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COCOS NUCIFERA OIL AS SUPPLEMENTATION IS A BOON FOR MALIGNANCY

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ABSTRACT

Cocos nucifera oil or Coconut oil is made from fresh, mature coconut kernels and is edible. Coconut oil's anticancer properties have only been studied in a few studies. In the case of liver malignancies, the fatty acid component of coconut oil directly targets the liver via portal circulation and as chylomicron via lymph, although it has effects on all types of malignant tissue. In most South Asian countries, coconut oil is an essential part of the diet. At first, coconut oil was lumped in with foods high in saturated fats and chastised for having a negative impact on health. In any case, studies have shown that coconut oil is a good source of medium-chain unsaturated fats and its main constituent named as lauric acid has its effect on cancerous cells. As a result, new opportunities for its application in a variety of disciplines have arisen. Coconut oil is used for more than just cooking. Coconut oil is noteworthy for its hypocholesterolemic, anticancer, anti-hepatosteatotic, anti-diabetic, cancer prevention agent, soothing, anti-microbial, and skin saturating characteristics, among others. Despite all of its health benefits, coconut oil is still underappreciated due to a lack of solid scientific evidence. Thus coconut oil will be an good supplement to provide a good quality of life among cancer patients.

KEYWORDS: Coconut oil, Malignancy, Lauric acid, Breast cancer, Colon Cancer, Lung Cancer.

INTRODUCTION

Cocos nucifera oil is a conventional product that has been utilized ethnopharmacologically for a long time. It is extracted irrespective of using chemicals from fresh coconut flesh at a low temperature. In test animals, coconut oil has been demonstrated to suppress the initiation of carcinogenic agents in the breast and colon tumours. Coconut oil has its more effectiveness than unsaturated oil in chemically generated breast and colon malignancies. Higher percentage of intermediate chain fatty acids in coconut oil, making it good for people with weakened immune systems. Lauric acid its principal phytoconstituent, is responsible for anti-cancer properties.[1,2] As a consequence, it's being researched as a therapeutic activity for HIV/AIDS patients with highly impaired immune systems. Chemotherapy and radiotherapy are frequently used after primary cancer treatment to prevent cancer from spreading and improve long-term survival chances. Chemotherapy, additionally, is frequently accompanied with a variety of undesirable side effects, including, hair loss, exhaustion, discomfort, anxiety, depression, nausea and vomiting and others, all of which can be mitigated by taking coconut oil supplements.[3-5] To date, there are few studies on utilization of *Cocos nucifera* oil supplement to help cancer patients improve their life's quality. This information, additionally, could aid healthcare workers in caring for cancer patients and ensuring that they have a decent life's quality while undergoing treatment.[6]

Chemical Properties of *Cocos nucifera*

- ***Fatty acids*** **–** Saturated fatty acids of about 94% is the main component of coconut oil with a significant proportion of about 62% medium-chain fatty acids **(Table:1)**.[7]

Table 1: Fatty Acids & Its Proportion In Coconut Oil.

Fatty Acids	Percentage
Lauric acid	45-52 %
Myristic acid	16-21 %
Palmitic acid	7-10 %
Caprylic acid	5-10 %
Oleic acid	5-8 %
Capric acid	4-8 %
Stearic acid	2-4 %
Linoleic acid	1-3%
Caproic acid	0.5-1 %
Linolenic acid	Upto 0.2 %
Palmitoleic acid	Upto traces

Cocos nucifera oil and Cancer treatment

Patients with breast cancer who drank coconut oil demonstrated significant improvements in their functional status as well as personal pleasure. In

addition, the side effects associated with the tough treatment have been significantly reduced. Lauric acid is a cancer-fighting component present in coconut oil, which makes up half of its makeup. This item is capable of curing over 90% of colon illness.[8]

The following are some of the reasons why coconut oil is beneficial in the fight against cancer:

- **A ketogenic cleanse's mainstay is coconut oil:** The most important component of a ketogenic food is coconut oil. Experts have shown that malignant growth cells can survive on amino acid maturation and glucose alone, making a diet full of ketogen is a sensible and wise choice for disease patients.[9]
- **Lauric acid, a cancer-fighting agent, is abundant in coconut oil:** The malignant growth killer lauric acid can be found in abundance in coconut oil. A few studies have shown that about half of the part of coconut oil works as a working cancer-killing fixing that has helped colon disease patients: lauric acid is a type of dissolved unsaturated fat that has been referred to successfully dispense with harmful cells as seen in a few research centre trials.[7,10] There are several protein-protein interactions that can be modulated by coconut oil in response to produce a novel target for cancer medicaments **(FIG:1)**.
- **Carcinogenic compounds are slowed by cold-pressed coconut oil:** Research has discovered that when coconut oil is processed at a low temperature, it inhibits the entry of carcinogenic chemicals into the breast and colon. Because coconut oil is heavy in saturated fat and has immune-boosting characteristics, it's a great supplement for people who have abnormal cell development or other harmful diseases such as HIV/AIDS.[11,12]
- **Cancer is prevented by the fats found in coconut oil:** Consuming two-three tablespoons of coconut oil every day has been shown to protect against the most dangerous diseases, including diabetes, virus-related illnesses, osteoporosis, and, most critically, cancer. The American Society for Nutrition, however, pointed out that the good fats included in coconut oil are not only effective in treatment approaches, but also in the prevention of this terrible condition, with some easy steps of prevention such as properly planning your meals.[13]
- **The use of coconut oil can assist a patient cope with the negative effects of chemotherapy:** Chemotherapy, the most popular cancer treatment, can be devastating to the immune system, leaving you open to other illnesses. Because coconut oil is high in medium chain fatty acids, it can help your immune system heal and reverse the negative effects of this operation.[14]

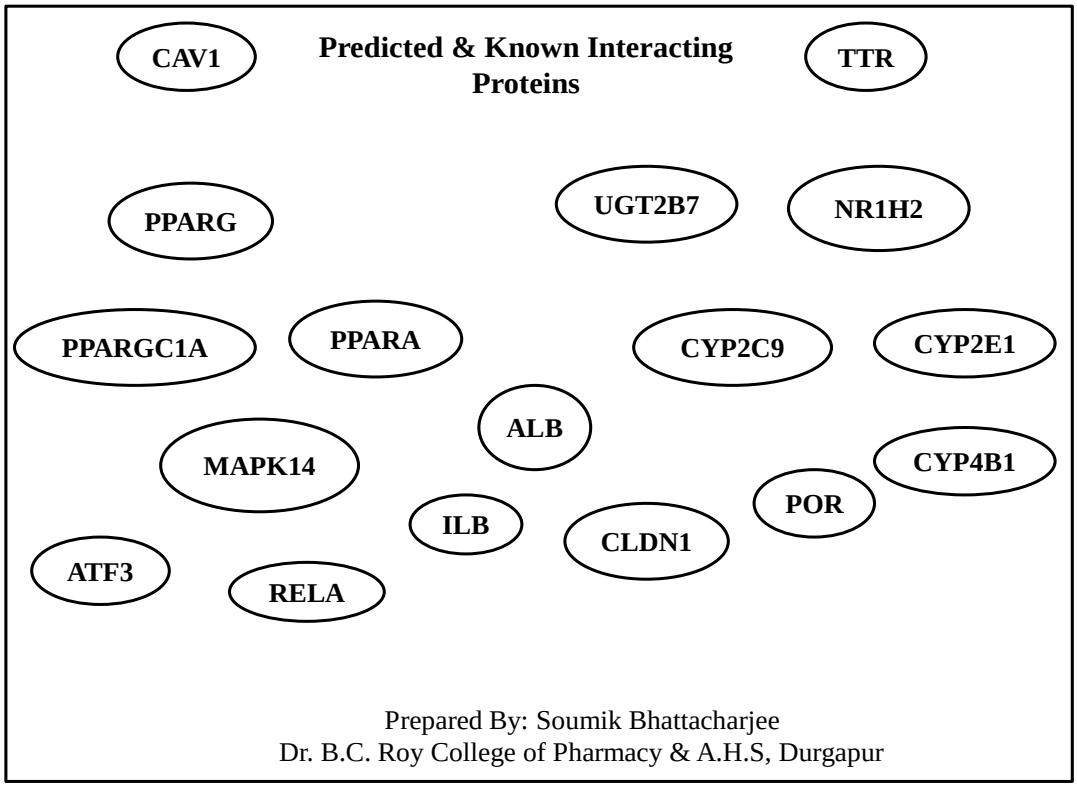

FIG: 1 Protein-Protein Interactions Modulated By Coconut Oil For Targeting Cancer Cells.

