

Puroast® Coffee

Laboratory and Questionnaire Summary

Clinical and Chemistry Background:

Worldwide upper abdominal complaints such as dyspepsia and gastroesophageal reflux symptoms like heartburn are some of the most frequent gastrointestinal problems that cause patients to seek medical care. The incidence of such problems is being increasing documented as the world's population ages and obesity becomes more frequent. In countries such as Argentina, Sweden, Japan, Iran, and the United States the incidence during a one year period of gastroesophageal reflux symptoms ranged from approximately 25% to 61% while the dyspepsia was found almost as frequently in western countries. People who experience such symptoms frequently seek relief by taking acid reducing compounds such as Zantac® or Pepcid® and/or acid neutralization drugs like Tums® and Roloids. ® As part of their initial therapeutic plans for such patients physicians often restrict or eliminate acidic compounds such as citrus juices and coffee while adding a more powerful acid reducing drug such as Prilosec®.

The exact reason for coffee causing such upper abdominal complaints is unknown but the leading hypotheses involve coffee's acidity. Over twenty years ago R.J. Clarke reported in his paper on the flavor of coffee that over fifty different types of acids had been identified in brewed coffee and those included aliphatic, chlorogenic, alicyclic, carboxylic, and phenolic acids. Some of these acids such as the chlorogenic ones are found in large amounts in brewed coffee. Clifford reported in 1987 that these acids make up around 7% of the dry basis weight of Arabica coffee. These chlorogenic acids are largely degraded during the roasting process into quinic acid, which has been associated with unfavorable sourness. Chlorogenic acids are therefore hypothesized to be one of the acids that may be a contributing to why some people develop symptoms when drinking coffee.

Another potential reason for coffee causing such upper abdominal complaints is its bitterness. This bitterness is closely correlated to the extent of extraction which is dependent upon the roast, the water's mineral content and temperature, time, grind size, and brewing procedure. Voilley *et al* have documented that caffeine has a distinct bitter taste but accounts for only 10% of coffee's bitterness. Other bitter compounds include trigonelline and chlorogenic acids. As mentioned above chlorogenic acids are degraded to quinic acid; which is also a contributor to coffee's bitterness as reported by McCamey *et al*.

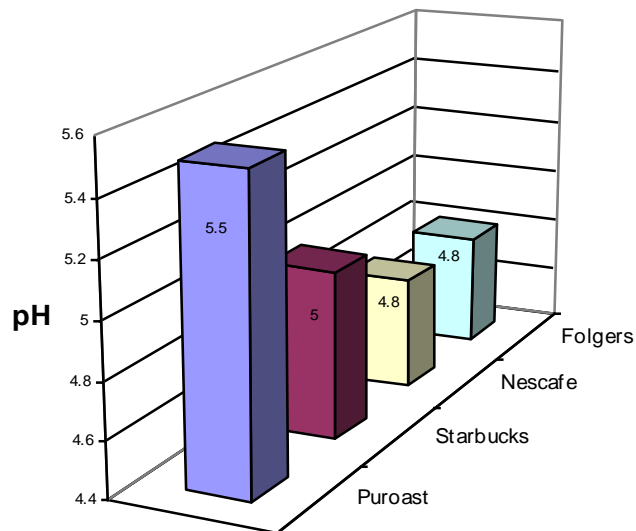
Brew coffee's acid content and bitterness is greatly dependent upon the roast degree, type of roaster, and brewing method. As shown in the table below Puroast® coffee chemistry is unique and different from all of its competitors because Puroast® has a patented slow roasting method known as conduction roasting; which uses renewable fuel and exposes the coffee beans to a lower temperature for a longer period of time. This process is significantly different from the convection roasting method used by other coffee companies that employs a natural gas heated process. This roasting process is also called flash roasting because the coffee beans are exposed to high temperatures for a short time period.

