

# RESEARCH AND REVIEWS: JOURNAL OF FOOD AND DAIRY TECHNOLOGY

## A Study on Certain Foods That Fight With Cancer and Prevent or Reduce Its Side Effects - Anti Cancer Diet for Diabetic Patients.

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### Review Article

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#### ABSTRACT

Fruits and vegetables contain many beneficial nutrients and phytochemicals that protect against many diseases. Further, different types of vegetables and fruits may differ in their contents of carbohydrates, antioxidants, vitamins, minerals, and other unidentified phytochemicals. One must consume daily at least 400 g of vegetables and fruits including at least 30 g of pulses, nuts and seeds. People who eat much quantity of vegetables have about one-half the risk of cancer and less mortality from cancer. Diabetes is on the rise, yet most cases are preventable with healthy lifestyle changes. Both diabetes and cancer are prevalent diseases whose incidence is increasing globally. Worldwide, the prevalence of cancer has been difficult to establish because many areas do not have cancer registries. Major groups of the vegetable and fruit phytochemicals show anticancer activity which includes vitamins (Biotin B6, B12, C, E, and K), flavonoids, and minerals. Hence, the present article explores out some anticancer foods which can be commonly taken in the diet of diabetics to prevent increased risk of different forms of cancer.

#### INTRODUCTION

Diabetes, often referred by doctors as diabetes mellitus, described as a group of metabolic diseases in which the person has high blood sugar, either because insulin production is inadequate, or because the body's cells do not respond properly to insulin, or both.

There are three main types of diabetes mellitus

- Type-1 diabetes
- Type-2 diabetes
- Gestational diabetes

The worldwide burden of type 2 diabetes has increased rapidly in tandem with increases in obesity. The most recent estimate for the number of people with diabetes

Worldwide in 2000 was 171 million, and this number is projected to increase to at least 366 million by the year 2030 <sup>[1]</sup>. Fruit and vegetable consumption has been associated With decreased incidence of and mortality from a variety of health outcomes including obesity, hypertension, and cardiovascular diseases in epidemiological studies <sup>[2-4]</sup>.

Sometimes type 2 diabetes can develop without any warnings signs. In fact, about a third of all people who have type 2 diabetes don't know they have it. All forms of diabetes increase the risk of long-term complications. These typically develop after many years <sup>[5]</sup>, but may be the first symptom in those who have otherwise not received a diagnosis before that time.

According to New research from university of Cincinnati (UC) into the development of type 2 diabetes has found that it may not just be the immune system to blame for the metabolic condition, but that fat cells may also be involved. The study, undertaken by scientists at the University of Cincinnati, revealed that cellular changes in fat tissue can lead to the state of hyper inflammation, a characteristic of type 2 diabetes and obese-related glucose intolerance.

Cancer and cell biology experts say this new discovery about the cellular mechanisms behind glucose intolerance may provide a different target for drugs to treat type 2 diabetes as well as insights into how aggressive cancers form.

Cancer is a very severe disease, which kills annually about 3500 per million populations all over the world.

The researchers examined the role of a specific gene known as protein Kinase C or PKC-zeta, by using a preclinical animal model. PKC-zeta has already been implicated as a key cellular contributor to the malignant growth of tumors [6] the research has found that PKC-zeta has a dual role, moving from a regulator of inflammation to a proinflammation agent depending on the circumstances. When there is inflammation caused by obesity, PKC-zeta changes and the molecule starts to promote inflammation by causing adiposities to secrete a substance that travels in large quantities to the liver to cause insulin resistance.

Jorge Moscat, chair of the university cancer and cell biology department, said "This finding is quite novel because current drug development efforts target immune cells to eliminate this hyper inflammation.

Hence In addition to cardiovascular disease [7] and renal disease [8], type 1 and type 2 diabetes are also associated with a spectrum of cancers [9-12], since the first few reports are on increased incidence of cancer in insulin treated patients, there are ongoing debates regarding the risk association of insulin use with cancer [13-14]

Several chemo preventive agents are used to treat cancers, but they cause toxicity that prevents their usage. Consumption of fruits and vegetables is widely accepted as lowering the risk of most common cancers. An inverse relationship has been suggested between the consumption of Fruits and vegetables and the incidence of cancer in multiple organs [15-17]. Fruits and Vegetables contain several phytochemicals which prevent from the cancer and other diseases.

A report of the WHO study on diet, nutrition and prevention of chronic diseases recommended that we daily consume at least 400 g of vegetables and fruits including at least 30 g of pulses, nuts and seeds. People who eat much quantity of vegetables have about one-half the risk of cancer and less mortality from cancer [8]. The intake of 400-600 g/day of vegetables and fruits can reduce the occurrence of many common forms of cancers, and diets rich in plant foods can also lower the risk of heart disease and many chronic diseases [19].

In view of the above facts present work suggests that consumption of diet rich in fruits and vegetables provide health protective effects and stimulates substantial improvements in primary prevention.

### **Some Scientific facts**

According to World Health Organization (WHO) in 2008, more than 80% of the world's population relies on traditional medicine for their primary health care needs. Vegetables, fruits and their components are gaining interest because of their relatively safe status, their wide acceptance by consumers and their exploitation for potential multipurpose functional use.

Diabetes and cancer have a complex relationship that requires more clinical attention and better designed studies. Epidemiologic evidence suggests that people with diabetes are at significantly higher risk for many forms of cancer. Type 2 diabetes and cancer share many risk factors but potential biologic links between the two diseases are incompletely understood. Moreover, medications used to treat hyperglycemia may also be associated with either increased or reduced risk of cancer.

