

## AN ANALYSIS OF HEALTH BENEFITS OF ALMONDS

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**DOI:10.5958/2249-7137.2021.02585.4**

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### ABSTRACT

*Almonds are highly rich in vitamin E, copper manganese, fiber magnesium, phosphorus, monounsaturated fatty acids, & riboflavin protein, among or nutrients. Despite fact that almost half of an weight of almond is fat, daily intakes of 7 grams of this tree nut decrease LDL cholesterol content by 1%, particularly when combined with diets advised by National Cholesterol Education Program. Consumption of almonds on a regular basis does not cause weight gain, & its inclusion in low-calorie diets seems for promoting greater weight reduction compared to diet depending upon carbohydrate low-calorie. Almonds have lower glycemic index & have no negative effects on sensitivity of insulin. Almond is good source of bioavailable - tocopherol, & eating more of m increases LDL's resistance to oxidation. Furrmore, polyphenolic components of almonds have recently studied & shown to have antioxidant properties. While advantages of almonds for cardiachealth & obesity-related illnesses seem to be promising, allergic reactions in sensitive people may be a problem. More study is needed to get a better knowledge of function of bioavailability & bio-accessibility of almond components, along with synergy between m, in health consequences associated with m.*

**KEYWORDS:**Almonds, Cholesterol, Food, Nutrient, Vitamin.

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### 1. INTRODUCTION

With demographic & epidemiological imperative of an ageing society, re is an underst&able focus presently in food& agricultural production industry on manufacturing stuff that can be categorised with promoting health & chronic illness preventative measures claims, such as adding vegetation stanols/sterols in margarines & orange juice for aid in reduction of serum cholesterol & risk for heart disease. Furrmore, producers of natural foods high in one component are increasingly attempting to connect that ingredient to health advantages, such as presence of lycopene in tomatoes being linked to prostate cancer protection (1).

However, many studies have shown that in order to have a true effect on health, many distinct dietary variables must not only converge, but also interact in a dynamic manner. Despite some deceptive marketing attempts to promote particular "superfoods," humans might become able for glean instructions related to food. Although most studies indicate almonds' potential

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cardiac advantages are due to its high concentration of monounsaturated fats, its nutritional profile implies that additional bioactive components may also influence heart disease, along with other health outcomes including cancer & diabetes. However, even when assessing a food's health advantages, its possible negative consequences, such as allergic potential, must be taken into account (2).

California's almond manufacturing has almost doubled in the last 20 years, possibly due to consumer awareness of health benefits of almonds, they are leading agronomic product, with 6000 growers cultivating greater than 500,000 acres & over 30 major varieties for supply 80 percent of global market for this tree nut. This paper investigated how nutritional composition of almonds, with components acting independently & in synergy with one another or in conjunction with other foods, may contribute to health reimbursements connected with everyday consumption (3).

Almonds are a nutrient-dense food, & significant research over the past decade has connected almond consumption habits to a lower risk of chronic illnesses including coronary heart disease (CHD) & type 2 diabetes, along with weight management & control. Almonds, for example, have a staple of humanity's diet since pre-agricultural times, & its popularity has only grown in recent years, whether as snacks or as part of a meal. Almonds may be consumed whole (fresh or roasted), as spreads such as almond butter, or incorporated in a variety of culinary items & recipes. Almonds have complex food matrices that include a variety of nutrients & phyto protective compounds that have a positive impact on human health. All nuts are rich in calories & contain a lot of fat, though most of it is unsaturated. However, there is still some scepticism regarding nut intake recommendations, along with lack of knowledge & awareness of how nuts may fit into a well-balanced diet. The linked article emphasises that almonds are a great source of several vital nutrients, which include vitamin E & several essential minerals, that there is substantial evidence that almonds lessen plasma levels of cholesterol & other risk factors for heart disease, & that scientific proof is arising that almonds might well perform a factor in maintaining weight (4).

## **1.1 Almond Nutrient Composition:**

Almond is nutrient-dense food that provides tremendous source (i.e. >20 percent DV) of vitamin E (36.4 percent) & manganese in a typical 28 g serving (as percent of US Daily Value or DV) according to US Food & Drug Administration (FDA) (36.0 percent). Almonds are also a rich source of magnesium (19.5 percent), copper (16.0 percent), phosphorus (13.4 percent), fiber (13.2 percent, with insoluble/soluble fiber in a 4:1 ratio), riboflavin (13.5 percent), & protein (12.1%). Furthermore, almond proteins have a high arginine content & are easily digestible. Almonds' 164 calories come mostly from its fat content (49.4 percent of weight), but it's worth noting that monounsaturated fatty acids account for majority (67 percent) (MUFA). Almonds contain a wide variety of phenolic & polyphenolic chemicals, according to recent research, with 118.5 mg per serving (5).