Characteristics of Flash Roasting (Convection Roast) and Slow Roasting (Conduction Roast) Methods

	ALL OTHER COFFEES (Convection Roast)	PUROAST COFFEE (Conduction Roast)
Roasting Time	<10 minutes	>15 minutes
Roast Temperature	exceeds 400° F	Below 400° F
Oils	bitter surface oils	None
Fuel	natural gas	renewable biomass

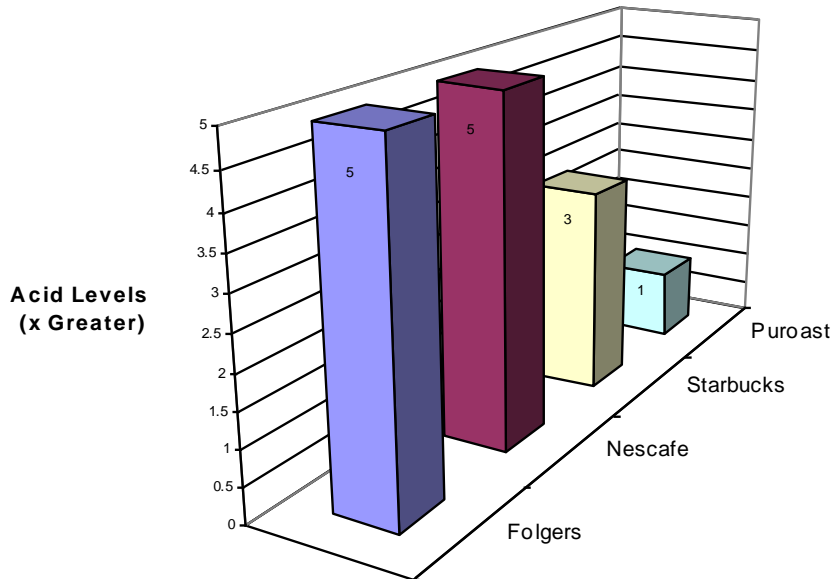
Differences between Puroast® brewed coffee and that of its leading competitors have been documented during chemical composition analyses conducted by Dr. Taka Shibamoto of the University of California, Davis's food science Department. As shown in the figure below Puroast® brewed coffee had a significantly higher pH than its leading competitors.

Coffee pH: Puroast vs. Leading Brands



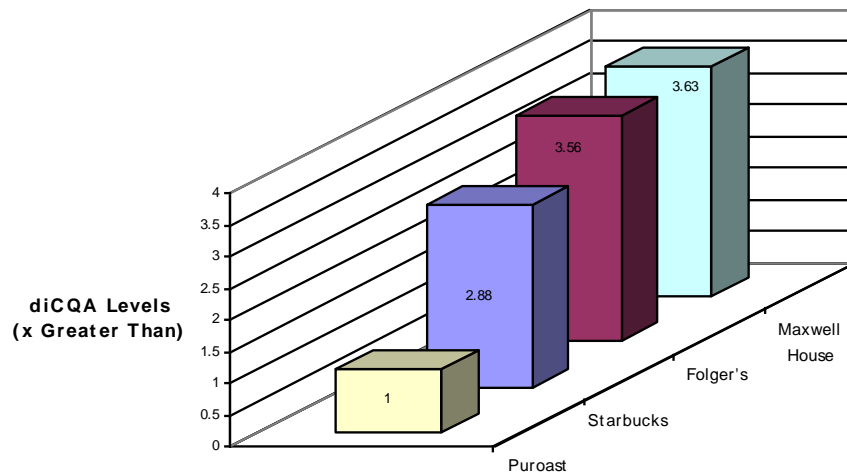
When the acid content of Puroast® brewed coffee and its competitors was calculated by Dr. Shibamoto; he found that the competitors acid levels were 3 to 5 times higher than the acid level found in Puroast® coffee. The figure below shows these differences.

