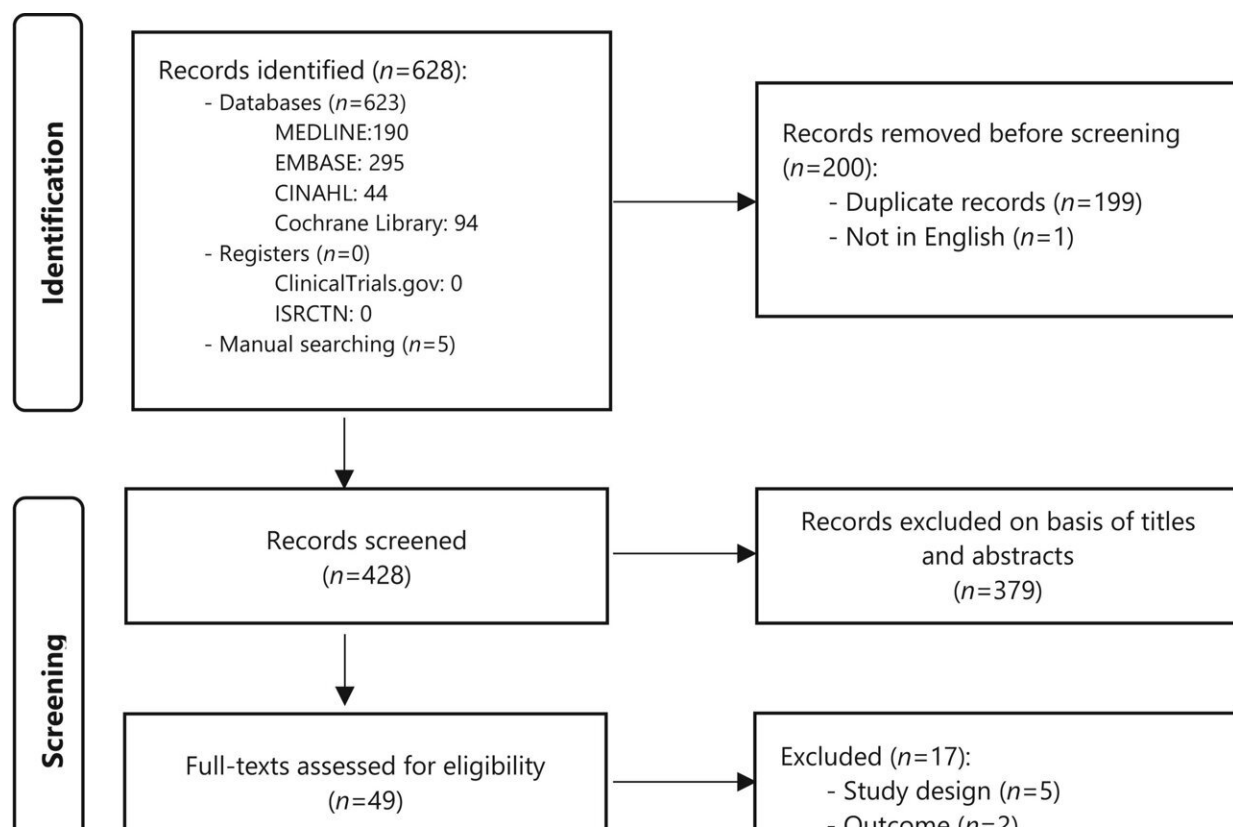


Natural compounds derived from soy and other plants found to reduce breast cancer recurrence and improve survival

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Flow diagram of the study selection process. CINAHL = the Cumulative Index of Nursing and Allied Health Literature; ISRCTN = International Standard Registered Clinical/social Study Number. Credit: *JNCI Cancer Spectrum* (2023). DOI: 10.1093/jncics/pkad104

Soy compounds called isoflavones are among the plant-derived compounds that may significantly reduce the risk of breast cancer recurrence or death, according to a new meta-analysis co-directed by investigators from the [Johns Hopkins Kimmel Cancer Center](#). The results were published Jan. 10 in the journal [JNCI Cancer Spectrum](#).