## **1.2 Almond Consumption & Risk Of Cardiac Disease:**

In 2003, FDA issued a qualified B-level health claim that consuming 42 g daily of almonds & other nuts (except Brazil, cashew, macadamia, & certain pine nuts) is inversely related with occurrence of cardiac disease (CVD). Because of high MUFA concentration of almonds, this component is often mentioned as subsidizing significantly to this benefit full nutritional status of

almonds, on or h&, discloses a dosage sequence closely correlated with most dietary recommendations, along with nutritional modes of action that encourage cardiac health, like hypocholesterolemic effects of fibre, phytosterols, polyphenolics, & a high unsaturated/saturated fat ratio; enhanced vascular ability to respond caused by arginine; & reduction of dyslipidemia, homocysteine, & oxidative stress. According to one research, including 52 g of almonds into daily diet of 43 free-living adults led in a 66% increase in dietary intake of -tocopherol (66%), MUFA (42%), polyunsaturated fatty acids (PUFA, 24%), magnesium (23%), & vegetable protein (19%) (6).

### **1.3 Potential Action Of Almond Intake On Obesity-Related Diseases:**

Speedily rising incidence of weighty & fatness, along with its implications for obesity-related illnesses such as cancer, cardiac disease, & diabetes, is mostly attributable to insufficient physical activity & excessive calorie intake. Nuts, which are high in energy, seem to be contra indicated as part of explanation to this issue. Nut intake, on or h&, is not linked to a higher BMI in free-living people & is inversely connected to risk of cardiac disease (CVD). A study found that adding 56 g of almonds per day (320 kcal per day) in regular diet of eight healthy individuals for six months lead to non-significant weight increase of 0.4 kg & no alteration in waist/hip ratio. Absence of impact wascribed to energy displacement from or meals, satiating properties of almonds, & inadequate absorption of almond lipids. In terms of final aspect, research by another researcher suggests that almond lipids are poorly absorbed because their cell walls restrict fat bio accessibility to physical & chemical processes in gastrointestinal system. Preliminary data from a research by Zemaitis & Sabate showed higher lipid excretion in individuals who ate almonds, which backed up these findings (7).

### **1.4 Almonds & Cancer:**

While there are theoretical grounds to think diets rich in nuts & seeds may defend against certain cancers, data is presently insufficient, according to a 1997 study by World Cancer Research Fund. 41 Following that, Herbert et al. compiled data from a 59-country observational research & discovered evidence that regular intake of nuts, grains, & cereal is protective contrary to prostate cancer. Large-scale European Prospective Investigation into Cancer & Nutrition (EPIC) found that mean nut & seed consumption ranged from 0.8 g per day in Swedish women to 12.4 g per day in Dutch men between 1992 & 2000, with total intakes reaching 265 & 300 g per day for women & men, respectively. Jenab et al. 43 found a significant inverse association between high intakes (>6.2 g day<sup>-1</sup>) & non-consumers for colon cancer in women in a subgroup analysis, despite finding no overall association between nut & seed intake & risk of colorectal, colon, & rectal cancers among 478 040 subjects in EPIC cohort (Hazard Ratio 0.89; 95 percent confidence interval 0.80–0.9).

### **1.5 Allergy To Almonds:**

While almonds provide a number of health advantages, they may also cause unpleasant responses in those who are sensitive to them. Almond allergy is similar to other tree nut allergies in that it causes angioedema, nausea swelling itching hives, trouble breathing, shortness of breath, & swallowing, & in rare cases, anaphylaxis. A study found that 50 percent of 3 million Americans with food allergies were allergic to peanuts, 30 percent to walnuts, 10% to almonds, & 4% to both peanuts & tree nuts, based on a telephone survey. Another study calculated that 10% of allergic

persons would respond to two or more nuts, resulting in a global population of approximately 500 000 people. It has discovered that two main almond allergens, with molecular weights of 45–50 & 70 kDa, bind substantially to IgE. In this respect, Poltronieri et al. report's has established in Europe for identification of allergenic proteins in almonds, & techniques for its detection have been created. It has discovered a significant almond storage protein in United States, & it is used to identify almonds in food items.