Factor Greater Acid Levels than Puroast



In other chemical assays conducted by the University of California Davis's Food Science Department it was found, as shown in the figure below, that Puroast® brewed coffee had a 1/3 lower total content of potentially gut irritating acidic compounds such as dichlorogenic acids (diCQA) compared to popular flash roasted (convection roast) brands like Starbucks. This difference in these potentially gut irritating compounds may be one of the reasons why some customers develop gastrointestinal symptoms when drinking coffees such as those listed in the figure but not Puroast®.

diCQA Acid Levels



Puroast® Coffee Customer Questionnaire:

In 2001 Puroast® initiated a questionnaire program to determine its customers' reasons for buying Puroast® coffee, what their customers' responses were after they had drunk Puroast® coffee, and the reasons for their customers' satisfaction or dissatisfaction with Puroast® coffee.

From 2001 to 2005 when prospective customers came to the Puroast® Coffee Company's website they were offered an opportunity to participate in the questionnaire program. If they agreed to do so they then completed a baseline questionnaire in which the following questions were asked:

1. Their Age Range; i.e. 18 to 25 years, 25 to 49 years, etc.
2. How had they heard about the Puroast® Coffee Company?
3. Did They Suffer From Acid Reflux, Heartburn, Upset Stomach, Sour or Bitter Taste, or a Burning Sensation in Your Chest When You Drink Coffee, or Interstitial Cystitis?
4. Did They Change Your Coffee Drinking Habits Because of These Problems?
5. Did They Change Your Coffee Consumption Because of These Problems?
6. How Successful Were the Changes You Made?
7. How Many Cups of Coffee Did They Previously Drink per Day?
8. How Many Cups of Coffee Do They Drink Now?
9. What Other Brands of Coffee Do They Buy?

If a customer then purchased Puroast® Coffee and filled out the baseline questionnaire, a follow-up questionnaire was sent to the customer when the purchased coffee was shipped. The follow-up questionnaire contained the following questions:

1. Why Did They Buy Puroast® Coffee?
2. Did Drinking Puroast® Coffee Affect Their Symptoms?
3. What Did They think of Puroast® Coffee's flavor?
4. Would They Buy Puroast® Coffee Again?
5. Would They Recommend Puroast to Their Family and Friends?

At the time of this project's completion in March 2005; one hundred and forty-five (145) customers, who had previously developed upper gastrointestinal symptoms when they drank flash roasted coffee, had completed a baseline and follow-up questionnaire. These questionnaires were then paired up and analyzed.

These customers were primarily less than 65 years of age (96.6%) with more of this group being between the ages of 50-65 years (52.4%) versus 25-49 years (43.4%). The customers' age groupings are shown in the table below.

Customers' Age Range

Age Range	18-25	25-49	50-65	>65
	2	63	76	5

These customers came to the Puroast® Coffee website because they had heard of Puroast® coffee through a number of different channels. Most had learned of Puroast® coffee by either reading something about Puroast® or via a search engine (73.8%) but others had seen an ad at a grocery store (15.2%). Fewer numbers had been referred by friends (6.9%), heard or seen a promotion (2.8%), or had read an ad in some form of print media (1.4%).

How Customers Learned About Puroast® Coffee

Website/Internet	Grocery Store	Promotion	Friend	Print Media
107	22	4	10	2

On the baseline questionnaire 71.0% of the customers stated that they developed heartburn when they drank flash roasted coffee while 68.3% suffered acid reflux. Smaller percentages suffered an upset stomach (58.6%), had a sour or bitter taste in their mouth (46.2%), and/or had a burning sensation in their chest (35.9%).

Symptoms Suffered by Customers When They Drank Flash Roasted Coffee*

Acid Reflux	Heartburn	Upset Stomach	Sour or Bitter Taste	Burning Sensation in Chest
99	103	85	67	52

*Customers could list more than one symptom.

Because they develop the type of symptoms listed in the table above these customers frequently changed their coffee drinking habits. Most often they attempted to manage these coffee induced symptoms by reducing their daily coffee intake (57.9%). Overall they reduced their daily consumption was cut by 39.7% from an average of 3.78 to 2.28 cups. A smaller numbers stopped drinking coffee altogether (32.4%) or switched to decaffeinated coffee (27.6%). These changes in coffee drinking habits undertaken by these customers to manage their coffee related symptoms were most often only partially successful (65.0%) while 21.4% experienced no relief whatsoever. A smaller group (18.6%) was very successful in relieving these symptoms by changing their coffee drinking habits.

