Effect of bleaching on stability, consumer acceptability, and nutrition of Canola

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What’s in Canola?

- Oleic acid: 60%
- Linoleic acid: 22%
- Linolenic acid: 10%
- Palmitic acid: 5%
- Stearic acid: 2%
- Minor components: 1%

F.D. Gunstone. Rapeseed and Canola Oil. CRC Press. 2004
Minor Components (<1%) in Canola

**Antioxidants**
- Tocopherols (vitamin E)
- Carotenoids (xanthophylls, lutein)

**Pro-Oxidants**
- Water
- Transition metals (Fe, Cu)
- Polar lipids
- Chlorophyll (chlorophyll a, chlorophyll b)

*Bleaching can reduce or remove all*
Bleaching

- “Improves” oil color
- Involves use of activated earth (bentonite) to strip:
  - Chlorophylls
  - Carotenoids
  - Soaps
  - Phospholipids
  - Aroma & flavor?
  - Health-promoting minor components?
- Relatively quick process
- Done under vacuum
Can We Skip Bleaching?

**Potential Upside**
- Cost & energy savings
- Retain characteristic flavor and aroma
- Retain color
- Retain healthy, bioactive components?
- Marketing

**Potential Downside**
- Limited shelf life
- Retain characteristic flavor and aroma
- Retain color
- Limitations for direct use in engines and high heat culinary applications (frying)
Local farmer-owned plant produces unrefined canola oil

A farmer-owned plant near Airdrie is producing a new whole food oil made from Alberta-grown canola.

“We’re pleased to partner with retail and food service partners to bring this exciting new local product to Canadian families,” said Fame Biorefinery Corporation (FBC) Foods president Keith Jones.

FBC Foods produces the oil.

“Over 33 million litres of olive oil is imported into Canada each year, and with Vibrant Cold Pressed Canola Oil, we’re looking to regain market share for Canadian farmers,” he said.

Vibrant Cold Pressed Canola Oil is made from canola seed selected directly from Alberta farms, then cold pressed and gravity filtered to produce pure, whole oil, he added.

“Vibrant Cold Pressed Canola Oil is made without the conventional canola refining processes (solvent extraction at high heat, then degumming, bleaching and deodorizing),” Jones said.

“This produces a natural, flavourful and colourful oil that replaces extra virgin olive oil in salad dressings, dips, sauces, marinades and moderate temperature cooking.”

Canadian Sunshine In a Bottle!

Our Cold Pressed Canola Oil is crafted from fresh, pure Canadian Canola seed, with no additives or harsh processing. A whole oil, containing its natural colour, flavour and healthy compounds. Ideal for bread dips, salad dressings, marinades, sauces and baking. Produced in Western Canada, from top grade Canola seed grown by local Farmers

4 Bottle Pack

Contains 4 x 500 ml glass bottles in cardboard shipping pack, 11”L x 5”W x 5”H, Wt. 3.75 kg, Price $50.00 plus shipping and handling, plus GST

(~$95/gallon)
Preliminary Data

Free Fatty Acid Analysis

- Unrefined PSU Canola vs. Commercial Canola

- Free Fatty Acid Value (oleic acid equiv)
  - Unrefined: 0.956
  - Commercial: 0.1302

Color Analysis

- Unrefined PSU Canola vs. Commercial Canola

- Color Index
  - Unrefined: 125.69
  - Commercial: 0.02

Color Index = 1.29(A₄₆₀) + 69.7(A₅₅₀) + 41.2(A₆₂₀) - 56.4(A₆₇₀)
Human Sensory Analysis  
(n = 44)

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<th>Color</th>
<th>Green</th>
<th>Skunky</th>
<th>Metallic</th>
<th>Nutty</th>
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<tr>
<td>Sensory Score</td>
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Accelerated Shelf Life Study  
(Lipid Oxidation)

<table>
<thead>
<tr>
<th>Hours</th>
<th>Unrefined</th>
<th>Commercial</th>
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<tbody>
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Conjugated Dienes (uM)

Hours

Unrefined  
Commercial
Preliminary Data

<table>
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<tr>
<th></th>
<th>Unrefined</th>
<th>Refined</th>
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<tbody>
<tr>
<td>Color</td>
<td>Green/Dark Yellow</td>
<td>Pale Yellow</td>
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<tr>
<td>Aroma (positive)</td>
<td>Nutty</td>
<td>Neutral</td>
</tr>
<tr>
<td>Aroma (negative)</td>
<td>Metallic?</td>
<td>Neutral</td>
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<tr>
<td>Free fatty acids</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Oxidative stability</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

- Need to address high free fatty acid values due to lipase (enzyme) activity – *preheating step (75 – 100 C) before pressing*?

- Untrained sensory panel identified nutty aroma notes in unrefined PSU oil – *is this acceptable or preferable to consumers*?

- Oxidative stability (i.e., predicted shelf life) of unrefined PSU oil was **higher** than refined, commercial oil – *will compare with refined PSU oil in future and measure other oxidation markers*
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