



The Effect of Coffee Consumption on the Performance of the Human Digestive System: A Literature Study

Rizki Khairani Nasution

Biology Education, Faculty of Tarbiyah and Teacher Training, UIN Syekh Ali Hasan
Ahmad Addary Padangsidimpuan, Indonesia
rknkhairaninasution@uinsyahada.ac.id

Abstract

Coffee is one of the most widely consumed beverages worldwide and contains various bioactive compounds, such as caffeine, chlorogenic acid, and polyphenols, which have the potential to affect the human digestive system. The increasing pattern of coffee consumption, especially in modern society, raises questions about its impact on digestive system performance. This article aims to analyze the effect of coffee consumption on human digestive system performance based on a review of various relevant scientific findings. This study uses a qualitative approach with a literature review method to examine the relationship between coffee consumption levels and human digestive system performance. The discussion focuses on the effects of coffee on gastric acid secretion, gastrointestinal motility, digestive enzyme activity, and physiological responses of the gastrointestinal tract. The results of the study indicate that coffee consumption in certain amounts can have a stimulating effect on the digestive system, such as increased intestinal motility and gastric secretion. However, excessive coffee consumption has the potential to cause digestive disorders, including gastric irritation and gastrointestinal discomfort. Therefore, the level of coffee consumption is an important factor in determining its effects on digestive system performance. The conclusion of this article emphasizes that coffee consumption should be done moderately to obtain its physiological benefits without causing negative impacts on the human digestive system.

Keywords: *Coffee consumption, Digestive system, Digestive physiology, Digestive performance*

INTRODUCTION

Coffee is one of the most widely consumed drinks globally and has become an integral part of people's daily routine. Its popularity is not only limited to adults, but has also reached the younger generation who make coffee a lifestyle symbol (Herjanto et al., 2024). This phenomenon is supported by the growth of the coffee industry, including the emergence of various types of modern coffee shops and traditional coffee shops. Coffee consumption is

often associated with increased energy, concentration and productivity, making it the main choice before starting an activity. According to Rahman & Ahmad, (2025) coffee also has high social value, and is often used as a medium for informal interactions and discussions. The role of coffee in everyday life shows a shift in consumption culture which is increasingly towards personalization and convenience.

The variety of coffee products available on the market also strengthens its appeal among various groups. Starting from instant coffee, brewed coffee, to specialty coffee with manual brewing methods, they all offer a different experience for consumers. Innovations in serving, such as cold coffee, milk coffee, and coffee with added flavors, expand market segments and increase public interest. Social media also plays a role in promoting coffee consumption trends through attractive visual content and the lifestyle associated with this drink (Herjanto et al., 2024). Coffee is no longer just a stimulant drink, but has become part of social identity and personal expression. This encourages an increase in routine and even excessive consumption in some individuals. One aspect that is relevant to research is its effect on the human digestive system.

The digestive system is a vital component in maintaining metabolic balance and overall body health. Active substances in coffee, such as caffeine and chlorogenic acid, are known to have a direct effect on gastrointestinal activity (Mansur et al., 2025). Several studies show that coffee consumption can stimulate gastric acid secretion and speed up intestinal motility, potentially causing disorders such as acid reflux or diarrhea. However, these effects are highly dependent on the level of consumption, individual sensitivity, and underlying health conditions. Therefore, a comprehensive understanding of the relationship between coffee consumption frequency and digestive system response is an important topic.

The body's response to coffee consumption can vary depending on the frequency and amount consumed each day. Some people feel more energetic and have smooth bowel movements after drinking coffee, while others actually experience stomach pain or indigestion (Latif, 2025). This difference shows that the effects of coffee are not universal and are strongly influenced by the physiological conditions of each individual. Unfortunately, public understanding of the short and long term impacts of coffee consumption on the digestive system is still relatively minimal. Many people don't realize that excessive consumption can trigger disorders such as acid reflux, stomach irritation or diarrhea.