Customers were asked what was/were the primary characteristic(s) of Puroast® Coffee which influenced them the most when they were making their initial Puroast® Coffee purchase. Most frequently these customers thought that the fact that Puroast® Coffee had a lower acid content (95.7%) was the most important factor although good taste (55.9%) was also very important. The fact that Puroast® Coffee was considered a healthier product (46.9%) while being full bodied (38.6%) were somewhat less important factors in these customers decision making process.

Reasons Customers Purchased Puroast® Coffee*

Less Acidic	Healthier	Full Body	Good Tasting
139	68	56	81

*Customers could list more than one reason.

On the follow-up questionnaire the customers were asked what degree of symptom relief of their coffee associated symptoms they had experienced when they drank Puroast® Coffee. The largest percentage experienced partial relief of their coffee associated symptoms when they drank Puroast® Coffee (48.3%) while 27.6% had complete relief with only a very small percentage having no symptom relief (8.96%).

Degree of Relief of Coffee Related Symptoms Experienced by Customers when They Drank Puroast® Coffee

Partial	Complete	None
70	40	13

The degree of relief of specific symptoms varied somewhat although in no case was there less than 50% of the customers who experienced, at least, partial relief of their coffee related symptoms when they drank Puroast® Coffee. The symptom for which there was the greatest degree of relief was upset stomach (74.1%) while 60.2% of the customers had, at least, partial relief of their heartburn. Customers experienced relief of their other symptoms at the following levels; acid reflux (56.6%), sour or bitter taste (55.2%), burning sensation in their chest (53.8%).

Number of Customers Experiencing Partial or Complete Relief of Specific Coffee Related Symptoms when Customers Drank Puroast® Coffee*

	Acid Reflux	Heartburn	Upset Stomach	Sour or Bitter Taste	Burning Sensation in Chest
Baseline	99	103	85	67	52
Symptom Response	56	62	63	37	28

*Customers could have more than one symptom.

Customers thought Puroast® Coffee’s overall good taste (78.6%) was its most important flavor characteristic while its smoothness (64.1%), lack of a bitter aftertaste (61.4%), and its full body nature (57.1%) were also highly regarded flavor characteristics.

Puroast® Coffee’s Most Important Flavor Characteristics*

Full Body	Smooth	Good Taste	No Bitter Aftertaste
61	93	114	89

*Customers could list more than one flavor characteristic

Customers were asked after they had tasted Puroast® Coffee if they would purchase Puroast® Coffee again and if they would recommend Puroast® Coffee to their family and friends. An extremely high percentage of these customers (95.1%) answered that they would buy Puroast® Coffee again and a slightly larger percentage (95.7%) stated that they would recommend Puroast® Coffee to their family and friends.

Would Customers Buy Puroast® Coffee Again and Would They Recommend Puroast® Coffee to Their Family and Friends?

	Yes	No
Would you buy Puroast® Coffee again?	138	7
Would you recommend Puroast® Coffee to your friends & family?	139	6

Summary:

Low acidity is seen as a positive factor influencing product selection by a significant majority of the purchasing public. This was also true among our customers because they rated Puroast® Coffee’s lower acid content as the most important factor in making their initial Puroast® coffee purchase although good taste was also important to many. Among these customers, the majority (~97%) ranged in age from their early twenties to mid-sixties. They all had experienced some annoying or distressing upper gastrointestinal symptoms when they drank flash roasted coffee. Most customers (~58%) attempted to lessen these symptoms by reducing their coffee intake by about 40% while fewer entirely stopped drinking coffee and/or tried decaffeinated coffee. Despite these attempts, the customers continued to seek alternatives and eventually found the Puroast® Coffee website. After drinking Puroast® coffee the customers found, that rather than having the gastrointestinal symptoms they had experienced previously when they consumed flash roasted (convection roast) coffee, their symptoms were actually partially or completely relieved in the vast majority (~76%) when they drank Puroast® coffee. The vast majority of these customers (~79%) thought Puroast® coffee’s good taste was its more significant flavor characteristic while its smoothness (~64%) and lack of a bitter aftertaste (~61%) were judged just slightly less important. Because these customers could drink Puroast® coffee without developing their usual gut symptoms at all or to a much lesser degree together with their liking Puroast coffee’s flavor, over ninety-five percent of the customers said that they would recommend Puroast coffee to their family and friends and would buy Puroast again.

