The Evidence on Essiac & Cancer Prevention

Carcinogens and environmental toxins are on the rise. Cancer rates are doubling. Estimates say that over a third of cancer deaths could be prevented. Meanwhile, one in three Essiac users take the tonic believing it may prevent disease. Does the evidence support them? This article dives into the science of cancer prevention and how the herbs in Essiac might play in.

Disclaimer: This article is for informational purposes only. Do not take any supplements before consulting your care provider. The FDA has not approved Essiac for treating cancer or any other medical condition. Essiac is sold as a herbal dietary supplement.

Who Uses Essiac for Cancer Prevention?

Primary cancer prevention

About 38% of adults in the U.S. use some form of complementary and alternative medicine (CAM), according to a nationwide survey.

Essiac users don't fit under one profile, but most are cancer patients or survivors. Only a small subset of Essiac users report supplementing with the tonic desiring to stay healthy and prevent cancer or other chronic diseases. Taking measures to prevent cancer from ever developing in the body is called **primary cancer prevention** (Dy et al., 2004; Richardson et al., 2000).

The fact that Essiac isn't commonly used by healthy people for disease prevention isn't surprising. Research reveals that people with existing illnesses turn to complementary therapies **to fill a gap left by conventional medicine**. Reasons include wanting to reduce the side effects of prescribed medications or cope with illnesses that they feel can't be satisfactorily treated by conventional medicine (Tangkiatkumjai et al., 2020).

The main perceived benefits of taking Essiac for cancer prevention include antioxidant support and maintaining a healthy immune system and anti-inflammatory response.

It's important to note that although various dietary, supplement, and lifestyle changes may support general health, none have been proven to prevent cancer—Essiac included. The use of CAM for cancer prevention is still an active area of research we'll dive into below (Jain et al., 2021).

Cancer recurrence prevention

Another group of Essiac users includes cancer survivors who wish to stay cancer-free and turn to Essiac wanting to **prevent cancer recurrence**. A large subset of Essiac users who are also cancer survivors are women with breast cancer, according to survey studies (Zick et al., 2006; Richardson et al., 2000).

Also, cancer recurrence prevention may mean the person is still taking chemotherapy or undergoing certain treatments. Drug interactions are possible. For example, many breast cancer survivors may be taking prescribed prophylactic hormone therapy (e.g., tamoxifen and raloxifene) (Deli et al., 2020).

Secondary and tertiary prevention in cancer patients

In a North American survey published by the American Botanical Council, only 35.4% of the participants reported **taking Flor-Essence or Essiac to prevent disease**. Out of all users, 38.9% were cancer survivors who reported having no evidence of disease at the time of participating in the study. In 40.6%, the last check-up confirmed no evidence of disease (Richardson et al., 2000).

On the other hand, 62.4% of the participants in this study reported using the tonic primarily to treat a medical condition (cancer or other). Some of these participants may describe their use of Essiac as **secondary or tertiary cancer prevention** (Richardson et al., 2000).

In secondary prevention, cancer is detected early on. The patient is usually still asymptomatic, the cancer is treated, and attempts are made to improve outcomes. Diagnosed in the next stage, tertiary prevention aims to reduce further cancer growth and spread in the body (Kropp & Umar, 2019)

Limitations and precautions

Essiac has not been proven to prevent or treat cancer. Clinical studies are lacking to support its use in treating any disease. Learn more about the evidence behind Essiac's potential benefits in this post.

Additionally, the majority of patients with cancer who use Essiac wanting to prevent disease worsening or improve symptoms are taking chemotherapeutic drugs. These drugs can interact with Essiac and other drugs, supplements, and foods. To get the latest evidence-based information on possible Essiac interactions with oncology drugs, access this article.

If you or a loved one is undergoing chemotherapy and plan to use Essiac or any other CAM modality, please speak to your health care team first.

The Science of Cancer Formation and Prevention

What is carcinogenesis?

Carcinogenesis is the process of healthy cells mutating into cancerous cells. It starts with exposure to a carcinogen—a toxic substance that has the potential to trigger cancerous changes.

Cancer is a complex and multifactorial disease. There is no one known cause of cancer, and exactly what contributes to each type of cancer in each individual case is uncertain. Factors like carcinogen and toxin exposure, genetics, nutrition, lifestyle, and other diseases all play in (You & Henneberg, 2018).