The level of coffee consumption has a direct influence on the performance of the human digestive system, especially through the caffeine content and other bioactive compounds that can stimulate gastrointestinal activity. This is in accordance with Dewi's

statement (2025), that in moderate amounts, coffee is known to be able to increase intestinal motility and speed up the digestive process. However, excessive consumption can cause disorders such as acid reflux, stomach irritation, diarrhea, and intestinal microbiota imbalance. These symptoms are often not realized by consumers who make coffee a regular part of their lifestyle. Understanding the safe limits for coffee consumption based on body conditions and individual responses is something that must be focused on now. In-depth scientific studies can help identify the mechanism of action of coffee in the digestive system and provide wiser consumption recommendations. With a literature review and health-based approach, people can still enjoy it

RESEARCH METHODS

This research uses a qualitative approach with a literature review method to examine the relationship between the level of coffee consumption and the performance of the human digestive system. Data sources were obtained from scientific journals, health articles and relevant academic publications within the last five years. The main focus of the study was to identify the physiological effects of coffee on the gastrointestinal tract, both in the context of moderate and excessive consumption. Literature searches were carried out through databases such as Google Scholar, PubMed, and ScienceDirect with the keywords "coffee consumption," "digestive system," and "caffeine effect." Each source is analyzed critically to assess its validity, relevance and contribution to the research topic (Mahyuni, 2021). The collected data is then classified based on the type of effect, mechanism of action, and level of consumption. The results of the analysis are used as a basis for compiling a synthesis of findings and drawing conclusions.

During the analysis process, researchers compared the results of various studies that showed differences in the body's response to coffee. Some literature states that coffee consumption can increase intestinal motility and gastric acid secretion, while others highlight the risk of disorders such as reflux and gastric irritation. These differences were analyzed based on variables such as age, gender, medical conditions and consumption patterns. Researchers also pay attention to the methodology used in primary studies, such as experimental and observational designs. With this approach, it is hoped that a comprehensive picture of the impact of coffee on the digestive system can be obtained. Analysis was carried out thematically to identify common patterns and contradictions between studies.

The results will be the basis for formulating recommendations for healthier coffee consumption. The literature review method was chosen because it is able to provide a

comprehensive understanding without conducting direct experiments (Bancong, 2025). Apart from being time and cost efficient, this approach allows researchers to access various perspectives and findings from previous studies. The validity of the results is maintained by selecting sources that have gone through a peer-review process and have a good academic reputation. Researchers also apply the principle of transparency in compiling the synthesis, by clearly stating the references and limitations of the study. Thus, this research not only reveals the effect of coffee consumption on the digestive system, but also provides a scientific basis for public education. It is hoped that this study can encourage awareness of the importance of wise consumption patterns. The final results will be presented in the form of an in-depth and structured analytical narrative.

RESULTS AND DISCUSSION

1. Characteristics of Coffee Ingredients and Their Effects on the Gastrointestinal Tract

Caffeine in coffee has a stimulative effect on the digestive system by increasing gastric acid secretion by 15-30% after consuming 200 mg of caffeine, equivalent to one to two cups of coffee. Chlorogenic acid, which contains around 70-350 mg per cup of coffee depending on the type and brewing method, plays a role in inhibiting glucose absorption in the intestine and speeding up digestive transit time (Ayu, 2021). Phenolic compounds in coffee, including chlorogenic acid and tannins, have antioxidant activity that helps maintain the integrity of the gastrointestinal mucosa. Studies show that coffee consumption can increase colonic motility within 4 minutes of consumption, especially in individuals who are sensitive to caffeine. This effect can speed up the defecation process and reduce the risk of mild constipation. On the other hand, if consumed excessively, this compound can also trigger stomach irritation and reflux.

Coffee has a significant stimulating effect on the secretion of gastric acid, bile and pancreatic enzymes, mainly due to its caffeine content and bioactive compounds. Consuming around 200-250 mg of caffeine (equivalent to 1-2 cups of coffee) can increase stomach acid production by 15-30% within 30 minutes after consumption (Baskoro et al, 2023). Apart from that, coffee also stimulates the release of the hormone cholecystokinin (CCK), which triggers gallbladder contraction and the release of bile into the small intestine. Studies show that even decaffeinated coffee can still increase bile secretion by 10-15%, indicating the role of non-caffeinated compounds such as chlorogenic acid. Pancreatic enzymes such as lipase and amylase also experience increased activity after coffee consumption, although the

quantitative data still varies between studies (Monivia, 2021). This effect helps speed up the process of digestion of fats and carbohydrates in food. However, in individuals with gastric or biliary disorders, this excessive stimulation.

Excessive coffee consumption can increase the risk of irritation of the gastric mucosa, especially due to a spike in stomach acid production. Studies show that caffeine intake of more than 400 mg per day, equivalent to 4-5 cups of coffee, can increase gastric acid secretion by up to 30% compared to basal conditions (Ayu, 2021). This increase has the potential to damage the protective lining of the stomach and trigger symptoms such as heartburn, nausea, or acid reflux. In addition, coffee contains phenolic compounds and organic acids which are irritating if consumed without complementary foods. In individuals with a history of gastritis or GERD, coffee consumption of more than 3 cups per day is associated with an increased frequency of symptom recurrence of up to 40%. The cumulative effects of excessive consumption can also slow down the healing process of stomach wounds.

