

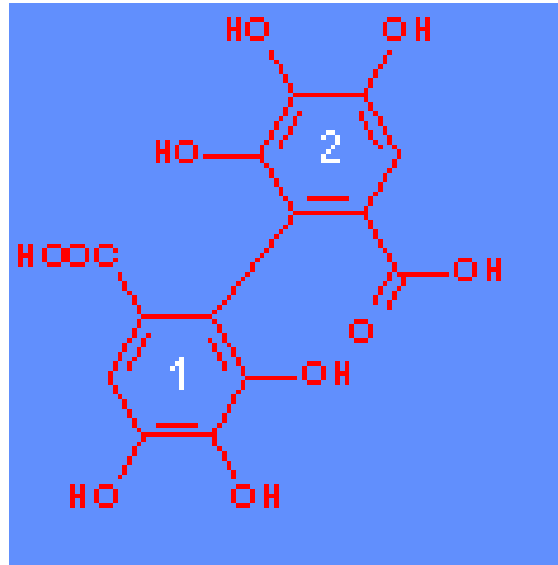


# Washington Red Raspberry Research Monograph

## Red Raspberries a Good Source of Ellagic Acid

The most promising benefit that red raspberries hold for consumers is their substantial quantity of ellagic acid. Ellagic acid is a phenolic compound that has become known as a potent anti-carcinogenic/anti-mutagenic compound. Clinical tests conducted at the Hollings Cancer Institute at the Medical University of South Carolina (MUSC) show that ellagic acid, a naturally occurring plant phenol may be the most potent way to prevent cancer, inhibit the growth of cancer cells, and arrest the growth of cancer in subjects with a genetic predisposition for the disease. Dr. Daniel Nixon, MUSC, began studying ellagic acid in 1993. His recently published results show:

- Cervical Cancer Cells - HPV (human papilloma virus) exposed to ellagic acid experienced normal cell death.
- Ellagic acid leads to G1 arrest of cancer cells, thus inhibiting and stopping cancer cell division.



- Ellagic acid prevents destruction of the P53 gene by cancer cells. P53 is regarded as the safeguard of mutagenic activity in cervical cells (Narayanan BA, 1999).
- Tests reveal similar results for breast, pancreas, esophageal, skin, colon, and prostate cancer cells.

The Meeker red raspberry is the best source of ellagic acid followed by Chilliwack and Willamette. The Meeker variety is specific to the Pacific Northwest--grown primarily for commercial use in Washington State. The Chilliwack and Willamette varieties contain lesser variations of ellagic acid. Both of these varieties are grown in the Pacific Northwest

*Ellagic Acid's Properties in Red Raspberries*

and may be found in lesser volumes outside the United States.

### How does ellagic acid work?

Ellagic acid acts as a scavenger to "bind" cancer-causing chemicals, making them inactive. It inhibits the ability of other chemicals to cause mutations in bacteria. In addition, ellagic acid from red raspberries prevents binding of carcinogens to DNA, and reduces the incidence of cancer in cultured human cells exposed to carcinogens.

### Red Raspberries in Food

Red raspberries are seeing increased use by consumers and manufacturers due to their high concentrations of ellagic acid. As consumers increase their consumption of nutritional beverages and cereal-based bars, red raspberries are being used to add sweetness, color, flavor and beneficial acids.

Red raspberries have made their way into a wide variety of functional foods because of

the nutritional, functional and technical advantages they provide manufacturers. Red raspberries are sold fresh, IQF, block frozen, frozen puree, and in various levels of concentrations of juice and purees. The

**Ellagic acid** (milligrams/g dry weight)

Variety Fruit	Seeds	Pulp	Whole
Meeker	8.40	3.36	4.31
Chilliwack	7.78	2.58	3.39
Willamette	8.13	2.05	2.91
Average	8.10	2.66	3.54

many forms in which red raspberries can be used offer manufacturers a great deal of flexibility in new product formulation. Also, given today's leading market trends for health, nutrition, convenience and natural ingredients, red raspberries match market demands on several levels.

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