

Efficacy of Dried Cruciferous Powder

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ABSTRACT

- 11 of the 13 subjects showed positive increases of their ratios, and the three subjects with the lowest initial ratio had an average increase of 500%. The results demonstrate that dehydrated whole brassicaceae supplementation can significantly raise the 2/16 hydroxyestrogen ratio in premenopausal women.

INTRODUCTION

- This compound and the 2-hydroxylated metabolites of estrone and estradiol constitute the principal urinary products of estrogen.
- Cancer risk increases in proportion to the 2/16 ratio depression below 2.0.
- Research in this area was originally fueled by the epidemiological observation that risk of breast cancer was lowered by consumption of whole cruciferous (Brassica) vegetables.
- Phytochemicals from crucifers were found to stimulate the synthesis of the 1A1 class of cytochrome P450 enzymes (CYP1A1).
- Increased hepatic 2-hydroxylation decreases the flux of estrogens through the alternative 16- β -hydroxylation pathway in liver and extrahepatic tissues, raising the 2/16 ratio.
- A number of recent studies and meta-analyses have shown that the beneficial physiological effects of whole fruit and vegetables, including crucifers, cannot be attributed to only one component in the food. Such effects include detoxification and cancer protection.
- However, since the CYP1A1 stimulation is attributed to the presence of indoyl-3-carbinol (13C) or its active conjugate diindolylmethane (DIM), emphasis has been centered on nutritional supplements that contain only these compounds.
- Such single compound extracts may lose effectiveness through the lack of potential benefits from the entire range of natural compounds found in whole crucifers. In addition, relatively large doses of 13c may fail to undergo complete conversion to the active metabolite, DIM, especially in individuals with low stomach acid output. While the protective, anti-cancer effect of high fruit and vegetable intake has been demonstrated consistently, single nutrient supplementation has generated conflicting results.

TESTING

- 12 of the 13 subjects had 2/16 hydroxyestrogen ratios less than 2.0, the value below which cancer risk increases.

INTERVENTIONS

- Subjects took a dietary supplement that consisted of desiccated, pondered, and encapsulated organically grown Brussels sprouts and kale.
- Subjects were instructed to take the 3 capsules with meals twice daily, providing for a daily intake of 3.6 g of desiccated whole vegetables. This amount of dehydrated product corresponds to approximately 36 g of fresh vegetables.

RESULTS

- The subject with the lowest ratio of 0.32 had an almost 10-fold increase to 3.05, well above the cancer risk category cutoff of 2.0. The three subjects with the lowest initial ratios showed an average improvement of 500%.

DISCUSSION

- The risk of cancer in estrogen-sensitive tissues increases as urinary 2/16 hydroxyestrogen ratios fall below values of about 2.0.
- The current study showed that twice daily consumption of 3 capsules containing a total of 600 mg equal parts of dehydrated organic Brussels sprouts and kale for 90 days is effective for raising the 2/16 ratio in premenopausal women with initially low ratios.