Recent analyses suggest that the incidence of all cancers has been doubling since the late 19th century. Breast, prostate, and colorectal cancer are especially on the rise and have been linked with a Westernization of lifestyle. Scientists predict 21.6 million new cancer cases in 2030—a 53% increase from 2012! (You & Henneberg, 2018; Bray & Soerjomataram, 2015).

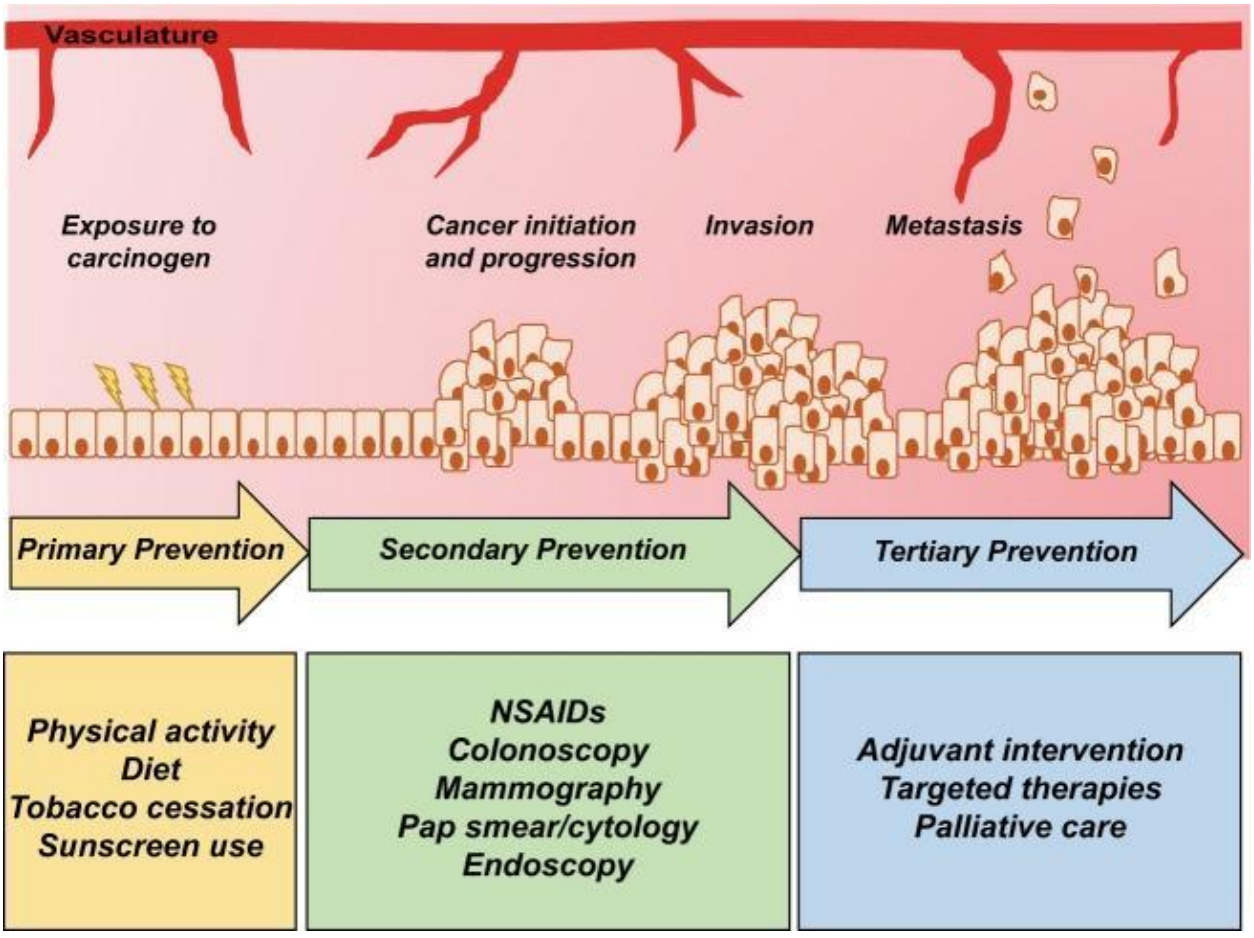

Image taken from Kropp & Umar, 2019.

Carcinogens on the rise

There are 62 known human carcinogens according to the U.S. National Toxicology Program (NTP). The European International Agency for Research on Cancer (IARC) lists over 100 carcinogens (Smith et al., 2016).

