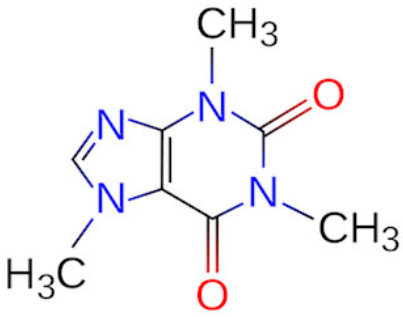
Decaf Tea and the Safety of Decaffeination Processes

A history and overview of the different decaffeination processes and their safety

This article gives an overview of different decaffeination processes, with an eye towards both safety and flavor considerations. The article starts by exploring the earliest processes for decaffeinating coffee, which have since been banned due to safety concerns, and concludes by outlining the three major processes currently in use today for decaffeinating tea and their advantages and disadvantages in terms of safety, flavor, and cost.

Why Decaffeinated Tea?

Although caffeine, and the boost in alertness that it brings, is one of the primary reasons people choose to drink tea, there are a number of people who enjoy the flavor and aroma of tea but wish to limit their caffeine intake. Decaffeinated tea serves this purpose. But removing the caffeine from tea without removing the flavor is not only tricky, it is actually *impossible*, at least impossible to do perfectly. Contrary to popular belief, you cannot decaffeinate your own tea by steeping in water. In water, caffeine and flavor diffuse together; by the time your tea has no caffeine left, the flavor will be all gone. If it were that easy, tea companies would use this process commercially, and the fact that they don't is testimony to the fact that this process does not work.



The Caffeine Molecule

Over time, people have experimented with different processes using a variety of chemicals. Unfortunately, all of them remove flavor along with caffeine, but some are better than others. And, perhaps of more interest, *some of them are safer than others*.

A History of Unsafe Decaffeination Processes:

The history of decaffeination is mired in hazardous chemicals. The two first processes used are particularly nasty stories, and it is sad to realize that people actually drank such products--in both cases coffee.

- **Benzene** - The first decaffeination process, invented by Ludwig Roselius for decaffeinating coffee, involved benzene, a chemical that is now regarded as highly dangerous, even in low concentrations. Fortunately, this method was soon abandoned.
- **Trichloroethylene** - This chlorinated hydrocarbon was the next attempt at decaffeination. Unfortunately

(or fortunately that it was discovered) it was found that Trichloroethylene caused liver tumors in mice, and its use was quickly abandoned as well.

Modern Decaffeination Processes:

Fortunately, safer processes have been invented, but their relative safety is widely variable. We start with the least safe and progress to the two safest processes.

- **Methylene Chloride** - Like trichloroethylene, this chemical is a chlorinated hydrocarbon; it also goes by the name of dichloromethane. Although it the least toxic of the simple chlorohydrocarbons, it is toxic in large quantities, and has been linked to several types of cancer. Although it is much safer than trichloroethylene, the process using methylene chloride leaves traces of the chemical in the tea leaves. This process is currently legal, but regulated, in the United States.
- **Ethyl Acetate** - Although its organic-chemistry name makes it sound like the other chemicals above, ethyl acetate is not only a naturally-occurring compound, but occurs naturally in the tea leaf itself. The chemical has a fruity smell which, in low concentrations, can even impart a desirable quality to the aroma. This process is completely safe, and is relatively inexpensive, but it has the downside of extracting more flavor than other processes.
- **Compressed CO2** - Although no decaffeination process is perfect, CO2 is as close to the "holy grail of decaffeination" as we have been able to get. CO2 is a completely inert gas and is thus completely safe. Although it does extract considerable flavor, the CO2 decaffeination process is regarded as one of the better ones in terms of leaving flavor intact. Its main downside is that it is expensive, mainly because it requires the gas to be compressed to a supercritical level, which requires a high amount of pressure, since CO2 changes phase directly from a solid to a gas, without a fluid stage, at normal air pressure.

Companies using the methylene chloride process tend not to draw attention to it because it is the least safe of the modern, legal decaffeination processes, and has a negative public perception. On the other hand, tea companies tend to draw attention to teas that have been decaffeinated using the CO2 process, as this method is seen as the most desirable process. There are a few premium decaffeinated teas that advertise the ethyl acetate process as well, although this is less common.

Alternatives to Decaf Tea:

Although there is a great deal of variability in the quality of decaf teas, both based on the decaffeination process used, and the quality of the original leaf, serious tea enthusiasts tend to prefer pure, caffeinated teas as they are almost always superior in flavor. However, there are times when caffeine is not appropriate, such as close to bedtime, in certain people sensitive to caffeine for medical reasons, or people who abstain from caffeine for personal or religious reasons.

People who wish to avoid caffeine, but who want the purity of flavor and aroma of a beverage that has not been stripped of its flavor by a chemical decaffeination process often prefer to drink herbal teas. There are numerous herbal teas that are naturally caffeine-free and some, such as rooibos, resemble the tea plant in many aspects of flavor and aroma and thus make a good caffeine-free substitute for tea.

Resources and Further Reading:

- Caffeine Content of Tea - How much caffeine is in different teas?
- Herbal Teas on RateTea.net - Listings and reviews of, and information about different caffeine-free herbal teas.
- Decaffeination on Wikipedia - A good and ever-changing resource on the topic of decaffeination.

Comments

Sign in to write a comment