

## Cholesterol study shows algal extracts may counter effects of high fat diets

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Health Enhancement Products, Inc., in conjunction with Wayne State University's Department of Nutrition and Food Science in the College of Liberal Arts and Sciences, announces the publication of a scientific article in the *Journal of Nutrition & Metabolism*, "ProAlgaZyme sub-fraction improves the lipoprotein profile of hypercholesterolemic hamsters, while inhibiting production of betaine, carnitine, and choline metabolites."

The paper describes the beneficial effects of the Company's proprietary algal culture in supporting healthy [cholesterol](#) balance. The fractions and isolates derived from the Company's proprietary algae culture "PAZ" (formerly referred to as "ProAlgaZyme") were shown to be a viable candidate for supporting healthy cholesterol balance, in sharp contrast to the control group. The project, led by Smiti Gupta, Ph.D., associate professor of [nutrition](#) and [food science](#) at Wayne State University, involved monitoring lipid metabolism in a widely accepted animal model for investigating human lipid metabolism. The scientific paper describes a follow-up study to the original research conducted by Gupta. In the previous study, published in 2012, the test group consumed algal-infused water while simultaneously consuming a high fat diet. The algal fractions and isolates were shown to have a preventative beneficial effect against the negative effects of the high-fat diet on the animal's plasma cholesterol levels. Specifically, the extracts significantly increased high density lipoprotein cholesterol (HDL-C, aka "good" cholesterol), and reduced non-HDL cholesterol ("bad" cholesterol) and the ratio of total cholesterol/HDL-C, despite the ongoing consumption of high fat food.

The test subjects in the recent study consumed a high fat diet for four weeks, at which point they became hypercholesterolemic (i.e. they had high plasma cholesterol levels.). Subsequently, the animals were given the extracts for 0 (untreated), 3, 7, 10, 14, and 21 days while still on the high fat diet. The results indicated that the PAZ extracts may be a useful option for improving the plasma cholesterol profile despite the hypercholesterolemic state induced by a high fat diet.

Specifically, "bad" cholesterol concentrations significantly decreased in all subjects consuming the PAZ extracts, compared to those who were not treated. Furthermore, increased levels of "good" cholesterol could be seen as early as Day Three for that same group. By Day 21, "good" cholesterol levels increased by 28% and "bad" [cholesterol levels](#) decreased by 30%.

Additionally, metabolomics analysis was conducted to analyze the concentration of certain metabolites (small molecules which are byproducts of normal metabolic functions) in the blood. Administering the PAZ extract correlated with significantly decreased levels of several metabolites that are independent predictors of increased risk of atherosclerosis and cardiovascular disease.

Gene expression analysis was also conducted, to get a deeper insight into the increase in plasma HDL-c levels. Thus the expression levels (mRNA) of proteins involved in HDL-c metabolism were evaluated. By Day Ten, subjects showed a threefold increase in the gene expression of APO A1, a major protein associated with the production of HDL particles, the "good" cholesterol which increased sixfold by Day 21.

"To put this in perspective, the benefit of raising HDL can be explained by examining how these "good" cholesterol particles function: They play a key role in removing excess cholesterol from cell storage and transporting that cholesterol to the liver for excretion from the body,"

said Amy Steffek, Ph.D., HEPI Director of Research & Development. "They also have other properties that promote and protect cardiovascular health, and serve as an independent predictor of cardiovascular risk. To simplify, one can lower risk of cardiovascular disease by increasing levels of HDL cholesterol. Given that cardiovascular disease is a leading cause of death in the US and other industrialized nations, the effects of our algal extracts in improving "good" cholesterol, and therefore cardiovascular health, are significant and potentially wide-reaching. Whether the relationship between our bioactive extracts and increased HDL cholesterol is causal or correlative, the studies conducted show an improved metabolic state, despite the continuation of a high fat diet."

Provided by Wayne State University

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