Information Sheet 7: Cruciferous Vegetables (Brassicaceae)

Key Points

- There is increasing evidence that eating cruciferous vegetables reduces the risk of prostate cancer, particularly advanced and aggressive prostate cancer
- Examples of cruciferous vegetables:
  - Broccoli, cabbage, cauliflower, brussels sprouts
- Cruciferous vegetables are best eaten raw or after steaming or cooking at mild heats
- Eating vegetables as part of a healthy diet is beneficial to general health and well-being

Introduction

Cruciferous vegetables are a good source of nutrients and other substances which may protect against cancer. Examples of cruciferous vegetables include broccoli, cabbage, cauliflower and brussels sprouts [1].

There is evidence that consumption of cruciferous vegetables may protect against prostate cancer, especially advanced and aggressive prostate cancer [2, 3]. Furthermore, consumption of vegetables as part of a balanced diet is beneficial for general well-being and may protect against other diseases such as heart disease [4].

Common Types of Cruciferous Vegetables

- Broccoli
- Cabbage
- Cauliflower
- Brussel sprouts
- Turnips
- Bok choy
- Chinese cabbage
- Mustard
- Radish
- Watercress [2]

Nutrients in Cruciferous Vegetables

Cruciferous vegetables contain many nutrients and phytochemicals (chemicals made by plants) which have been suggested to protect against cancer. However, unique to cruciferous vegetables is their high content of glucosinolates, which are responsible for their bitter taste [2]. The potential protective effects of cruciferous vegetables against cancer are attributed to the breakdown products of glucosinolates, isothiocynates (ITC) [5].
Cooking Cruciferous Vegetables
The temperature of cooking can affect breakdown of glucosinolates to ITC. **Cooking at high heats decrease ITC release and may decrease the benefits of eating cruciferous vegetables.** On the other hand, cooking at low heats can enhance ITC release [5]. Steaming is also preferred over boiling because glucosinolates can leach into the boiling water [6]. Therefore, it is recommended to eat cruciferous vegetables raw or after mild steaming for a few minutes [2, 5].

Interactions with Theophylline
Theophylline is a drug prescribed for asthma, chronic bronchitis and emphysema. Certain drugs and foods, including cruciferous vegetables, can increase clearance of theophylline and decrease its activity. Patients with an increased clearance of theophylline require an increased dose. To keep blood concentrations of theophylline within optimal levels (within 10-20μg/mL), regular monitoring is required to adjust the dose accordingly [7].

Summary of Research
Breakdown products of glucosinolates inhibit growth and promote death of prostate cancer cells in the laboratory [2, 8]. The high content of glucosinolates and breakdown products in cruciferous vegetables highlight the potential for cruciferous vegetables to protect against prostate cancer.

There is increasing evidence that high consumption of cruciferous vegetable intake reduces the risk of prostate cancer. A recent meta-analysis combining data from 13 studies found a significant association between cruciferous vegetable intake and a reduced risk of prostate cancer [1]. In one study, this association was strongest for protection against advanced and aggressive forms of prostate cancer, particularly for broccoli and cauliflower consumption. Having ≥3 servings a week compared to <1 serving per month of broccoli or cauliflower was associated with a 45% and 52% decrease in prostate cancer risk respectively [3].

The specific effects of broccoli consumption were investigated in a study which randomly allocated men to a broccoli-rich diet or a pea-rich diet. Results found that men on the broccoli-rich diet had significant changes in molecular pathways associated inflammation and prostate cancer development [9]. These results support the notion that a diet rich in cruciferous vegetables may reduce the risk of prostate cancer.
References