Diets high in fruits and vegetables, whole grains, legumes, olive oil, and fish are strongly associated with a reduced risk of developing type 2 diabetes. This diet can also help with blood sugar

control for people who already have diabetes. In addition, consumption of foods rich in nutrients, particularly vitamin E, vitamin C, manganese, potassium, zinc, chromium, vitamin B12, biotin can help reduce risk of the long-term consequences such as heart disease and also cancer.

**Table 1: Nutrient Requirement For Diabetic Patients**

S.no	Nutrients / minerals	Function
1	Potassium	Improve their sensitivity to insulin, and the effectiveness of the hormone, controls blood pressure.
2	Zinc	Zinc is well-known as a powerful guardian against viral infections, and may also act to protect beta cells from destruction.
3	Manganese	A key co-factor in the way enzymes within the body handle glucose metabolism.
4	Chromium	Improves glucose tolerance, lower their fasting glucose levels, decrease insulin levels and cut cholesterol and triglyceride levels, whilst increasing HDL-cholesterol levels
5	Vitamin K	Lowers the risk of cancer and diabetes, heals wound's fast.
6	Vitamin B <sub>6</sub>	Has a strong role to play in the prevention of diabetes-related complications.
7	Vitamin B <sub>12</sub>	The correct functioning of nerve cells, and therefore taking it as a supplement may help to reduce nerve damage, have a strong role to play when treating diabetic neuropathy
8	Vitamin C	Lowers the amount of sorbitol, improves glucose tolerance
9	Vitamin E	Oxygenates the blood, fight toxins and improve the activity of insulin within the body. When the body has an insufficient amount of vitamin E, internal structures can be damaged by enhanced free-radical damage, reduces the risk of diabetic complications
10	Biotin	Works in synergy with insulin in the body and independently increases the activity of the enzyme glucokinase.

**Table 2: Brief Nutritional Profile of Some Foods Having Anti-Cancer Activity**

Food item	POTASSIUM (k)	ZINC (Zn)	MANGANESE (Mn)	VIT - K	VIT B <sub>6</sub>	VIT-B <sub>12</sub>	VIT-C	VIT-E	BIOTIN
Tomatoes Sliced, raw 1 cup= 180 gm	426.60 mg	0.31 mg	0.21 mg	14.2 µg	0.14 mg	0.00	24.66	0.97 mg	7.20 µg
Olives ,black canned 1 cup= 134.40gm	10.75 mg	0.30 mg	0.03 mg	1.88 µg	0.01 mg	0.00	1.21 mg	2.22 mg	0.00
Garlic , raw 6.00 cloves 18.00gm	72.18 mg	0.21 mg	0.30 mg	0.31 µg	0.22 mg	0.00	5.62 mg	0.001 mg	0.00
Soya beans cooked 1cup=172.00gm	885.80 mg	1.98 mg	1.42 mg	33.02 µg	0.40 mg	0.00	2.92 mg	0.60 mg	0.00
Turmeric ground 2 Tsp=4.40gm	111.10 mg	0.19 mg	0.34 mg	0.54 µg	0.08 mg	0.00	1.14 mg	0.14 mg	0.00
Cauliflower, cooked 1 cup=72.00gm	176.08 mg	0.21 mg	0.16 mg	17.11 µg	0.21 mg	0.00	54.93 mg	0.09 mg	1.61 µg
Mushrooms cri mini , raw 1 cup = 72.00gm	322.56 mg	0.79 mg	0.10 mg	0.00	0.08 mg	0.07 µg	0.00	0.01 mg	0.00
Strawberries , fresh 1 cup = 144.00gm	220.32 mg	0.20 mg	0.56 mg	3.17 µg	0.07 mg	0.00	84.67 mg	0.42 mg	1.58 µg
Ginger , slices fresh 1 Tsp =6.00gm	24.90 mg	0.02 mg	0.01 mg	0.01 µg	0.01 mg	0.00	0.30 mg	0.02 mg	0.00
Oats unprocessed dry 0.25 cup = 39.00cup =5.38	167.31 mg	1.55 mg	1.92 mg	0.00	0.05mg	0.00	0.00	0.00	7.80 µg

**Table 3: List of Certain Anti-Cancer Foods and Their Role In Anti-Cancer Activity**

S.NO	FOOD NAME	COMPONENTS	EFFECTS
1	Tomatoes	Lycopene	Supports strong immune system
2	Olives	α-tocopherol hydroxyl tyrosol	Slows cancer growth
3	Garlic	Allicin	Fights with activity of cancer cells
4	cauliflower	glucosinolates	Helps to maintain nutritional status in patients receiving cancer treatment
5	Mushrooms	Lentinian	Stimulates the immune system
6	Strawberries	Ellagic acid	Slows tumor growth
7	ginger	gingerol	Acts against cancer cells, helps alleviate nausea from chemotherapy
8	Oats	Fiber-beta glucon	Acts as co-factor for more than 300 enzymes hence reduces risk of certain cancers.
9.	turmeric	cur cumin	Fights cancer cells, makes chemotherapy more effective.
10	Soya beans	Soy protein	Fights with survival and spread of cancer

As per the food processor, version 10.12.0 ESHA Research , Salem , Oregon , USA and World's healthiest foods , whfoods . Org

### CONCLUSION

Eating well-balanced meals is an essential part of taking better care of managing diabetes. Nutritional advice and information are essential for the effective management of diabetes.

According to Reuters Health reports" the new study can give people with the disease hope that through lifestyle changes, they could end up getting off medication and likely lowering their risk of diabetes-related complications,"

For diabetic patients physical activity and healthy eating can help them to:

- maintain general good health
- better blood glucose levels
- achieve target blood lipid (fat) levels
- maintain a healthy blood pressure
- maintain a healthy body weight
- prevent or slow the development of diabetes complications

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