## **1.6 Perception On Almonds Regarding Nutrition & Health:**

Noneless not exclusive to United States, 2005 version of Dietary Guidelines for Americans emphasizes particular worry about insufficient vitamin E, magnesium, & fiber consumption by children, adolescents, & adults, based on dietary intake statistics or evidence of public health concerns. Almonds seem to be part of answer to enhancing nutritional profile of diet, especially when combined with advice that fat consumption should come mainly from sources of MUFA & PUFA, such as nuts. While health claim for advantages of almonds & or tree nuts in lowering heart disease has been authorized, further research is needed to show its involvement in chemoprevention, value as satiating meal, & effects on inflammation & insulin resistance. Despite potential for almonds to play a significant role in health promotion, further research is needed to better understand & bioavailability & bioaccessibility of almond components, along with apparent synergy between them. More study is required on nature & cause of allergic reactions to almonds & or tree nuts in those who are allergic to them.

## **1.7 Nutritional Attributes Of Almonds:**

### **1.7.1 Almonds As Source Of Energy & Macro Nutrients:**

Almonds have a caloric content of approximately 575 kcal per 100 g & a fat content of around 50%. However, almonds have a beneficial fatty acid composition since mono unsaturated fatty acids (MUFA) predominate & saturated fat level (3.7 G per 100 g almonds) is lowermost of all nuts. There are 62 percent MUFA & 24 percent poly unsaturated fatty acids in total fat composition. Almond fatty acids play a key role in health benefits of nut intake, including a decreased risk of cardiovascular disease & sudden cardiac death, lower blood cholesterol, preservation or augmentation of low density lipoprotein (LDL) oxidation resistance, & improved endothelial function. Almonds have 21.2 percent total protein, making them an excellent source of plant protein, & their proteins are strong in arginine. Almonds also have approximately 3.9 g total sugars per 100 g, & since they have less than 5 g sugars per 100 g, they qualify as "naturally low in sugars" under new European nutrition regulation 1924/2006 on nutrition & health claims.

### **1.7.2 Almonds Are Naturally High In fibre:**

Whole natural almonds provide around 12 g of dietary fiber per 100 g, which is enough to qualify as "naturally rich in fiber" under new European standard. As per epidemiologic & human interventional research, dietary fibre from plant cell walls of foods such as whole grain cereals, vegetables, beans, fruits, & nuts is associated with a variety of health advantages. These advantages include a lower incidence of coronary heart disease & diabetes, along with beneficial effects on digestive system, such as prebiotic effects. Plant cell walls are composed of supramolecular networks of cellulose, hemicelluloses, pectic chemicals, & non-carbohydrate components (e.g. phenolic compounds) & are primary source of dietary fibre. Different kinds of dietary fiber may aid to diminish postprandial glycemia & cholesterol levels in blood. Increasing dietary fiber

consumption may aid you feel more satiated & lose weight over time. When nuts, such as almonds, are added to low-calorie diets for weight reduction, they may enhance satiation & result in inadequate fat absorption in intestine. The last two effects may be attributed to nuts' high fibre & protein content. The rate & amount of lipid release from plant food tissues during digestion is known to be influenced by plant cell walls, & structural characteristics of almond cell walls (dietary fibre) play a significant role.

### **1.7.3 Micronutrients:**

Almonds are among most nutrient-dense foods accessible. Almonds are abundant in vitamin E, riboflavin (vitamin B2), & minerals copper calcium, magnesium manganese, phosphorus, , zinc, , & potassium.

### **1.7.4 Phytosterols & Antioxidants:**

Tree nuts, like almonds, have no dietary fat but are abundant in phytonutrients, class of compounds that impede absorption of cholesterol & hence aid maintaining balanced levels of cholesterol. Most common phytosterols in plants are campesterol,  $\beta$ -sitosterol, 5-avenasterol, & stigmasterol. Cholesterol-lowering activity of nuts in human studies has typically been larger than expected due to fatty acid exchange & high concentrations of MUFAs. This effect may be due in part to phytosterols contained in nuts. Several nuts, in addition to antioxidant vitamin E, are among dietary plants with greatest overall antioxidant content. Dietary flavonoids are thought to act as antioxidants in vivo, lowering risk of chronic illness. However, its effectiveness has been questioned due to findings showing only very little quantities of flavonoids are found in plasma after eating flavonoid-rich meals. Flavonoids from almond skins are bioavailable & work synergistically with vitamins C & E to improve LDL cholesterol resistance to oxidation, according to in vitro & animal studies. There has also been research on the impact of almond intake on DNA damage & oxidative stress in cigarette smokers. Complete characterisation & quantification of almond polyphenolics & antioxidants, antioxidant activity of almond seed extracts, flavonoids from almond skins, & effects of almond skin polyphenols & quercetin on human LDLs & lipid peroxidation biomarkers are currently the focus of research.

