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Coconut Oil: is it Healthy or not as Healthy as we Think?

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Abstract

Coconut oil has recently emerged as a heart healthy oil and addition to a balanced, nutritious diet. To some degree, coconut oil has become a fad in the form of "superfood." However, the field of Nutrition itself is still relatively new, and not all claims associated with coconut oil and heart health has been fully studied. There is still a necessary review of the effects of this oil in the body required from both biological and chemical perspectives. The following mini-review seeks to gather the currently available information on coconut oil as researched by other scientists to potentially clear up the controversy related to whether coconut oil is heart healthy or not.

Keyword: Heart Health; MCT; Saturated Fat; lauric acid; coconut oil; cholesterol

Abbrevations: US: United States; CVD: Cardiovascular Disease; MCT: Medium-Chain Triglyceride; MCFA: Medium Chain Fatty Acid; LCFA: Long Chain Fatty Acid; SFA: Saturated Fatty Acid; LDL-c: low density lipoprotein; HDL-c: High Density Lipoprotein; TG: triglyceride; CHD: Coronary Heart Disease; TC: Total Cholesterol

Introduction

Over one-third of the United States (U.S.) adult population is considered to be obese [1]. Additionally, the number of U.S. adults who are classified as either overweight or obese has continually increased over the past two decades [1]. Cardiovascular disease (CVD) is the leading cause of all-cause mortality in both men and women in the U.S. [2]. Modifiable risk factors for CVD include being overweight or obese, sedentary lifestyle and poor diet (e.g., a diet high in saturated fat, added sugar and low in fiber). In recent years, coconut oil has emerged as the heart healthy alternative to butter. Researchers also described coconut oil with antibacterial and antifungal properties when used as a topical treatment on human skin and hair [3]. The anecdotal claims for heart health are largely based on research studies using medium-chain triglycerides (MCT) oils [4]. However, the chemical structure and metabolism of coconut oil is different and can not be equated to MCT oils [5]. Therefore, the purpose of the mini-review is to examine the chemical composition of coconut oil in relation to human metabolism, weight loss, and heart disease.

Discussion

Chemical composition and metabolism of coconut oil

The chemical composition of coconut oil shows ca. of 92% saturation with 70% as medium-chain fatty acids (MCFA) (45-56% lauric acid C 12:0; 5-7% capric acid 10:0; 5-9% caprylic acid C 8:0; 0-1% caproic acid C 6:0) [5-7]. Chemically MCFA are defined as a carbon chain length of 6 to 12, whereas long chain fatty acids (LCFA) are a chain length of 12 or more. The length of the carbon chains dictates the fatty acid's role in metabolism in the human body. Digestion of MCFA begins in the mouth with salivary lipases and continues with gastric juices of the stomach, without assistance from the pancreatic fat-digesting enzymes. MCFA are absorbed from the intestines into portal vein and then transported to the liver and can be utilized for metabolism usually in the form of ketone bodies. In contrast, digestion of LCFA involves pancreatic lipases. LCFA form lipoproteins in the small intestine. Thus, allowing direct entry into the bloodstream via the lymphatic system and mostly bypassing the liver. While these lipoproteins travel in the blood, the fatty components (cholesterol and saturated fatty acids- SFA) will accumulate in the tissues of the body contributing to the fat stores, thus increasing the risk of chronic diseases (hypertension, cardiovascular disease, obesity). These risks are not common among MCFA since they are not easily esterified and resist binding making them less likely to contribute to the fat storage [8]. The distinction between the MCFA and LCFA is important in the metabolic conversion because instead the energy generated by MCFA is specifically converted into fuel for immediate use by the organs and muscles in the body.

Coconut oil, weight loss, and cardiovascular disease

In the past five years, a systematic review was published examine the relationship of coconut oil consumption and cardiovascular disease [5]. Cardiovascular risk factors

examined include but are not limited to low-density lipoprotein, LDL-c; high-density lipoprotein, HDL-c, and triglycerides, TG. The blood lipid results of the of seven intervention studies reviewed found coconut oil when compared to cis-unsaturated oils (e.g., vegetable oils) significantly raised LDL-c in six of the trials reviewed; raised HDL-c in five of the reviewed trials; with no significant difference in TG levels in five of the studies. Observational studies on populations whose native diet including high consumption of coconut products (not just coconut oil) showed no relationship to an increased risk of cardiovascular disease. One such study, examined coconut consumption and cardiovascular deaths using population data in Sri Lanka [9]. No relationship was found between coconut consumption and increase CVD risk. Similar results were found in another population-based study, which statistically evaluated the relationship between population consumption data for total fats, SFA and unsaturated fat and coronary heart disease (CHD) and CVD mortality data from twelve countries [7].

Three recently published randomized control trials examining the relationship of coconut oil on heart health had equivocal results [10-12]. The first study allocated 114 CHD patients to either coconut oil (n=92) or diet (n=22) for a three-month dietary intervention [10]. The coconut oil group was given 13mL of coconut oil to consume daily for three months; the diet group maintains usual intake. The coconut oil group significantly increased HDL-c and reduced waist circumference in CHD patients. However, the study failed to report dietary intake and if patients were consuming coconut products other than the 13mL given for the study. Along with the failure of randomized patients, this may have lead to bias in the results. In another randomized study comparing coconut oil consumption to sunflower oil on CVD risk factors in patients with CHD, found no change in lipid profiles over time or between groups [11]. The third study examined the impact of virgin coconut oil on CVD risk factors in twelve postmenopausal women compared to safflower oil using a randomized crossover design [12]. The women consumed 30mL of either oil for 28-days with a 28-day washout between oils. The women significantly increased their total cholesterol, LDL-c, and HDL-c during the 28-days with coconut oil consumption and compared to the safflower oil consumption period with no change in body composition. The study results were similar to the findings of the previous studies reviewed [5].

Conclusion

Coconut oil consumption shows to have some health benefits. However, consuming coconut oil may not reduce one's risk for cardiovascular disease and obesity. Variance in extraction methods, daily intake, and metabolic processes in the body still present controversy. The exact metabolic pathway of coconut oil is still unclear as to whether it follows the pathways of an MCFA or LCFA. Lauric acid, which is the fatty acid that is found in the greatest amounts in this oil, likely dictates the metabolic process of this oil. Presenting some beneficial factors to health. Further research should be conducted to determine the breakdown of lauric acid and further study the impact coconut oil has on human health.

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