GOLDEN BEAN 2012
CALOUNDRA

COFFEE ROASTING
SAMPLE
PROCEDURES &
EQUIPMENT

By Mark Beattie
AGENDA

Coffee Roasting Lab Process Flow

1. Green Bean Evaluation
   - Moisture Analysis
   - Density Analysis
   - Grading
   - Sample Roasting

2. Brown Bean Evaluation
   - Moisture Analysis/ Weight Loss
   - Colour Analysis
   - Particle Size Analysis
   - TDS Analysis

3. Cupping
ROASTING PROCESS FLOW

SELECTING AND EVALUATING ORIGINS

Green Bean Evaluation

Bean Selection

Sample Roasting

Cupping Scoring

Brown Bean Evaluation

Green Bean

Size

Moisture

Defects

Processing Method

Smell

Brown Bean

Evenness

Weight

Moisture Loss

Brown Bean

Shape

Smell

Colour
1. Green Bean Evaluation

- Size
- Processing Method
- Moisture & Density
- Smell
- Defects
Moisture Analysis

- Expressed as a % of water to total

“To attain true repeatability all variables need to be eliminated”
Moisture Analysis

- Impacts storage conditions
- Check for value of purchases and shrinkage
- Ideal 9-12% for roasting (9-13% grading)
- Importance for consistent roasting results
- Helps determine pre blend options

“To attain true repeatability all variables need to be eliminated”
Density Analysis

- Expressed as weight per volumetric measure
- Measure g/cm³

“To attain true repeatability all variables need to be eliminated”
Density Analysis

- Bean density impacts roasting conditions
- Denser beans have tighter cell structures
  - High Density: good conductor
  - Low Density: poor conductor
- Higher altitude generally more dense
  - Slower growing
Grading

2 main methods

1. SCAA (takes into account cup character)

2. Brazil/New York Exchange

*Note: Each Origin usually also has their own grading method
**Grading**

- Typically done using screens (10-20)
- Higher number larger size
- SCAA: 300g at 5% above or below tolerance

<table>
<thead>
<tr>
<th>1/64 inch</th>
<th>mm</th>
<th>Classification</th>
<th>Central America and Mexico</th>
<th>Colombia</th>
<th>Africa and India</th>
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<td>8</td>
<td>Very Large</td>
<td>Superior</td>
<td>Supremo</td>
<td>AA</td>
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<td>19</td>
<td>7.5</td>
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<td>18.5</td>
<td>7.25</td>
<td>Large</td>
<td>Superior</td>
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<td>18</td>
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<td>17</td>
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<td>Medium</td>
<td>Segundas</td>
<td>Excelso</td>
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<td>15</td>
<td>6</td>
<td>Small</td>
<td>Terceras</td>
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<td>PB</td>
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<tr>
<td>11</td>
<td>4.5</td>
<td></td>
<td>Caracolillô</td>
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<tr>
<td>10</td>
<td>4</td>
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<td>9</td>
<td>3.5</td>
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<td>8</td>
<td>3</td>
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</table>
Grading

- Defects affect cup quality
- Count and record (Primary vs Secondary)
- SCAA also takes into account Quakers
The processing method used on a coffee is usually the single largest contributor to the flavour profile of a coffee.
Understand Coffee Processing

- **WET PROCESS**
  - Cleaner
  - Brighter
  - Fruitier
  - Better acidity

- **DRY PROCESS**
  - Heavy body
  - Sweet
  - Smooth
  - Complex

- **Pulped Natural**
  - Brazil
  - Low humidity
  - Honey Processed

- **Re-Passed**
  - Experimental
  - Floaters
Sample Roasting

- 2 x 100g samples
- Lighter (Agtron 60) easier to detect origin character and defects
- Darker more caramalised notes, also important for Australian market
- Consistency is important
- 8+ mins
SCAA Roasting and Cupping Protocol

