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Press release

Food colourings and preservatives: Three new studies point to links between food additives and an increased risk of cancer, type 2 diabetes, cardiovascular disease, and hypertension



Credits : Mathilde Touvier/Inserm

Among the 3.5 million food and beverage items listed in the Open Food Facts World database in 2024, more than 139,000 contain at least one food colouring additive and more than 700,000 contain at least one preservative. Three new studies show links between the consumption of these additives and an increased risk of cancer, type 2 diabetes, cardiovascular disease, and hypertension. This research is conducted by a team of researchers from Inserm, INRAE, Sorbonne Paris Nord University, Paris Cité University, and the CNAM, within the Nutritional Epidemiology Research Team (CRESS-EREN). The findings are published in the journals [Diabetes Care](#), [European Journal of Epidemiology](#) and [European Heart Journal](#).

Despite the widespread use of food additives in the global market, there is a lack of epidemiological studies examining their links to the incidence of chronic diseases, due to the absence, until now, of precise data on exposure to specific substances in population-based studies.

To address this gap, the team led by Mathilde Touvier, Research Director at Inserm, is conducting large-scale epidemiological studies.

Researchers have studied the links between the consumption of food colouring additives and preservatives and the health of participants in the French NutriNet-Santé cohort (more than 100,000 participants) and published a series of three articles on the subject, providing new insights to inform public policies.

On food packagings, they generally correspond to European codes ranging from E100 to E199 (for colouring additives), from E200 to E299 (for preservatives in the strict sense), and from E300 to E399 (for antioxidant preservatives).

Two of these studies show, for the first time, associations between the consumption of food colouring additives and an increased risk of type 2 diabetes ([Diabetes Care](#)) and cancer ([European Journal of Epidemiology](#)). These additives are used to add or restore colour to food products in order to make them more appealing. They are characteristic markers of ultra-processed foods.

The third study, published in the [European Heart Journal](#), shows an association between the consumption of preservatives—additives that extend the shelf life of foods containing them—and the risk of hypertension and cardiovascular disease.

These data are of strategic importance to public health, given the widespread yet preventable nature of exposure to food additives within the population.

Among the key findings, researchers identified the following associations :

- Food colouring additives as a whole were associated with a 38% increase in the risk of type 2 diabetes among higher consumers, compared with those with the lowest exposure. Among the different types of colouring additives, caramel colours were associated with a 43% increase, whilst carotenoid colours (E160) were associated with a 39% increase; beta-carotene (food additive, E160a) with a 44% increase; ordinary caramel (E150a) with a 46% increase; curcumin (E100) with a 49% increase; and anthocyanins (E163) with a 40% increase in the risk of type 2 diabetes;
- Food colouring additives as a whole were associated with a 14% increase in the risk of overall cancer, a 21% increase in the risk of breast cancer and a 32% increase in the risk of post-menopausal breast cancer. Certain colouring additives were also individually associated with increased risks: beta-carotene (food additive, E160a) was associated with a 16% increase in the risk of overall cancer and a 41% increase in the risk of breast cancer; and ordinary caramel (E150a) was associated with a 15% increase in the risk of overall cancer.
- Preservatives as a whole were associated with a 24% increase in the risk of hypertension among high consumers compared with those with the lowest exposure; non-antioxidant preservatives were associated with a 29% increase in the risk of hypertension and a 16% increase in the risk of cardiovascular disease; antioxidant preservatives were associated with a 22% increase in the risk of hypertension. Among the 17 individual food preservatives consumed, eight were associated with a higher incidence of hypertension (including potassium sorbate (E202; +39%) and citric acid (E330; +25%)), and one with a higher incidence of cardiovascular disease (ascorbic acid (E300; +15%)).

As for preservatives, these findings are consistent with those of [two recent studies](#) in the NutriNet-Santé cohort, which, in early 2026, observed associations between the consumption of these ubiquitous additives and the risk of cancer and type 2 diabetes.

These findings represent the first large-scale epidemiological studies on a broad range of colorants and preservatives in relation to these conditions. They are consistent with several experimental and mechanistic studies—conducted on cellular or animal models—which have also demonstrated the harmful effects of some of these additives on health markers.

The authors of this study conclude that these findings underscore the need for health authorities to reassess the safety of these additives to incorporate this new scientific knowledge and better protect the public. Regarding preservatives, this reassessment should also incorporate a risk-benefit analysis. In the meantime, this research supports the recommendations of the National Nutrition and Health Program, which advises limiting exposure to non-essential food additives and prioritizing unprocessed or minimally processed foods.