But is that all? The number of carcinogens has been increasing with environmental pollution and a more toxic lifestyle.

Since the 19070s, over 87,000 chemicals have been approved for commercial use. Only over one thousand have been formally examined and graded for their carcinogenic potential. Many more continue to be used with unknown health consequences, including heavy metals and environmental toxins that cause hormonal, immune, and neurological disruption (Cohen & Jefferies, 2019).

10 characteristics of a carcinogen

Scientists have described 10 characteristics that make carcinogens so destructive. To sum it up, carcinogens (Smith et al., 2016):

1) Gravitate toward DNA. Carcinogens attract negative ions either directly or after metabolic activation (i.e. they are *electrophiles*). This creates a pull, magnetizing them toward DNA and vital proteins

2) Damage DNA (are *genotoxic*). This means that they can cause DNA damage, insert new information into DNA, trigger gene mutations, and lead to aberrations in the genetic material

3) Disrupt DNA repair or cause genomic instability

4) Induce harmful epigenetic changes (including DNA methylation, histone modification, microRNA expression)

5) Trigger oxidative stress, causing oxidative damage

6) Cause chronic inflammation

7) Suppress the immune system

8) Manipulate the activity of cellular receptors. This can affect normal cellular division, metabolism, detoxification enzymes, hormonal signaling, and more

9) Make cancerous cells immortal (blocking programmed cell death and cellular aging or *senescence*)

10) Cause cells to uncontrollably divide, alter their supply of energy and nutrients, and trigger the formation of new blood vessels in tumors (angiogenesis)

Neither of these steps is enough to cause cancer on its own. The whole cascade needs to repeat many times before a tumor finally forms. In fact, most precancerous cells are destroyed

before they can cause any damage. Prevention usually happens at this step (Peters & Gonzalez, 2018).

“Cancer prevention” is often banalized in the popular press. People may interpret it as stopping smoking and eating more vegetables. However, cancer prevention and the pathways it impacts is a lot more complex.

In the next section, we’ll explore how Essiac may affect these pathways as a candidate preventive formula.

Potential Ways Essiac May Support Cancer Prevention

This section goes over the scientific research on the potential cancer-preventive effects of Essiac and its individual constituents. Most studies have been carried out in animals or cells and. These studies are considered insufficient evidence to make claims about health effects in humans. Proper clinical studies are needed to determine whether Essiac affects parameters of cancer prevention in humans.

The main constituents of Essiac are burdock root (60%) and sheep sorrel (30%). These two herbs are theoretically most likely to have an effect on any of the mechanisms listed below. The effects of slippery elm (8%) are expected to a lesser degree. The contribution of rhubarb root (2%) to the overall effect is possible but likely minimal.

1) Oxidative & DNA Defense

According to estimates, nearly one-third of all cancer deaths in the U.S. could be prevented through appropriate dietary changes. Dietary changes include the use of antioxidant-rich plants (Khan et al., 2008).

The original Essiac formula contains antioxidant herbs that act in synergy. In one study, high concentrations of antioxidants in Essiac helped protect against DNA damage in test tubes (Leonard et al., 2006).

In another study, both Essiac and Flor-Essence increased antioxidant defense and reduced inflammation in mouse cells. Essiac seemed to have a stronger and more widespread effect than Flor-Essence in this study (Cheung et al., 2005).

A 2021 study reported the recommended dosage of the original Essiac liquid extract increased the overall lifespan of *C. elegans* roundworms. It increased the worms’ ability to withstand dying from high levels of oxidative stress. Scientists use *C. elegans* to experimentally assess lifespan, oxidative stress, and innate immunity (Ruiz et al., 2021).

Burdock, the dominant herb in Essiac, is high in antioxidants. Its lignans, caffeoylquinic acids, and polyphenols are potent free radical scavengers in test tubes. Burdock also contains luteolin, a yellow-colored antioxidant that carries anti-inflammatory and immune-balancing potential (Wang et al., 2019).

Alcoholic burdock root extract showed strong free radical scavenging activity in cells. A specific burdock extract also had selective antiproliferative activity against several human cancer cell lines (Predes et al., 2011; Theoharides et al., 2015).

Sheep sorrel, the second most dominant Essiac constituent, is among plants with the highest quercetin content. It's also a great source of vitamin C (Bhagwat et al., USDA; Atanassova et al., 2018).