Conclusions:

There is a substantial segment of the population who suffers gastrointestinal symptoms when drinking flash roasted (convection roast) coffee and has also tried to manage these symptoms by manipulating their coffee drinking patterns without much success. These customers make their initial purchase of Puroast coffee primarily because of its lower acid content. Subsequently these customers find that they can drink Puroast® coffee without experiencing the same degree of gastrointestinal symptoms that they previously experienced and importantly that Puroast® coffee tastes good. These customers seem to be very enthusiastic about Puroast® coffee because they almost universally state that they will buy Puroast® coffee again plus recommend it to their family and friends. This seems to indicate that there is a significant sales upside among this customer base, the potential of which may be significant because these customers (~ 58%) had decreased their daily coffee consumption by about 40% so it also would seem reasonable that since they can drink Puroast® coffee without their usual degree of symptoms that they would once more increase their daily coffee intake to the level it was prior to their developing symptoms when they previously drank flash roasted (convection roast) coffee.

Below Are A Few of the Many Unsolicited Testimonials That Puroast® Coffee Company Has Received When Customers Returned Their Questionnaires

- One detail I was not able to add is this: I am a black coffee drinker. When I started experience acid reflux from coffee I had to start adding milk to cut the acid. I didn't like this solution which only partially worked, and gave me stomach problems to boot. Now I am glad to be enjoying the full rich flavor of black coffee again. You're a great company with an exceptional product! Many thanks, Steve H.
- Thank you so much for making this low acid coffee! I was diagnosed with IC more than a year ago and coffee has been the hardest thing to give up. I've tried a few other low acid brands that didn't taste as good as yours and still cause some painful IC symptoms. Puroast is the best tasting and gentlest to my bladder low acid coffee that I've tried. I still have to be careful and not drink too much of your coffee. I have limited myself to 3 cups every other day and this seems to totally eliminate any IC symptoms. Boy do I look forward to coffee days! I can't wait to try all of your flavors. Thank you, thank you, thank you. Please keep doing what you do. Sincerely, Teri H.
- Survey attached...thanks for the great coffee!! Bonnie S.
- Puroast coffee: Hi, I have attached the research questionnaire. The questions really don't address the intensity of the pain and discomfort I was experiencing, both from regular coffee and tea. All I can say is that I am so happy that I found your coffee. I had seen it after searching the Internet but didn't really believe it would help me. Then on vacation in Vermont, I saw the coffee in the supermarket and wanted to give it a try. I am very happy that I can enjoy coffee again, especially one that really tastes very good. Ellen W.
- A few things that were not addressed by your questionnaire: My neighbor, Ruth Rooks and I embarked on the low acid coffee search together so all my purchases have been split with her even though she may not appear in your customer database. I believe her opinion would be of interest to you as well, especially since she has been a long term coffee drinker where as I have just started.
- Secondly, something that I don't think will be apparent from your questionnaire is that this is the only coffee I have been able to drink without side effects (albeit still in limited quantities). I don't even attempt to drink regular coffee and the other low acid coffees I've tried still give me some side effects. And the taste is much better than other low acid coffees. Good luck with your research. Kerry O.
- I have GI problems and was told to stay away from coffee because of the acid. I searched the web and found your company. I tried the French roast and both myself and my husband just love it, we feel it actually taste better than any other regular coffee we have tried, plus the benefit of low acid. I just put in my THIRD order to try the halfcaff and decaf and more of the flavored ones for me. I am feeling fine and the low acid was just what I needed. I can't thank you enough for your products. Jane M.