Effects of Cocos nucifera oil on patients with breast cancer

Breast cancer is the most frequent cancer that affects women in our country, and it is also the leading cause of death, among other malignancies. After first treatment for breast cancer, chemotherapy and radiotherapy are frequently used to prevent metastases and improve long-term survival chances. Chemotherapy, on the other hand, is frequently linked to a variety of undesirable side effects, including nausea and vomiting, hair loss, exhaustion, discomfort, anxiety, depression, and others. The majority of the side effects were disturbing to the patients, and many were apprehensive during therapy.[15-17] Both the condition and its treatment can interrupt a woman's life and have a negative impact on many parts of her life, lowering her quality of life. In test animals, coconut oil has been demonstrated to suppress the induction of carcinogenic agents in the colon and breast tumours. Coconut oil was found to be more protective than unsaturated oil in chemically generated colon and breast malignancies. Coconut oil is high in medium-chain fatty acids, making it appropriate for immune-compromised people. Breast cancer and its treatment, particularly chemotherapy, can have a negative impact on a patient's quality of life.[18,19] It is thought that consuming coconut oil helps breast cancer patients retain their physical function by raising their energy levels. Coconut oil is high in lauric acid, a disease-fighting chemical with numerous health advantages. Patients frequently regard serious side effects of chemotherapy as distressing aspects that contribute to low quality of life. Loss of appetite, for example, was the most commonly reported symptom that had an impact on quality of life. Coconut oil is one of a kind, as it contains medium-chain triglycerides, which are commonly utilised to improve the nutritional status of patients. Furthermore, having a healthy appetite might aid wound healing and promote a quick recovery from illness.[20-22]

***Cocos nucifera* oil in colon cancer**

The utmost fatty acid in oil of coconut i.e the lauric acid, has been proven to have anticancer properties via oxidative stress-induced apoptosis. Lauric acid is the most agile and shown to have a higher affinity for EGFR (epidermal growth factor receptor) and TS (thymidine synthase) in various in-silico investigations.[23,24] According to these findings, lauric acid-induced dose-dependent cytotoxicity in HepG2 (human hepatocellular carcinoma), HCT-15 (human colon cancer) and Raw 264.7 (murine macrophages) cells revealing morphological features of apoptosis in colon cancer, as well as lauric acid's anticancer activity, may be partially mediated by EGFR signaling downregulation and subsequent reduction in cell viability through apoptosis, because EGFR signalling is so important for cancer cell survival, it's a topic of interest in therapeutic development.[25-27]

Effectiveness of *Cocos nucifera* Oil in lung cancer

Two cell lines of lung malignancy were treated to several of coconut oil concentrations for about 72 hours in an experimental design. The cancer cells' morphological variations were found after treatment. Coconut oil at IC50 values of 12.04 percent (v/v) and 8.64 percent (v/v) triggered apoptosis in A549 and NCI-H1299 cell lines of lung malignancy, respectively with 3.57 percent and 4.20 percent of the cells of apoptosis in this treatment.[28,29] After treating with oil of coconut, couple the cell lines showed morphological alterations like the maturation of extensive cytoplasmic vacuolization and bulging of the cellular membrane. Coconut oil had no toxicity over skin-derived fibroblasts at the values of IC50 for either types of cell lines, indicating that it can cause lung cancer cell death and is safe to consume.[30,31]

Effect of *Cocos nucifera* oil in liver cancer cell lines

Coconut oil's medium chain fatty acids are said to be able to target liver cell lines. The effect of *Cocos nucifera* oil was investigated as an experiment on HepG2 (Human hepatocellular carcinoma cell lines) liver cancer cells to confirm the in vitro findings. A significant minimum dose of 20% coconut oil was seen to be effective against HepG2 liver cancer cells in a cell viability assay, whereas 40% coconut oil practically killed the entire liver cell. Alb, ttr, rela, ppara, mapk14, and por RNA expression are very high in HepG 2 cells, according to the human protein atlas, followed by medium level RNA expression of ugt2b7, cyp2e1, ppargc1a, atf3, pparg, nr1h2, and cldn1. According to in silico results, the genes mentioned above are linked to liver tumour. The effect of virgin coconut oil on HepG2 cells in a cell culture experiment by Pruseth B. et al also supports coconut oil's anticancer potential.[32,33]

CONCLUSION

The 12-carbon Lauric-Acid makes for over half of the fatty acids in coconut oil. Monolaurin is a chemical formed when lauric acid is metabolised. Both monolaurin and lauric acid have the ability to fight pathogens such as bacteria, viruses, and fungi. As we saw in our review, lauric-acid in extra virgin coconut oil has anti-cancer properties. This crucial and useful chemical is contained in human milk and helps to lower the incidence of cancer in newborns. Various studies have shown that coconut oil has anticancer properties, particularly in the colon, breast, lung, liver, and oral cavity. Despite the fact that coconut oil has a wide range of positive effects, its chemical mechanism of action has yet to be discovered. However, more research into the added benefits of lauric acid and the usage of extra virgin coconut oil is required. As a consequence of this review and previously published results, coconut oil appears to have high anticancer efficacy, suggesting that it could be a viable source for new anticancer medicaments.

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