Quercetin is a strong antioxidant, anti-inflammatory, and antihistamine. It also supports immune health and is being researched for preventing cancer in cellular experiments (Shoskes et al., 1999; Zahedi et al., 2013; Kowalski et al., 2005).

Slippery elm contains antioxidants and anti-inflammatory compounds as well. These include tannins, flavonoids, organic acids, and fatty acids. However, its main active compound is mucilage (Watts, 2012; Newall et al., 1996).

A reason to be cautious with high-dose antioxidants

Most scientists believe that dietary antioxidants play a role in cancer prevention, but their clinical significance and safety remain uncertain.

According to the most recent theory, antioxidants can either protect from cancer or *promote* it. For example, antioxidants N-acetylcysteine and vitamin E accelerated lung cancer in mice. Beta-carotene supplementation increased the risk of lung cancer in smokers (Mendelsohn & Larrick, 2014; Midha et al., 2019).

Antioxidant pathways protect against cancer by neutralizing potentially carcinogenic reactive molecules. At the same time, they can promote cancer progression by shielding possibly present precancerous cells via their antioxidant action. The net effect may be guided by a person's genetics, lifestyle, and other factors (Mendelsohn & Larrick, 2014).

This might also, in part, explain the conflicting results of Essiac on breast and prostate cancer cells (Ulbricht et al., 2009; Kulp et al., 2006; Ottenweller et al., 2004; Eberding et al., 2007; Tai et al., 2004.

Therefore, antioxidants can have paradoxical effects. More research on their safety is needed before they can be recommended to everyone for cancer prevention.

Summary

All in all, clinical trials have yet to determine whether antioxidants in Essiac can play a role in cancer prevention.

2) Programmed Cell Death (Apoptosis)

Apoptosis—sometimes called “cellular suicide”—is when healthy cells undergo programmed self-destruction. Cancer cells bypass apoptosis, which allows them to survive longer, become more invasive, and resist chemotherapy (Pfeffer & Singh, 2018).

Burdock root has been researched for inducing apoptosis in cells and animals. Arctigenin from burdock induces apoptosis by activating the mitochondria. Cancer cells hijack mitochondria to evade death. Arctigenin also reduces the activity of a gene that blocks apoptosis (Bcl-2). Injected arctigenin reduced tumor growth in mice by increasing apoptosis (He et al., 2018).

Sheep sorrel extract also triggered apoptosis in leukemia cells (Wegiera et al., 2012).

On the other hand, a recent study on worms and cancer cells hypothesizes that the overall **antiproliferative potential of Essiac may rely on mechanisms other than apoptosis** (Ruiz et al., 2021).

3) Cancer cell division

Studies on deadly glioma cells reveal that arctigenin from burdock may block cancer cells from dividing by **causing early cell cycle arrest**. Artigenin also increased the expression of cancer-fighting proteins (p21, retinoblastoma, and p53) and decreased the expression of proteins associated with cancer development (cyclin D1 and CDK4) (Wang et al., 2019).

In another cell-based study, arctigenin stopped lung, liver, and stomach cancer cells from dividing (Susanti et al., 2013).

Emodin from sheep sorrel root stopped four tumor cell lines from dividing and mutating in another study (Lee et al., 2005).

4) Cancer signaling

Abnormal protein kinase (MAPK) signaling in cells may lead to uncontrolled proliferation and altered energy dynamics—the hallmarks of cancer. The hyperactivation of this pathway is responsible for over 40% of human cancer cases, according to research (Yuan et al., 2020).

Aside from blocking apoptosis, disrupted protein kinase signaling also changes energy balance in the cell. It enables cancer cells to tolerate extreme conditions, overcoming metabolic stress and starvation (Yuan et al., 2020).

In one cellular study, **arctigenin from burdock altered MAPK** and rendered tumor cells susceptible to effects of nutrient deprivation. Artigenin was 100% cytotoxic to tumor cells under nutrient deprivation and barely cytotoxic in a nutrient-rich environment (Awale et al., 2006).

Researchers hypothesize that arctigenin may also block a pathway (Akt) that makes cancer cells tolerant to glucose starvation. More research is needed to confirm this (Awale et al., 2006).

Additionally, studies are investigating whether a type of arctigenin-rich burdock extract (GBS-01) may also reduce the tolerance of cancer cells to glucose deprivation. In theory, this might make cancer cells die off quicker if starved of sugar. Yet, this hypothesis also remains unproven (Ikeda et al., 2016).

