Grapefruit juice gets anti-cancer fillip

By Stephen Daniells

25/10/2007- **Grapefruit juice and its active components, furocoumarins, may inhibit cytochrome P450 enzymes involved in the activation of compounds into cancer-causing compounds, suggests new research from the US.**

Researchers from Texas A&M University report that extracts from grapefruit juice could inhibit the enzymes at concentrations of 25 per cent or lower,

"Grapefruit juice bioactive components may act as potent inhibitors of cytochrome P450 enzymes that are involved in activation procarcinogen to carcinogen," wrote the authors in the *Journal of Food Science*.

"This represents a unique mechanism in the anticarcinogenesis strategy, part of which includes reducing the generation of reactive oxygen species."

Grapefruit contain flavonoids, which have received much attention because of their ability to scavenge free radicals. Recently, American and Chinese researchers reported that one specific flavonoid, naringenin, has anti-cancer effects beyond that of an antioxidant (*Journal of Nutritional Biochemistry*, Vol. 17, pp. 89-95).

Another study from Israeli scientists reported that eating a red grapefruit daily could lower blood cholesterol by 15 per cent (*Journal of Agricultural and Food Chemistry*, doi:10.1021/jf058171g).

The new study investigated the effects of grapefruit and its active components on the activity of different enzymes in the cytochrome P450 group. These enzymes are involved in the metabolism and detoxification of many environmental carcinogens, fatty acids, fat soluble vitamins, and 60 per cent of currently-marketed drugs, stated the researchers.

Lead researcher B.S. Patel and co-workers looked at the enzyme inhibiting effects of seven different grapefruit and pummelo juices, in addition to five furocoumarins isolated from grapefruit juice - paradisin A, dihydroxybergamottin, bergamottin, bergaptol, and geranylcoumarin.

They report that both juices inhibited cytochrome CYP3A4 and CYP2C9 isoenzymes at a concentration of 25 per cent, while inhibition of the CYP2D6 isoenzyme was less at all the concentrations tested.

Moreover, paradisin A was reported to be the most active inhibitor amongst the furocoumarins. This was followed by dihydroxybergamottin, bergamottin, bergaptol, and geranylcoumarin, respectively.

"Inhibition of cytochrome P450 enzymes by grapefruit juices and its furocoumarins offers some clinical advantages in improving bioavailability of poorly absorbed drugs and reduce the dose requirements and ultimately reducing the cost and harnessing the health benefits of consuming grapefruit juice," stated the researchers.

Roughly two-thirds of the world's grapefruit and grapefruit juice hail from Florida.

Source: *Journal of Food Science*
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"Potent Inhibition of Human Cytochrome P450 3A4, 2D6, and 2C9 Isoenzymes by Grapefruit Juice and Its Furocoumarins"
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