

# The Effect of Safflower Oil on the Nature of Serum Cholesterol Esters

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MANY investigators have reported that when vegetable oils rich in essential fatty acids are administered to subjects with hypercholesterolemia, they cause a decrease in serum cholesterol levels. Usually, the vegetable fat is given as the sole source of fat in a diet with carefully controlled concentrations of other nutrients. The purpose of this investigation was to determine whether safflower oil, a vegetable oil containing high concentrations of essential fatty acids, would still be effective in reducing serum cholesterol levels if given to hypercholesterolemic patients as a supplement to their usual diets and, if so, to find out how soon this effect could be achieved, whether relatively small doses of the oil could be used with any success, and whether a decrease in serum cholesterol concentration was accompanied by an increase in unsaturation of the fatty acids contained in the cholesterol esters.

## MATERIAL AND METHODS

Eight ambulatory, male patients with hypercholesterolemia, from the Veterans Administration Center, Los Angeles, were selected. Their serum cholesterol levels were measured during a control period at which time they were fed usual hospital rations. At the termination of the control period, a safflower oil supplement was administered orally three times daily after meals. The amount of the dose and the experimental period was varied. In the first series of experiments 7.5 ml. per dose (a total

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TABLE I  
Relationship Between Plasma Cholesterol Levels and Iodine Value of Cholesterol Ester Fatty Acids

Control Diet		Safflower Oil Diet	
Cholesterol (mg. %)	Iodine Value	Cholesterol (mg. %)	Iodine Value
<i>Patient H. S.</i>			
354	...	272	188
373	104	245	186
323	124	...	...
<i>Patient R. B.</i>			
290	...	291	184
286	108	288	124
289	112	...	...
<i>Patient H. B.</i>			
345	...	259	184
355	...	310	146
318	114	...	...
<i>Patient M. C.</i>			
267	143	251	158
264	124	267	184
271	160	...	...
<i>Patient F. W.</i>			
258	100	253	170
254	140	256	161
270	156	...	...
<i>Patient D. R.</i>			
273	123	217	156
260	113	...	...
<i>Patient E. C.</i>			
488	97	414	155
425	116	...	...
<i>Patient A. A.</i>			
297	129	272	119
260	113	...	...

of 22.5 ml. or approximately 21 gm.) was given during the first period of supplementation. Thereafter, the dose was decreased to 5 ml. three times per day after meals. Each experimental period lasting from two to four weeks was preceded by and then followed by a control period of two to four weeks during which supplementation was discontinued. Blood was drawn from the patients at the termination of each experimental and control period.

Plasma cholesterol determinations were made and the cholesterol esters were separated from the other lipid components of the blood by silicic acid chromatography. The cholesterol esters were eluted, saponified to obtain the fatty acids, and iodine values were determined on the mixed fatty acids.

#### RESULTS

The results are shown in Table I.

#### SUMMARY

A decrease in serum cholesterol levels was achieved in half the patients receiving the

safflower oil supplements. In these patients, a return to unsupplemented hospital rations was accompanied by an increase in the serum cholesterol level. Attempts to correlate this decrease in serum cholesterol level with an increase in unsaturation of the cholesterol ester fatty acids were unsuccessful in that the iodine value of the fatty acids was increased after safflower oil supplementation even when the serum cholesterol levels were unaffected (Table I). It is possible that a longer experimental period with larger supplements of safflower oil might have showed more positive results. However, a response of 50 per cent is better than would be expected if this were entirely due to chance. It can be concluded that relatively small amounts of safflower oil, when supplemented to an ordinary diet, are effective in decreasing serum cholesterol levels in some persons in relatively short periods of time. Whether a positive response to this therapy is dependent on the essential fatty acid stores and/or requirement of a patient has not been shown in this investigation.