5) Carcinogen & Toxin Exposure

Long-term exposure to high levels of different carcinogens and environmental toxins has been implicated in most cancers, along with these other factors (Cohen & Jefferies, 2019).

Burdock reduced inflammation from cigarette smoke exposure and liver-damaging chemicals in animals. It also protected the liver against the heavy metal cadmium, acetaminophen, a toxic Chinese herb, and a diet high in unhealthy fats (Possebon et al., 2018; Lin et al., 1996; Predes et al., 2014; El-Kott et al., 2015; Zhou et al., 2020; Romualdo et al., 2020).

Sheep sorrel extract protected against liver-toxic chemicals and reduced damage to other organs in rats (Alkushi, 2017).

According to 12 small studies on nearly 900 people, rhubarb may aid detoxification and reduce the symptoms and toxic effects of pesticide and herbicide poisoning (Wang & Pan, 2015; Wang et al., 2015; Yu et al., 2012)."

6) Detoxification Pathways

Carcinogens aren't that harmful left alone. They become highly destructive once they get activated by the liver's cytochrome P450 (CYP450) enzymes as part of phase I detoxification. CYP450 enzymes help clear drugs and foreign substances from the body, but they need to work in balance with phase II detoxification (Peters & Gonzalez, 2018; Wilkinson & Clapper, 1997; Liska 1998)

Phase II detoxification involves the body's most powerful enzymes (like glutathione-S-transferases) that further process carcinogens and drugs. Phase II renders carcinogens harmless and makes them soluble in water. As such, they don't stick around in the body and get flushed with the urine (Liska 1998).

Cancerous mutations become more likely if phase I is overactive and phase II underactive (Liska 1998).

Essiac has variable effects on phase I detox enzymes, but its net effect is inhibitory. For example, quercetin from burdock root is a known potent inhibitor of the CYP450 enzyme CYP3A. Rhubarb root may activate CYP3A, but it's unlikely to change the direction of effect since it's present in tiny amounts in the original Essiac formula (Cassileth, 2011).

Catechins and polyphenols in Essiac may induce the phase II enzymes. This may support the detoxification of carcinogens and aid cancer prevention, according to some scientists. It also might explain the health-preserving effect of many herbs, fruits, and vegetables (Pandey & Rizvi, 2009; Surh et al., 2008, Wilkinson & Clapper, 1997).

While blocking phase I and inducing phase II enzymes might theoretically be helpful for cancer prevention, it's also a source of potentially dangerous drug interactions. Read about Essiac's drug interactions in this article.

7) Radiation Protection

Leukemia and most solid cancers have been linked with exposure to radiation. Early life exposure especially increases the risks for many cancers throughout life (Gilbert, 2010).

In a mice study, tea made from an eight-herb formula similar to Flor-Essence reduced DNA damage from X-ray radiation. Animals who underwent radiation and drank the tea were in similar health as animals not exposed to radiation. Animals in the control group suffered radiation damage (Marignac et al., 2020).

This doesn't mean that Essiac can protect against cancer-causing radiation but warrants further research.

8) Blood Vessel Growth

Vascular endothelial growth factor (VEGF) plays a large role in cancer development and progression. It disrupts immunity, triggers cancer pathways, and increases blood vessel growth or *angiogenesis* in cancerous tissue (Parveen et al., 2019).

Arctigenin from **burdock reduces the expression of VEGF** in cells. Emodin, found in sheep sorrel and rhubarb, also blocks VEGF (Parveen et al., 2019).

9) Immune Support

Essiac and its constituent herbs had immune-balancing effects in cellular and animal experiments. Essiac increased the activity of CD8+ cells, which are crucial for tumor surveillance and immune defense in the body (Seely et al., 2007).

In mice, Flor-Essence increased spleen cells, which support immunity, and macrophages, which clear cellular debris and dying cells from the body (Wu et al., 2020).

Additionally, arctigenin in burdock may lower colon inflammation by balancing the immune system. It reduced the number of immune cells (Th1 and Th17) linked with autoimmunity and inflammation in test tubes (Wu et al., 2015).

Quercetin, concentrated in sheep sorrel, reduced allergic and autoimmune reactions while supporting a healthy immune response in cellular and animal experiments (Li et al. 2016)."

