

Cold Brew Coffee – A Microbial Hazard?



While hot brewed coffee is a food item that is almost risk-free in terms of microbial safety, cold brew coffee offers good growing conditions for spoilage organisms and various pathogenic germs due to its production method. In a recent test, a series of samples was taken to determine whether cold brew coffee poses a microbial risk for consumers.

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*All images courtesy of the Coffee Consulate,
Mannheim, Germany*

Cold brew coffee is an emerging trend in the world of coffee. Coffee consumers regard it as a high-quality product with a special aromatic profile. Due to its novelty on the market, there are no internationally recognised standards and definitions of what cold brew coffee is and under which conditions it should be produced. “Cold brew” typically refers to the extraction of ground roasted coffee with water at lower temperatures than body temperature (usually 8°C — refrigerator or room temperature) over several hours. The difficulty of making cold brew coffee is to adapt the extraction process to the variable properties of coffee. For example, the processing conditions of the coffee beans, as well as the degree of roasting and grinding, influence the extraction

behaviour. Also, the dosage of roasted coffee, the temperature and hardness of the water as well as the extraction method and duration influence the quality and flavour of cold brew coffee (also see *Tea & Coffee Trade Journal*, September 2020, 192(8), 31-32).

Hygiene Requirements for Cold Brew

Coffee is exposed to many microbial risks during processing and production. The warm, humid and tropical climate of the coffee cultivating area provides an optimal environment for the growth of various species of fungi. Processing and storage may lead to further microbial contamination, especially with *Enterobacteriaceae* (a large family of different types of germs (bacteria) that commonly cause infections in healthcare settings).

While the roasting of coffee beans, the use of very hot water and the immediate consumption at hot temperatures typically lead to a negligible microbial contamination of hot-brewed coffee, cold brew coffee can be classified as a beverage that requires special hygiene requirements in terms of food contamination, ie food safety. This is due to the fact that no heating process takes place during the production of cold brew coffee, and thus, there are no microbicidal effects.

Cold brew coffee has a slightly acidic environment (pH 4.9 – 6.0), which does not inhibit microbial growth. Consequently, yeasts,

moulds, and lactic and acetic acid-producing bacteria can multiply during the long extraction process and the subsequent storage. Besides the spoilage agents mentioned, pathogenic germs such as Salmonella or Listeria must be taken into account. Possible sources of contamination should be identified to ensure the microbial stability of cold brew coffee. For example, the equipment, containers, ingredients used as well as the personnel may contribute to microbial contamination and thus compromise food safety. Therefore, cold brew coffee must receive special consideration in the HACCP (Hazard Analysis Critical Control Point) concept.

Cold Brew Coffee Test Results

In summer 2020, a total of 23 different cold brew coffee samples were collected from coffee shops, including those with an affiliated roasting house, in southern Germany. These samples were examined for a wide range of micro-organisms that have been reported as causing spoilage or health risks such as aerobic lactic acid bacteria, yeasts, hygiene indicators such as *Enterobacteriaceae*, *Pseudomonas* spp and coagulase positive *Staphylococcus*, potentially pathogenic germs such as presumptive *Bacillus cereus* and pathogens *Listeria monocytogenes* and *Salmonella* spp as well as for moulds.

An increased microbial load was found in two samples (nine percent). One of the samples showed a clearly increased bacterial count of potential spoilage organisms, namely lactic acid bacteria and yeasts. In another sample, contamination with presumptive *Bacillus cereus* was detected. This was a cold brew coffee with a storage time of five days.

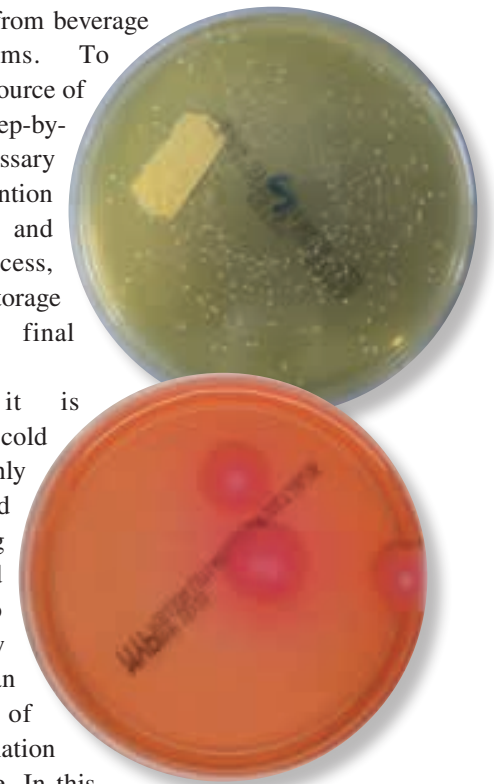
Two forms of gastrointestinal diseases (the emetic and the diarrheal syndrome) can be caused by *Bacillus cereus* since they belong to opportunistic food-borne pathogens, producing several toxins that have been associated with food poisoning, though mostly corresponding with a considerably higher microbial load.

Microbial Test Conclusion

Fortunately, only a small proportion of the samples examined showed microbial contamination. However, the survey has shown that compliance with the hygiene requirements for the production of cold brew coffee should be regularly monitored. The risk of microbial contamination of cold brew coffee is to be compared with that of non-alcoholic

beverages on draft from beverage dispensing systems. To identify a possible source of contamination a step-by-step control is necessary with particular attention to the ingredients and the extraction process, as well as to the storage conditions of the final product.

In general, it is recommended that cold brew coffee is freshly made and consumed the same day. A long storage period (several days to weeks) of cold brew coffee leads to an increased risk of microbial contamination and affects the taste. In this context, cold brew coffee should be compared with filter coffee: filtered coffee would never be stored for such a long time but rather be discarded after a few hours due to its stale taste. The same should be done with cold brew coffee at the end of the working day unless microbial safety and product quality are otherwise ensured. ■



(Above) Cold brew is highly susceptible to spoilage agents and pathogenic germs. (Below) Cupping samples for microbial tests.



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