<table>
<thead>
<tr>
<th>Roasting Preparation</th>
<th>Environment</th>
<th>Cupping Preparation</th>
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<tbody>
<tr>
<td>Simple Roaster</td>
<td>Well litigated</td>
<td>Balance (Scale)</td>
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<tr>
<td>Agron or other color</td>
<td>Clean, no interfering</td>
<td>Cupping glasses with lids</td>
</tr>
<tr>
<td>reading device</td>
<td>aromas</td>
<td></td>
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<tr>
<td>Grinder</td>
<td>Cupping tables</td>
<td>Cupping spoons</td>
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<tr>
<td></td>
<td>Quiet</td>
<td>Hot water equipment</td>
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<tr>
<td></td>
<td>Comfortable temperature</td>
<td>Forms and other paperwork</td>
</tr>
<tr>
<td></td>
<td>Limited distractions (no</td>
<td>Pencils and clipboards</td>
</tr>
<tr>
<td></td>
<td>phones, etc.)</td>
<td></td>
</tr>
</tbody>
</table>

Cupping Glasses:
The SCAA recommends the use of a 5 or 6 ounce Manhattan or "rocks" glass. The cups should be clean with no apparent fragrance and at room temperature. Lids can be of any material.

Sample Preparation
Roasting:
- The sample should be roasted within 24 hours of cupping and allowed to rest for at least 8 hours.
- Roast profile should be a light to light-medium roast, measured via the M-Basic (Gourmet) Agron scale of approximately 58 on whole bean and 63 on ground, +/- 1 point (55-60 on the standard scale or Agron/SCAA Roast tile #55).
- The roast should be completed in no less than 8 minutes and no more than 12 minutes. Scorching or tipping should not be apparent.
- Sample should be immediately air-cooled (no water quenching).
- When they reach room temperature (app. 75°F or 20°C), completed samples should then be stored in airtight containers or non-permeable bags until cupping to minimize exposure to air and prevent contamination.
- Samples should be stored in a cool dark place, but not refrigerated or frozen.

To determine measurement:
- The optimum ratio is 8.25 grams per 150 ml of water, as this conforms to the midpoint of the optimum balance recipes for the Golden Cup.
- Determine the volume of water in the selected cupping glass and adjust weight of coffee to this ratio within +/- .25 grams.

Cupping Preparation:
- Sample should be ground immediately prior to cupping, no more than 15 minutes before infusion with water. If this is not possible, samples should be covered and infused not more than 30 minutes after grinding.
- Samples should be weighed out as WHOLE BEANS to the predetermined ratio (see above for ratio) for the appropriate cup fluid volume.
- Grind particle size should be slightly coarser than typically used for paper filter drip brewing, with 70% to 75% of the particles passing through a U.S. Standard size 20 mesh sieve. At least 5 cups from each sample should be prepared to evaluate sample uniformity.
- Each cup of sample should be ground by running a cleansing quantity of the sample through the grinder, and then grinding each cup's batch individually into the cupping glasses, ensuring that the whole and consistent quantity of sample gets deposited into each cup. A lid should be placed on each cup immediately after grinding.

Pouring:
- Water used for cupping should be clean and odor free, but not distilled or softened.
2. Brown Bean Evaluation

- Evenness
- Shape
- Weight/Moisture Loss
- Smell
- Colour
Weight Loss

- Weight loss can help measure consistency of profiles and potential cup character

<table>
<thead>
<tr>
<th>AGTRON TILE</th>
<th>TEMPERATURE</th>
<th>ROAST</th>
<th>WEIGHT LOSS</th>
<th>CUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>215</td>
<td>Moderately Light</td>
<td>15%</td>
<td>Bright, sharp</td>
</tr>
<tr>
<td>65</td>
<td>221</td>
<td>Light Medium</td>
<td>16%</td>
<td>Milk chocolate</td>
</tr>
<tr>
<td>55</td>
<td>229</td>
<td>Medium</td>
<td>17%</td>
<td>Caramel, dark chocolate</td>
</tr>
<tr>
<td>45</td>
<td>238</td>
<td>Moderately Dark</td>
<td>19%</td>
<td>Smoothly smoky</td>
</tr>
<tr>
<td>35</td>
<td>243</td>
<td>Dark</td>
<td>20%</td>
<td>Pungently smoky</td>
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</tbody>
</table>

