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## Citrus extracts get cholesterol-lowering boost

By Stephen Daniells

26/03/2007- **Hesperidin and naringin, compounds found in oranges and grapefruit, cut cholesterol levels by about 25 per cent in lab animals, says a study that may boost interest in these citrus flavonones.**

*"It was shown [for the first time] that supplementation of diets with both flavonones which were fed by intubation, similar to the method by which humans consume original orange juice, alters cholesterol and antioxidant status when rats are fed a diet high in cholesterol,"* wrote lead author Shela Gorinstein in the *Journal of the Science of Food and Agriculture*.

High cholesterol levels have a long association with many diseases, particularly cardiovascular disease (CVD), the cause of almost 50 per cent of deaths in Europe, and reported to cost the EU economy an estimated €169bn (\$202bn) per year.

The new study, by researchers from Israel, Korea, and Poland, randomly assigned 60 male Wistar rats to one of six diet groups: one group was fed a normal diet (control) while the other five groups consumed the normal diet plus supplements of hesperidin (0.1 mg dissolved in 1 mL water), naringin (0.46 mg per mL), cholesterol (one per cent, non-oxidised cholesterol), hesperidin plus cholesterol, or naringin plus cholesterol.

Both flavonones were found to increase the antioxidant status of the supplemented animals, with the greater antioxidant activity found for hesperidin, with a Trolox equivalent antioxidant capacity (TEAC) of 0.99, compared to 0.32 for naringin.

*"It was found that the antioxidant potential of hesperidin was higher than naringin,"* said Gorinstein.

After 30 days of consuming the diets, both flavonones were found to significantly hinder cholesterol increases as a result of the high-cholesterol diet, while no effect on cholesterol levels was observed between the control and hesperidin/ naringin-only diets.

Indeed, rats consuming the hesperidin/ naringin plus cholesterol diets had total cholesterol levels about 16 per cent lower than rats consuming high-cholesterol-only diet. LDL-cholesterol levels were also reduced by about 27 per cent for high-cholesterol diets supplemented with the flavonones, compared to rats consuming high-cholesterol-only diet.

No differences in weight gain, feed consumption or feed efficiency were observed between the diets.

*"In conclusion, diets supplemented with hesperidin and naringin significantly hindered the increase in plasma lipid levels caused by cholesterol feeding,"* wrote the researchers. *"Hesperidin and naringin, bioactive compounds of citrus fruits, are powerful plasma lipid lowering and plasma antioxidant activity increasing flavonones."*

The mechanism behind the effects was proposed to be due to the activity of the flavonones on lipopolysaccharide (LPS)-induced nitric oxide production in macrophages.

Commenting independently on the research, David Bender, from the Royal Free and University College Medical School, London, told *Chemistry & Industry* magazine: *"This is potentially beneficial to health with regards to heart disease."*

The *Chemistry & Industry* article, by Casey Gauthier, also quotes Shilpee Mehrotra from Innocent Drinks. *"We are very excited by this recent research. Any evidence that further strengthens the fact fruit can help protect against disease is hugely important."*

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*"Effect of hesperidin and naringin on the plasma lipid profile and plasma antioxidant activity in rats fed a cholesterol-containing diet"*

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*"Citrus promotes healthy hearts"*

Author: C. Gauthier

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