briess	Malted Barley	50lb	
Ashburne Mild	Briess	0	8/12/2010	Briess	Malted Barley	50lb	
Bairds Roasted Barley	Baird	0	8/12/2010		Malted Barley		
Black Barley	Briess	0	8/12/2010	Briess	Malted Barley	50lb	
Black Malt 2-row	Briess	0	8/12/2010	Briess	Malted Barley	50lb	

Navigation Pane

Check Inventory

Delivery Report by Date Grain Usage

Purchase Orders Datasheet View

Inventory Report for Current Supplier Project Grain Use

GRAIN DELIVERIES / STATISTICS For Cargill Munich

Date	Lot #	Color	Extract	in use?	Silo
▶ 11/2/2010	284101	10.16	75.40	✓	0
10/12/2010	274102	7.16	75.80	✓	0
9/29/2010	257102	12.4	77.00	✓	0
9/17/2010	257102	12.4	77.00	✓	0
9/7/2010	223101	8.54	77.30	✓	0
9/7/2010	223102	8.87	77.90	✓	0
8/26/2010	232101	8.87	75.60	✓	0
8/26/2010	233101	8.87	75.60	✓	0
Average		9.404	75.94		

Brands that use Cargill Munich

Brand	Batch Size	Pounds	Notes
Brewers Choice	15 BBL	50	
BC IPA	15 BBL	50	
Christmas Ale	22 BBL	150	
Kolsch	25 BBL	85	
Number Fifteen	25 BBL	375	
Oktoberfest	25 BBL	580	
Winter ESB	25 BBL	175	
Hefeweizen	30 BBL	50	
Pumpkin Ale	30 BBL	375	

Cargill Base Malt Statistics Cargill Website Analysis

Go To Malt Folder

Input of control points

Check Inventory

Delivery Report by Date

Grain Usage

Inventory Report for Current Supplier

Project Grain Use

GRAIN DELIVERIES / STATISTICS For Cargill Munich

Date	Lot #	Color	Extract	in use?	Silo
11/2/2010	284101	10.16	75.40	<input checked="" type="checkbox"/>	0
10/12/2010	274102	7.16	75.80	<input checked="" type="checkbox"/>	0
9/29/2010	257101	12.4	77.00	<input checked="" type="checkbox"/>	0
9/17/2010	257102	12.4	77.00	<input checked="" type="checkbox"/>	0
9/7/2010	223101	8.54	77.30	<input type="checkbox"/>	0
9/7/2010	223102	8.87	77.90	<input type="checkbox"/>	0
8/26/2010	232101	8.87	75.60	<input type="checkbox"/>	0
8/26/2010	232102	8.87	75.60	<input type="checkbox"/>	0
Average		9.404	75.94		

Integrating Access to Data

Lot#

Lot#

Lot#

Lot#

Submit

Sample Results:

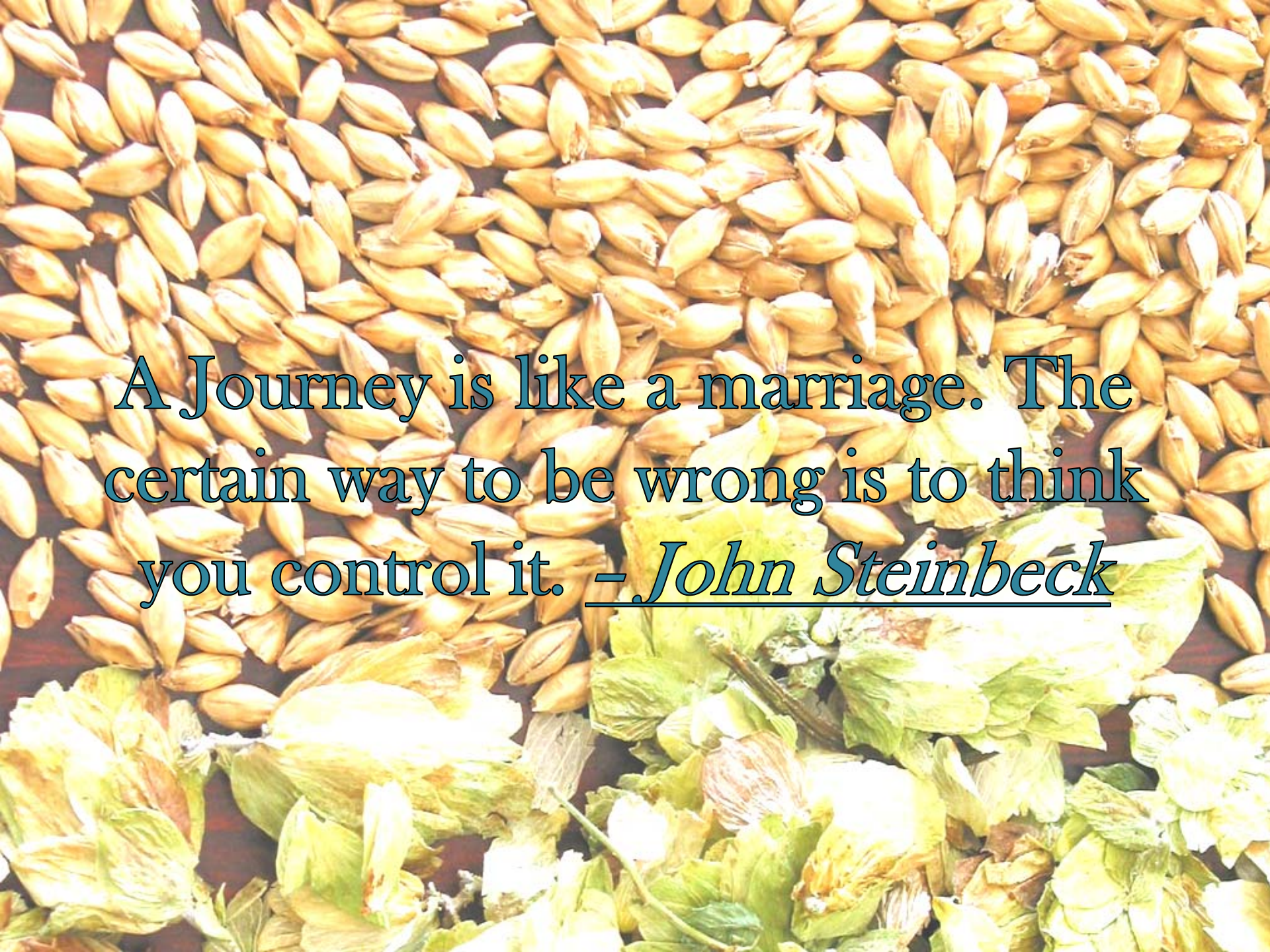
Lot # 012110: **DWC Pale Ale**

Lot # 032019: **Cargill Two-Row Pale**

Lot #	# 012110	# 032019
Bushel Weight:		38.8
Assorted 7/64:		71.3
Assorted 6/64:		23.7
Assorted Thru:		0.7
% Moisture:	3.90	4.35
Color: (° Lovibond)	3.30	1.75
Turbidity:	10.0	6
Viscosity:	1.58	1.40
Alpha Amylase:		60.8
Diastic Power:		119
Extracts (FGAs):	79.3	
Extracts (FG):	82.5	81.9
Extracts (CGAs):	78.5	
Extracts (CG):	81.7	81.1
Extracts (F/C):	0.8	0.8
Proteins (Soluble):	4.50	5.38
Proteins (Total):	10.21	11.08
Proteins (S/T):	44.07	48.60

Seek out all the angles





A Journey is like a marriage. The certain way to be wrong is to think you control it. - John Steinbeck