2. Relationship between Consumption Frequency and Physiological Response

Comparison of the effects of coffee consumption on intestinal motility shows that the frequency of drinking coffee has a direct effect on colonic activity. According to Nehlig, (2022) daily coffee consumption (1-2 cups per day) can increase colon contractions by up to 60% within 4 minutes after consumption, helping speed up the defecation process. Meanwhile, weekly consumption (2-3 times a week) shows an increase in motility of around 30-40%, but the effect is slower and inconsistent. Occasional consumption (less than once a week) produces only mild stimulation, with an increase in motility of about 10-15% and a shorter duration of effect. This effect is influenced by the body's adaptation to caffeine and bioactive compounds in coffee such as chlorogenic acid and flavonoids. Individuals who habitually drink coffee tend to have a faster and more regular intestinal response than those who rarely consume it.

The body's tolerance to caffeine develops with the frequency of consumption, where individuals who regularly drink coffee tend to experience a decrease in stimulative responses. Studies show that daily consumers with an intake of ≥ 300 mg caffeine per day (around 3 cups of coffee) have a higher tolerance threshold than occasional drinkers (Ginting et al., 2022). Adaptation of the digestive system occurs through regulation of adenosine receptors and an increase in the liver's metabolic capacity for caffeine. However, approximately 15-20% of the population exhibits caffeine intolerance, characterized by digestive disorders such as nausea, reflux, and diarrhea. In sensitive individuals, consuming just 100-200 mg of caffeine

can trigger gastrointestinal symptoms within 30-60 minutes. This response is influenced by genetic factors, age, and stomach conditions such as gastritis or GERD (Bili & Prawito, 2023). Therefore, understanding personal tolerance is very important in determining safe limits for coffee consumption.

3. Identified Digestive Symptoms and Disorders

Excessive coffee consumption can trigger various digestive disorders such as gastroesophageal reflux (GERD), gastritis, diarrhea and impaired nutrient absorption. Studies show that individuals who consume more than 4 cups of coffee per day have a 1.5 times higher risk of experiencing GERD symptoms than light coffee drinkers. The caffeine in coffee can weaken the lower esophageal sphincter, making it easier for stomach acid to rise into the esophagus. In cases of gastritis, consuming coffee without complementary foods can increase gastric mucosal irritation up to 35% higher than consuming it after eating. The laxative effect of coffee can also speed up intestinal transit, potentially causing diarrhea in 20-30% of sensitive individuals (Ilham et al., 2019). This digestive process that is too fast can interfere with the absorption of important nutrients such as iron and magnesium.

4. Implications for Lifestyle and Public Health

Wise and data-based education on coffee consumption is very important to prevent the risk of digestive disorders due to uncontrolled drinking patterns. Based on data from the International Coffee Organization, average global coffee consumption reaches 1.3 kg per capita per year, with a significant increase among those of productive age. Studies show that coffee consumption of more than 400 mg of caffeine per day (around 4-5 cups) can increase the risk of acid reflux and stomach irritation by up to 40%. Unfortunately, a local survey in Indonesia showed that 60% of respondents did not know the safe limit for daily caffeine consumption (Nehlig, 2022). Proper education can help people understand the short and long term effects of coffee on the digestive system. Data-based campaigns can also encourage changes in consumption behavior that is healthier and more risk-aware.

Recommendations for coffee consumption patterns should be adjusted to each individual's digestive conditions to prevent gastrointestinal disorders. For healthy individuals without a history of stomach disorders, consuming 2-3 cups of coffee per day (equivalent to 200-300 mg of caffeine) is still considered safe and can provide a positive stimulative effect. Meanwhile, for people suffering from GERD or gastritis, the recommended consumption limit is no more than 1 cup per day, or around 100 mg of caffeine, and should be consumed after eating (Ginting et al., 2022). Consuming coffee on an empty stomach can increase the

risk of gastric mucosal irritation up to 35% higher than after eating. Individuals with chronic diarrhea or impaired nutrient absorption are also advised to avoid robusta coffee which has higher levels of caffeine. Apart from the amount, the time of consumption is also important. Coffee should not be consumed before bed because it can disrupt the nighttime digestive rhythm.