Sheep sorrel also contains polysaccharides that seem to activate immune pathways involved in locating, engulfing, and removing cancerous cells (*phagocytosis*) in mice with bone cancer (Ito, 1986).

10) Anti-inflammatory Effects

Essiac was a moderate anti-inflammatory in cellular studies. Sponsor-initiated animal studies of Flor-Essence also report prevention of chemically induced inflammation. However, sponsor-led studies are not publicly available and did not undergo peer review (Seely et al., 2007; Richardson et al., 2000)

Burdock root, the main herb in Essiac, has been clinically researched in patients with inflammation. It reduced markers of inflammation and oxidative stress (CRP, IL-6, MDA) in a small clinical trial of patients with knee osteoarthritis. It also reduced symptom recurrence in another trial including patients with colon inflammation (Maghsoumi-Norouzabad et al., 2014; Mizuki et al., 2019)

In animals, burdock root suppressed allergic and autoimmune inflammation. In mice, burdock hydroalcoholic extract injection reduced inflammatory mediators and neutrophils after exposure to a toxin (LPS) and carcinogens. It also reduced melanoma tumor growth and enhanced mice survival. In cells, burdock blocked histamine and other inflammatory compounds (Yang et al., 2016; Nascimento et al., 2019; Li et al., 2016).

Compounds in burdock extract likely reduce inflammation by **blocking the cyclooxygenase-2 (COX-2) enzyme**. Non-steroidal anti-inflammatory drugs like Aspirin act on the same mechanism. Blocking COX-2 reduces many inflammatory cytokines (including TNF-α and IL-6) (Wang et al., 2019).

Proponents claim that Essiac may help offset cytokine storms thanks to its anti-inflammatory potential. This remains to be tested.

Cytokine storms have been implicated in COVID-19 complications. Interestingly, cytokine storms can also happen in cancer patients undergoing chemotherapy. However, it's unknown whether burdock or Essiac can help prevent cytokine storms or affect the outcomes (Ye et al., 2020; Filippou & Karagiannis, 2020; Turnquist et al., 2020).

Sheep sorrel and slippery elm also have anti-inflammatory potential. Quercetin from sheep sorrel may lower inflammatory histamine, leukotrienes, and prostaglandins. Slippery elm may reduce the production of an inflammatory cytokine called interleukin 8 (IL-8), which has been linked with cancer (David et al., 2016; Townsend & Emala Sr, 2013; Mlcek et al., 2016).

11) Cytotoxic Properties

Essiac and arctigenin from burdock showed cancer-specific cytotoxic ("cancer-fighting") properties in cells (Seely et al., 2007; Susanti et al., 2012).

Anthraquinones from sheep sorrel and Turkish rhubarb also have cytotoxic properties and block pathways associated with cancer progression in cells (Dy et al., 2004; Li et al., 2016).

12) Psychological Effects

A controversial Canadian survey study of 510 women with breast cancer did not find a link between Essiac use and quality of life or mood (read more about the problems with this study here). Yet, Essiac users reported beneficial effects (Zick et al., 2006).

Aside from the mechanistic biochemical pathways mentioned above, psychological effects may also play a role in prevention. Psychological factors may influence a person's decision to try complementary and alternative medicine (CAM) like Essiac in the first place.

Herbal supplements are the most popular CAM modality. Users perceive supplements as safe and beneficial. Also, about 37% of CAM users are dissatisfied with conventional medicine and are looking for ways to take their health into their own hands. CAM users also realize that many factors contribute to health and well-being (Tangkiatkumjai et al., 2020; Ventola, 2010).

One study notes that some breast cancer survivors attribute prevention of breast cancer recurrence to factors like a **positive attitude, complementary medicine, diet, healthy lifestyle, and stress reduction**. Most women believed they could control cancer recurrence. The authors concluded that women's *perceptions* about the prevention and control of cancer recurrence are important (Alwhaibi et al., 2019).

Integrative human studies have yet to explore the potential psychological effects of Essiac use on cancer prevention.

In Conclusion

A minority of Essiac users take the tonic for purported cancer prevention.

Animal and cell-based studies point to anti-inflammatory, antioxidant, detoxifying, and immune-supportive effects of Essiac's constituent herbs. Research is still in the early phases, and clinical studies are lacking.

Therefore, there's currently not enough evidence to recommend Essiac for cancer prevention. However, it's reasonable to support the use of Essiac for maintaining good health.

Please talk to your care provider before supplementing to avoid disease and drug interactions.