*Table 2. Roast Colour Impact on Cup Flavour*

(From the presentation handout of the Coffee Blending Workshop presented by Victor Allen Mondry at the SCAA Conference in 2001)
Moisture Loss

- Comprehensive units like SINAR can measure moisture in roasted coffee
- Too much moisture can lead to shorter shelf life
- Quenching and humidity adds moisture
- Measure of consistency
“Two identical green coffee bean samples can be roasted to the same colour, but have dramatically different physical characteristics, most notably in bean size, pore size and pore volume, by simply changing the temperature and time parameters.”
Colour Analysis

- Primarily used to determine when to drop coffee
- Monitor consistency of roast profiles
- Tolerance level for roasters for QA
- Colour tiles cheapest option but limited for analysis and prone to human error
- Ground vs whole bean
Colour Analysis

ColorTrack - 30
Agtron - N/A
LaB* - L:58, a:-2, B:14

ColorTrack - 15
Agtron - 80
LaB* - L:57, a:8, B:16

ColorTrack - 30
Agtron - 70-60
LaB* - L:42, a:5, B:15

ColorTrack - 50
Agtron - 50-55
LaB* - L:37, a:5, B:13

ColorTrack - 55
Agtron - 45-50
LaB* - L:31, a:4, B:9

ColorTrack - 60
Agtron - 40-45
LaB* - L:29, a:3, B:8

ColorTrack - 65
Agtron - 40-35
LaB* - L:32, a:3, B:8

ColorTrack - 70
Agtron - 35-30
LaB* - L:20, a:0, B:4

ColorTrack - 75
Agtron - 30-25
LaB* - L:18, a:0, B:4

ColorTrack - 80
Agtron - 25-15
LaB* - L:6, a:-2, B:3
Particle Size Analysis

- Even size distribution ensures consistent extraction rate
- Provides information on grinder setting and grinder maintenance (café & cupping)
- Consistency important
TDS Analysis

- Stands for Total Dissolved Solids (PPM)
- Used more for brewed/filter coffee
- Consistency of extraction Proper grind calibration
- Strength of coffee & optimal extraction
  (SCAA Brewing Control Chart)

Brewed 1.0-1.5% vs Espresso 15-25%
SCAA BREW CHART

Brewing Ratio:
- Ounces / Half-gallon
- Grams / 1.9 Liter

Strength | Solubles Concentration – percent

Extraction | Solubles Yield – percent

- Strong
- Under-developed
- Strong bitter
- Weak
- Under-developed
- Weak bitter
- Ideal
- Optimum balance

- 4.75oz 135g
- 4.50oz 128g
- 4.25oz 121g
- 4.00oz 113g
- 3.75oz 106g
- 3.50oz 99g
- 3.25oz 92g
- 3.00oz 85g
- 2.75oz 78g
3. Cupping

- Aroma
- Wet/Dry
- Balance
- Acidity
- Body
- Flavour

Cupping
Cupping Equipment
### Develop and rank a score sheet

<table>
<thead>
<tr>
<th>RANK</th>
<th>TRAIT</th>
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<th>2</th>
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<td>CREMA</td>
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</tbody>
</table>

- Consider espresso vs milk based etc
- Add cupping notes
COMMON SAMPLE CUP SCORING METHOD

- Uniformity: 8.0
- Complexity: 7.8
- Clean Cup: 7.6
- Sweetness: 8.3
- Finish: 8.4
- Body: 8.3
- Brightness: 8.5
- Flavor: 8.7
- Wet Aroma: 8.6

Cupper’s Correction: 4.0
Score: 86.7
FLAVOUR WHEEL
QUESTIONS?