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Black raspberries to fight colon cancer

02/05/2002 - **Black raspberries are rich in antioxidants, and could be a powerful new tool in the fight against cancer.**

Gary Stoner, professor of public health at Ohio State University, and a team of researchers compared the antioxidant properties of black raspberries with those of blueberries and strawberries, two fruits which are also thought to help fight cancer. Black raspberries prevailed in the comparison by as much as 40 per cent.

"We were surprised by how much difference there was between the antioxidant activity of the raspberries compared to the other fruits," Stoner said.

The research appears in the current issue of the journal *Nutrition and Cancer*.

Rats were injected with azoxymethane (AOM), a carcinogen that causes colon tumours. After two weeks of exposure to AOM, the animals were placed into four groups and fed diets mixed with 0, 2.5, 5 or 10 per cent freeze-dried black raspberries. Two additional groups of rats, which did not receive AOM, served as controls. The two latter groups were fed a diet containing 0 or 5 per cent freeze-dried black raspberries respectively.

Nine weeks after the final injection of AOM, researchers looked for the development of tiny lesions in the colon called aberrant crypt foci (ACF). Although ACF rarely occur in humans, the lesions can develop into polyps in rats. In humans, polyps are benign masses of tissue which, if left untreated, could develop into malignant tumours.

Every rat injected with the carcinogen AOM developed the ACF lesions. While most of these lesions go away on their own, Stoner said, some may eventually develop into malignant tumours. In rats fed diets supplemented with black raspberries, the number of malignant tumours seemed to correspond with the amount of freeze-dried berries fed to a rat - the more berries a rat ate, the fewer tumours it had.

At the end of the study, the prevalence of adenocarcinomas or malignant tumours was reduced by 80 per cent in the rats that ate the most black raspberries in their diets.



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Adenocarcinomas were reduced by 28 and 35 per cent respectively in the groups eating diets of 2.5 and 5 per cent black raspberries. This reduction is based on the average number of tumours found in rats that had been injected with AOM and fed a berry-free diet.

The tumours were smaller in the rats that ate freeze-dried berries - diets of 2.5, 5 and 10 per cent yielded reductions in tumour size of 28, 42 and 75 per cent respectively when compared to the animals not fed the berries.

The researchers also measured urinary levels of 8-OHdG - a compound that is related to the degree of oxidative damage in the body. The process of oxidation produces free radicals, which can damage cell as well as genetic material. Free radicals are thought to play a role in the onset of cancer.

Berries reduced the level of 8-OHdG in the urine by 73, 81 and 83 per cent in the 2.5, 5 and 10 per cent berry diets respectively. *"This suggests that berries bind up a good portion of free radicals, preventing them from causing damage in the body,"* Stoner said.

In addition to measuring the levels of some of these chemopreventive compounds, Stoner and his colleagues compared the antioxidant activity of the black raspberries to that of strawberries and blueberries. Previous studies suggested that these two fruits had antioxidant activity superior to that of other fruits, but researchers had not studied black raspberries.

Using a device that measured each fruit's ability to absorb free radicals, the researchers found that black raspberries topped the charts: these berries exhibited 11 per cent more antioxidant activity than did blueberries and 40 per cent more than strawberries.

One reason for the raspberries' seemingly stellar health advantage may be their richness in compounds such as anthocyanins, which give berries their almost-black pigment; phenols, such as ellagic, coumaric and ferulic acid; calcium; and vitamins such as A, C, E and folic acid. All of these substances are known chemopreventive agents, Stoner said.

Fresh black raspberries are undoubtedly beneficial, but they are also expensive and can be hard to come by. Freeze-dried berries have as much nutritional content as fresh berries do, but the freeze-dried version is not readily available to consumers, Stoner said.

"The results of this study would translate in humans to eating two large bowls of fresh black raspberries each day," he said. *"That may seem a bit extreme. People need to know that these animals are given whopping doses of a carcinogen. It's conceivable that a much lower dose would be effective in humans."* The research was supported in part by a grant from the Ohio Department of Agriculture.

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