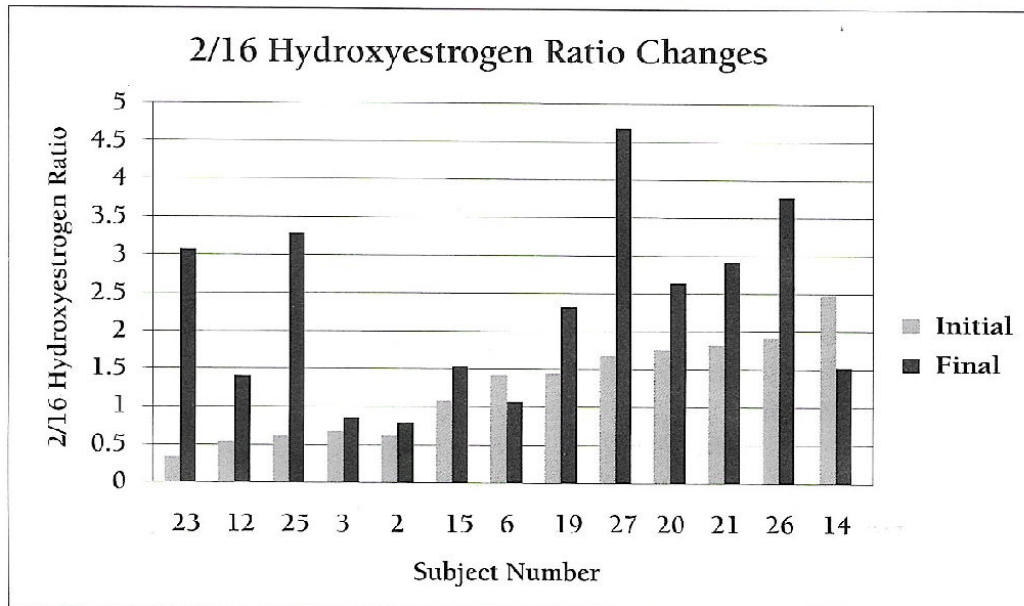


Figure 1. Shifts from initial to final 2/16 hydroxyestrogen ratios produced by cruciferous powder dietary supplements. Each line represents the initial and final 2/16 hydroxyestrogen values for one subject. The strong trend to move from lower to higher values is apparent, though 2 subjects showed final values less than their initial levels.

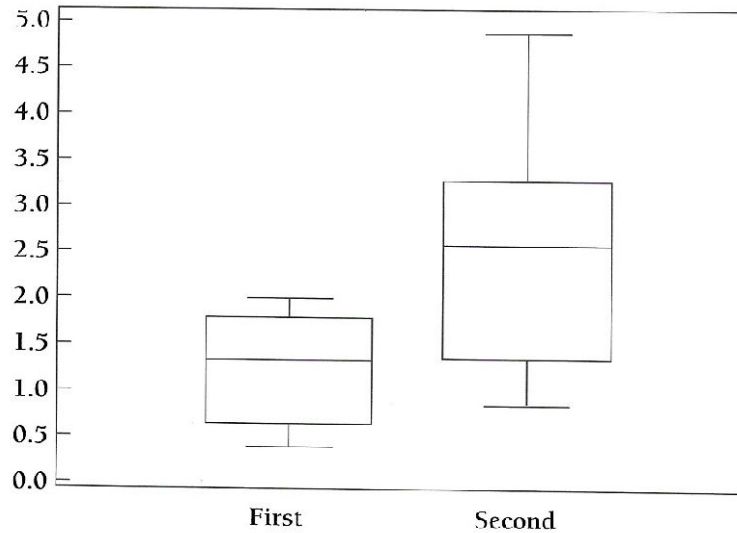


Figure 2. Means and error bars showing 95% confidence intervals from paired t-test analysis of the 13 initial and final 2/16 ratios. The two-tailed probability was 0.010, indicating statistical significance of the increase in mean values from 1.1 to 2.3. The large variability is consistent with known individually variable responses for cytochrome P450 induction.

- The finding that the 11 of the 13 subjects in this study (who reported 80% compliance with the study protocol) showed strongly positive increases in their 2/16 ratios is unexpected. Even more unexpected was the 500% average rise of ratio values found for the three subjects with the lowest initial ratios. Such results that exceed those found for concentrated 13C extracts are suspected to be due to synergistic effects of multiple phytonutrients in the whole foods on hepatic cytochrome P450 stimulation. The magnitude of hydroxyestrogen changes were comparable with those found in women treated with up to 400 mg of 13C extract, though the desiccated whole food powders are estimated to contain less than 1/100th the amount of 13C.
- These results demonstrate potential benefits from the entire range of natural compounds found in whole crucifers compared to single compound extracts, such as DIM and 13C.
- For women unable to make the dietary changes needed to increase their 2/16 ratio, the option of using a dried vegetable supplement can be effective.

CONCLUSIONS

- Use of dietary supplements containing 3/6g of dehydrated organic Brussels sprouts and kale is effective for increasing the 2/16 hydroxyestrogen ratio in premenopausal women. Individuals with the lowest ratios have the most dramatic increases.