The collection and analysis of data from the NutriNet-Santé cohort

Between 2009 and 2024, volunteers enrolled in the NutriNet-santé cohort reported their medical history, sociodemographic data, physical activity habits, as well as information about their lifestyle and health status. They also regularly provided detailed information on their food consumption by sending scientists multiple comprehensive 24-hour dietary records, including the names and brands of industrial foods consumed. This, when linked to several databases (Oqali, Open Food Facts, GNPD) and combined with measurements of additives in food and drink products and data on additive doses from the European Food Safety Authority (EFSA), enabled the assessment of participants' exposure to additives, particularly colourings and preservatives, throughout the follow-up period.

Analyses took into account the participants' socio-demographic profiles, their smoking status and alcohol consumption, the nutritional quality of their diet (calories, sugar, salt, saturated fats, dietary fibre, etc.) and numerous other factors that could have potentially biased the associations under investigation.

In addition to the overall totals for each type of additive (a total of 37 colouring additives and 58 preservatives detected in the participants' food records), 10 colouring additives and 17 preservatives were analysed individually in relation to the health outcomes under study. These were additives consumed by at least 10% of the study participants.

The colourant studies followed participants from 2009 to 2023, while the preservative study followed them for an additional year (2009–2024). For each study, individuals who had already been diagnosed with the condition under investigation before the start of follow-up were excluded from the statistical models. Consequently, each study involved a different total sample size: 105,260 participants for the study on food colouring additives and cancer risk (4,226 new cases, including 1,208 breast cancers, 508 prostate cancers, and 352 colorectal cancers), 108,723 for the study on the risk of type 2 diabetes (1,131 new cases), and 112,395 for the study on preservatives (2,450 new cases of cardiovascular disease and 5,544 new cases of hypertension).

The **NutriNet-Santé study** is a public health study coordinated by the Nutritional Epidemiology Research Team (CRESS-EREN, Inserm/INRAE/Cnam/Sorbonne Paris Nord University/Paris Cité University), which, thanks to the commitment and loyalty of more than 183,000 Nutrinautes, is advancing research on the links between nutrition (diet, physical activity, nutritional status) and health. Launched in 2009, the study has already resulted in more than 350 international scientific publications.

The call for new Nutrinautes is still open, so that we can continue to advance research into the links between nutrition and health.

By spending a few minutes each month completing various questionnaires on diet, physical activity and health via the secure online platform etude-nutrinet-sante.fr, participants help to advance our understanding of the links between diet and health. Through this civic gesture, anyone can easily become a contributor to public research and, with just a few clicks, play an important role in improving everyone's health and the well-being of future generations.

Sources

Food colouring additives and cancer incidence in the NutriNet-Santé prospective cohort

Sanam Shah, Anaïs Hasenböhler, Guillaume Javaux, Marie Payen de la Garanderie, Fabien Szabo de Edelenyi, Paola Yvroud, Cédric Agaësse, Alexandre De Sa, Inge Huybrechts, Fabrice Pierre, Marc Audebert, Xavier Coumoul, Chantal Julia, Emmanuelle Kesse-Guyot, Benjamin Allès, Serge Hercberg, Benoit Chassaing, Mélanie Deschasaux-Tanguy, Bernard Srour*, Mathilde Touvier*

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[European Journal of Epidemiology](#), 9 April 2026

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Food colouring additives and incidence of type 2 diabetes in the NutriNet-Santé prospective cohort

Sanam Shah, Anaïs Hasenböhler, Guillaume Javaux, Marie Payen de la Garanderie, Fabien Szabo de Edelenyi, Paola Yvroud, Cédric Agaësse, Alexandre De Sa, Inge Huybrechts, Fabrice Pierre, Marc Audebert, Xavier Coumoul, Chantal Julia, Emmanuelle Kesse-Guyot, Benjamin Allès, Valérie Deschamps, Serge Hercberg, Benoit Chassaing, Emmanuel Cosson, Sopio Tatulashvili, Mélanie Deschasaux-Tanguy, Bernard Srour*, and Mathilde Touvier*

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[Diabetes Care](#), 20 May 2026

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Preservative food additives and incidence of hypertension and cardiovascular diseases in the NutriNet-Santé prospective cohort

Anaïs Hasenböhler, Guillaume Javaux, Marie Payen de la Garanderie, Fabien Szabo de Edelenyi, Paola Yvroud-Hoyos, Cédric Agaësse, Alexandre De Sa, Inge Huybrechts, Fabrice Pierre, Xavier Coumoul, Léopold K. Fezeu, Pilar Galan, Jacques Blacher, Chantal Julia, Benjamin Allès, Serge Hercberg, Benoît Chassaing, Mélanie Deschasaux-Tanguy, Bernard Srour, Mathilde Touvier

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