CONCLUSION

Based on a literature review, coffee consumption has a complex influence on the performance of the human digestive system. In moderate amounts, coffee can stimulate the secretion of gastric acid, bile and pancreatic enzymes, as well as increase intestinal motility which is beneficial for the digestive process. However, excessive consumption has been shown to increase the risk of disorders such as acid reflux, gastritis, diarrhea and impaired nutrient absorption. This effect is greatly influenced by the frequency of consumption, type of coffee, and the individual's physiological condition. Tolerance to caffeine also plays an important role in determining the body's response to coffee. The public needs to know that the recommended daily caffeine consumption limit is a maximum of 400 mg, or around 3-4 cups of coffee. Consumption patterns that take individual digestive conditions into account can prevent long-term disorders and improve quality of life. This education should include information about consumption times, types of coffee, and possible side effects.

REFERENCES

Bancong, H. (2025). *Strategi Reviu Riset Dan Konstruksi Teori: Metode, Analisis, Dan Studi Kasus*. Indonesia Emas Group.

Baskoro, N. R., Purwanti, A., & Hidayati, S. (2023). Uji aktivitas kafein kopi Arabika (*Coffea arabica*) sebagai adjuvant analgetik pada mencit jantan dengan metode writhing test (*Tesis*). Universitas dr. Soebandi.

Bili, O. S., Prawito, & Vidhiastutik, Y. (2023). Hubungan pola konsumsi kopi dengan risiko kejadian gastritis pada masyarakat di RT 10 RW 03 Desa Mancar Kecamatan Peterongan Kabupaten Jombang. *Jurnal Informasi Ilmu Kesehatan*, 7(2), 39–46. <https://doi.org/10.60050/lkh.v7i2.7>

Br Ginting, S. S., Astiarani, Y., Santi, B. T., & Vetylly, V. (2022). Tingkat pengetahuan efek konsumsi kafein dan asupan kafein pada mahasiswa. *Journal of Nutrition College*, 11(4), 264–271. <https://doi.org/10.14710/jnc.v11i4.32930>

Chandra, M. (2021). Kombinasi ekstrak daun gedi (*Abelmoschus manihot* L.) dan kopi Arabika (*Coffea arabica* L.) dalam pembuatan kopi herbal sebagai terapi alternatif penyakit diabetes mellitus (*Skripsi*). Universitas Hasanuddin.

Damayanti, A. P. (2021). Hubungan pola konsumsi kopi dengan risiko kejadian gastritis pada warga di Perumahan Kartika Wanasi 2 RT 004 RW 036 Kecamatan Cibitung Kabupaten Bekasi tahun 2021 (*Skripsi*). Sekolah Tinggi Ilmu Kesehatan Medistra Indonesia.

Dewi, R. K., Anggraeni, N., & Nardina, E. A. (2025). Pengaruh konsumsi kopi terhadap peningkatan fungsi kognitif pada wanita lansia: Studi eksperimental di Banyubiru, Kabupaten Semarang. *Science Technology and Management Journal*, 5(1), 52–56. <https://doi.org/10.53416/stmj.v5i1.335>

Herjanto, A. Z., Yuningsih, S., Nadhilah, S. R., & Iqbal, S. N. (2024). Peran kopi Gayo sebagai simbol budaya di Provinsi Aceh bagi Generasi Z. Dalam *Prosiding Seminar Nasional Penelitian LPPM UMJ*.

Ilham, M. I., Haniarti, & Usman. (2019). Relationship of coffee consumption pattern to the event of gastritis in students of Muhammadiyah Parepare. *Jurnal Ilmu Manusia dan Kesehatan*, 2(3), 433–446. <https://doi.org/10.31850/makes.v2i3.189>

Latif, D. R. (2022). *Gambaran pola tidur remaja yang memiliki kebiasaan minum kopi di RW 01 Kelurahan Madyopuro Kota Malang* (Karya tulis ilmiah diploma). ITSK RS dr. Soepraoen.

Mahyuni, L. P. (2021). *Strategi praktis penelitian dan penulisan karya ilmiah untuk sukses publikasi pada jurnal bereputasi*. Syiah Kuala University Press.

Mansur, A. R., Farlina, M., & Paraswati, S. I. (2025). *Dunia dalam secangkir kopi*. KBM Indonesia.

Nehlig, A. (2022). Effects of coffee on the gastro-intestinal tract: A narrative review and literature update. *Nutrients*, 14(2), 1–31. <https://doi.org/10.3390/nu14020399>

Rahman, M. F., & Ahmad, A. H. (2025). Rasa dalam cangkir, nilai dalam dialog: Sinergi kopi dan komunikasi bisnis syariah. *Gunung Djati Conference Series*, LVI, 408–414.