

## **Flaxseed for Heart Healthy Nutrition**

The use of flaxseed in food and beverages, functional foods and dietary supplements has risen dramatically. This is related to the increasingly recognized benefits flax's rich omega-3 fatty acid content, lignans (powerful phytonutrient phytoestrogens/antioxidants) and fiber content.

A typical flax profile is approximately 40% fat, being mostly omega-3 as alpha linolenic acid (ALA); 28% dietary fiber, 21% protein, 4% mineral ash and 6% carbohydrates.<sup>1</sup>

To get an idea how omega-3 ALA rich flaxseed is compared to other ALA rich foods the following should be instructive.

One and a half tsp. of ground flaxseed supplies 1,000 mg of ALA in 40 calories. One half of flaxseed oil supplies the same 1,000 mg ALA in 20 calories.

To get the same 1,000 mg of ALA the following amounts of other sources is needed:

- Five walnut halves, providing 70 calories;
- two tsp. canola oil garnering 80 calories;
- one tbs. of wheat germ or soybean oil with 120 calories;
- Salmon, herring, albacore, two ounces of sardine, rainbow trout, or eel adding 100 calories;
- 9 - 12 ounces of most other fish adding 300 calories or more; 5 cups cooked broccoli providing 220 calories;
- 10 cups cooked spinach with 280 calories;
- ¾ cup soy nuts adding 285 calories and
- ¼ cup rice bran oil tipping the scales at 480 calories.<sup>2</sup>

And all the above plant sources are richer in omega 6 than omega 3, none having flax's most desirable 3 to 1 omega-3 to omega-6 ratio.<sup>3</sup>

## **ALA, EPA, DHA**

ALA is converted in the body to eicosapentaenoic acid (EPA) and, to a much lesser extent, docosahexaenoic acid (DHA).<sup>4,5</sup> EPA and DHA as such are found abundantly in fish oil. Both of these longer chains omega 3 fatty acids are known for their salubrious effects are cardio-vascular health.<sup>6</sup> However, flaxseed has impressive support for its heart health promoting benefits as well.

## **ALA Improves Heart Health**

Below is a small list of scientific studies supporting the benefit of a high ALA diet derived from plant sources.

-Supplementation with 8 g/ day ALA resulted in significantly lower systolic and diastolic blood pressure levels. There was observed a hypotensive effect of ALA, which may constitute another mechanism accounting in part for the apparent cardio-protective effect of this n-3 fatty acid.<sup>7</sup>

- To compare the effects of ALA to EPA + DHA on cardiovascular risk markers in healthy elderly subjects a randomized double-blind nutritional intervention study was done on 37 mildly hyper-cholesterolemic subjects (14 men and 23 women aged between 60 and 78 years.) During a run-in period of 3 weeks, subjects consumed an omega 6, oleic acid-rich (LN) diet. The following 6 weeks, 10 subjects remained on the control diet, 13 subjects consumed an ALA-rich diet (6.8 g/day) and 14 subjects an EPA/DHA-rich diet (1.05 g EPA/day+0.55 g DHA/day). The researches concluded in the European Journal of Clinical Nutrition that in healthy elderly subjects ALA might affect concentrations of LDL-cholesterol and apoB more favorably than EPA/DHA.<sup>8</sup>

-The Health Professionals Follow-up Study reported in the British Medical Journal a 1% increase in ALA as a percent of total calories was associated with a 40% risk reduction in non-fatal coronary heart disease.<sup>9</sup>

- A 2001 article in the Journal of Nutrition Health and Aging noted that both Crete and Japan have the greatest life expectancy among the peoples of the first world. They also enjoy the highest levels of dietary ALA and the lowest intakes of saturated fat<sup>10</sup>.

-The Lyon Diet Heart Study included as participants those patients who had survived a myocardial infarction (MI). The experimental group consumed a typical Mediterranean-style diet rich in ALA. The controls enjoyed diet low in ALA, typical of the Standard American Diet (S.A.D.). Those experimental ALA group had a 75% reduction in non-fatal myocardial infarctions, and a 70% reduction in death from all causes compared to the S.A.D. group.<sup>11</sup>

A number of studies have focused on the health benefits provided specifically by flax.

- Women who consumed 50g of milled flax a day (1/8 cup) for four weeks garnered total blood and LDL-cholesterol level reductions of 9% and 18%, respectively.<sup>12</sup>

- the Journal of Nutrition reported in 2004 that two ways that ALA may protect the heart are through (1) improvements in abnormal heart rhythms and (2) a reduction of blood platelet stickiness and resultant.<sup>13</sup>

- Also in 2004 data from the Nurses Health Study demonstrated the higher the ALA intake the lower the plasma concentrations of CRP.<sup>14</sup> The year following the European Journal of Clinical Nutrition reported that a diet high in ALA dramatically decreased CRP in men and women with high cholesterol levels.<sup>15</sup> In 2005 the American Heart Association presented studies showing ALA lowers C-reactive protein (CRP), an ever more important biomarker of inflammation.

-Indeed, lowering C-reactive protein may be as important as reducing LDL cholesterol for heart attacks and stroke prevention.<sup>16</sup> Fifty percent of all strokes and MI in the United States and Canada happen to persons with normal cholesterol finding. Twenty percent of all major cardio vascular events happen to folks with no major risk factors!<sup>17</sup>

- Even more recently, the American Journal of Physiology Heart and Physiology Circulation shared that in rabbits with hypercholesterolemia dietary flaxseed inhibited vascular contraction and atherosclerosis formation.<sup>18</sup>

- Lanzmann and Petithory in a review of studies focusing on flax and ALA concluded that this ALA rich essential fatty acid (EFA) source may reduce ventricular fibrillation.<sup>19</sup>

- The above research is leading to a consensus that flaxseed has very beneficial effects in the prevention of cardiovascular disease.<sup>20,21</sup> It is apparent even from this briefest of introductory reviews that the cardio-protective benefits of a flaxseed rich diet comes from numerous salubrious mechanisms. And this research also these many benefits despite differences in study populations, length of follow-up, outcomes, and methods of statistically analyzing the study data.

### **ALA RDA?**

At the present time, there is no Recommended Dietary Allowance (RDA) for EFAs in the U.S. However, the National Academy of Sciences' Institute of Medicine (IOM) recommends 1.6g/day of ALA for men and 1.1g/day for women.<sup>22</sup>

### **Excellent Source of Dietary Fiber**

Numerous health benefits are derived from consuming ALA in flax. Not to be overlooked is flaxseeds' dietary fiber content of about 28% grants added health benefits. The American Dietetic Association has cited fiber's "significant impact" on obesity, cardiovascular disease and type 2 diabetes prevention and management.<sup>23</sup>

Flax has a ratio of soluble to insoluble fiber that can vary in a ratio of between 1 part *soluble* to 4 parts *insoluble* to 4 parts to 6 parts respectively.<sup>24</sup> Insoluble dietary fiber supports healthy elimination and colon health, and may even have protective effects against colon cancer.<sup>25</sup> The soluble dietary fiber fraction of flax is found primarily as mucilage gums, which have been shown to play a role in lowering serum cholesterol levels.<sup>26</sup>

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