Investigators in Australia, Denmark, England, Norway and the U.S. reviewed 22 published [observational studies](#) that examined the impact of dietary intake of soybeans, lignans (compounds found in a variety of plants including seeds and nuts), cruciferous/cabbage-family vegetables, and [green tea](#)—and these substances' phytonutrients (natural compounds derived from plants)—on breast [cancer](#) recurrence and mortality, as well as on mortality from all causes.

This included 11 studies of soy isoflavones, three of [cruciferous vegetables](#), two of green tea, three of lignans, and three of enterolactone, which is formed in the gut when lignans are digested.

Soy isoflavones were associated with a 26% reduced risk of breast cancer recurrence, according to a meta-analysis that included six of the studies (of 11,837 women) reviewed by investigators. The results were most notable among post-menopausal survivors. The greatest risk reduction was seen at 60 milligrams per day.

This is equivalent to two to three servings per day, where one serving equates to a cup of soy milk, three ounces of tofu or a half-cup of cooked soybeans. However, the effect of soy consumption on the risk of mortality was smaller (12%) and not statistically significant, and was seen mostly at 20-40 mg per day, or one to two servings.

Another finding, reported for the first time in a [meta-analysis](#), relates to enterolactone, a compound metabolized from lignans. Lignans are found in various plants, such as seeds, nuts, legumes, whole grains, fruit and

vegetables. High levels are found in flaxseeds, cashew nuts, broccoli, and Brussels sprouts, among other sources.

Enterolactone was found to reduce the risk of breast cancer-specific mortality by 28% and death from any cause by 31%, particularly in post-menopausal women (35% reduction in death from any cause). It is not possible to calculate the effective dose of lignans in the diet from these enterolactone findings because the gut microbiome that plays a role in the metabolism of lignans varies among individuals.

"These findings were graded probable, which means there is strong research showing that they contributed to the results we are seeing," says lead study author Diana van Die, Ph.D., of NICM Health Research Institute at Western Sydney University, Australia.

The review also found some suggestive results, which means the results are generally consistent but rarely strong enough to justify recommendations:

- Consumption of green tea suggests an effect of reducing the risk of [breast cancer recurrence](#) by 44% in women with stage I or II breast cancer. The greatest effect was seen from consuming three to five cups per day and from five or more cups per day, as documented in two Japanese studies .
- Among those who consumed lignans prior to breast cancer diagnosis, there was a non-significant 34% risk reduction in cancer-specific mortality and 19% reduction in all causes of death in post-menopausal women. However, consumption of lignans by pre-menopausal women suggests an increased risk of mortality. This result indicates that the effects of lignans are dependent on the hormonal environment, although it was likely driven by one large study and needs further investigation. The

highest intake was nine or more servings per day in the studies reviewed.

- The impact of cruciferous vegetables was inconclusive, possibly influenced by the average intake being quite low (less than a half-cup per day) in the studies reviewed.

Investigators also looked into whether consuming soy, lignans, cruciferous vegetables, and green tea or their phytonutrients in the diet before or after breast cancer diagnosis made a difference. However, the data did not provide a concrete answer. All studies on green tea and lignans measured pre-diagnosis intake, while soy results came from studies that measured intake before and after diagnosis.

"It is critically important to stress that these studies were conducted on women who received medical and/or [surgical treatment](#) for breast cancer and that these foods and phytonutrients should not be considered as alternatives to treatment," says senior study author Channing Paller, M.D., director of prostate cancer [clinical research](#) and an associate professor of oncology at Johns Hopkins.

"This research highlights the need for more robust studies in this area, looking at the most effective dosages of these compounds and whether starting to consume them after diagnosis has the same effect as a lifelong dietary habit before diagnosis. This is what patients are looking for," Paller added.

More information: M Diana van Die et al, Phytonutrients and outcomes following breast cancer: a systematic review and meta-analysis of observational studies, *JNCI Cancer Spectrum* (2023). [DOI: 10.1093/jncics/pkad104](#)

Provided by Johns Hopkins University School of Medicine

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