### **1.8 Bio Accessibility Of Protein, Lipid & Vitamin E From Almonds:**

Almonds are unique among tree nuts in terms of quantity of protein & vitamin E (tocopherol) they contain. Almonds are mostly composed of fat, & it has been found in human volunteers that a significant part of this lipid is either slowly digested & absorbed or stays totally undigested. The word "bioaccessibility" refers to amount of nutrition that may be liberated from a complex food matrix & therefore become potentially accessible for absorption in gastrointestinal system. Assessment of almond nutrients' bioaccessibility is a hot topic in study since it may have consequences for treatment of overweight & obesity, along with lower risk of cardiovascular disease. Effects of mastication on particle size have a direct impact on lipid, protein, & vitamin E bioavailability, & preliminary research suggests that longer chewing increases number of broken plant cells, thus boosting vitamin E & lipid bioavailability. Almonds' potential contribution to energy intake may be reduced by approximately 7% as result of this reduction in fat energy absorption. Furthermore, postprandial lipaemia is influenced by rate & amount of lipid bioaccessibility in almonds, which is mainly controlled by integrity of plant cell walls (dietary fibre) that encapsulate lipids. In vitro & ileostomy digestibility experiments have shown that following duodenal digestion,

dietary fibre, fat, & protein contained in almond tissue are accessible for fermentation in colon by gut bacteria. More research has done utilizing a complete model of gastrointestinal system that mimics in vitro gastric & duodenal digestion to look into possible prebiotic impact of almond seeds. Resulting residues are utilized as substrates in colonic model to evaluate its impact on gut bacteria population composition & metabolic activity. After a 24-hour incubation, finely powdered almonds significantly boosted populations of Bifidobacteria & Enterobacterium rectale, resulting in a higher prebiotic index than commercial prebiotic fructooligosaccharide. As number of E. coli infections rises, so does number of E. coli amount of rectal produced during this in vitro fermentation was linked to amount of butyrate produced. Preliminary findings suggest that almond seeds have potential to be used as source of prebiotics, & that more in-depth research on human volunteers is needed. Data from epidemiological studies & human trials show that including nuts like almonds in one's diet does not cause weight gain, owing to its strong satiety properties & effects on resting energy. A significant increase in faecal energy loss, accounting for approximately 5–15 percent of energy content of almonds, has shown in human studies. Moderate nut intake, it is hypothesized, does not cause weight gain via three mechanisms: satiety, stimulation of energy expenditure, & efficient energy use.

## 2. LITERATURE REVIEW

Soumik Kalita et al. discussed Almonds & Cardiac Health in which they explained how several preventative methods for lowering dyslipidemia have proposed, with dietary modification being one of most significant. Dyslipidemia is a significant risk factor for coronary heart disease, & efforts to control it have proven to lower risk of cardiovascular disease (CVD). Although there are effective pharmaceutical treatments for this disease, dietary strategies are a safer alternative for preventing & managing dyslipidemia. It has suggested that include almonds in one's regular diet may improve one's lipid profile. Existing data evaluating impact of almonds on dyslipidemia in South Asian (especially Indian) setting is critically examined in this study (8).

David P. Richardson et al. discussed nutritional & health benefits of almonds in which they explained how study on benefits of almonds on lowering blood cholesterol levels & lowering risk of heart disease has exploded in past decade. Almonds are also showing promise in terms of health benefits related to body weight management & diabetes, according to new study. Almonds are rich in monounsaturated & polyunsaturated fatty acids, protein, & dietary fiber, along with range of important nutrients such as vitamin E & a number of trace elements. Almonds have a low salt content & a high potassium content, along with variety of phyto protective compounds. Existing data also suggests that when nuts are eaten in moderation, weight gain is unlikely, & that regular intake of nuts may be advised as part of a healthy balanced diet (9). Hao J et al. studied almond shell characteristics in which they discussed how every year, a significant number of almond shells are discarded. In this article, morphological & chemical features of almond shells are studied in order to aid in its better use. Almond shells are studied for its micromorphology, surface elements, thermal stability, crystallization, chemical composition, & relative characteristics. Almond shells have a diameter of 300-500 μm for big holes & 40-60 μm for tiny holes, as measured by a microscope & an electron microscope (10).

## 3. DISCUSSION

Despite being high in calories, almonds are high in monounsaturated fat, fiber, vitamin E, minerals including magnesium & copper, & phytonutrients. Almond intake has

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hypocholesterolaemia advantage due to its favourable fat composition & fiber content. Almonds are expected to improve or controllable cardiac & diabetes risks, such as body weight, glucose homeostasis, inflammation, & oxidative stress, due to its unique nutritional makeup. This article goes through nutritional content & hypocholesterolaemia advantages of almonds, along with impact of almond intake on body weight. Although additional research is needed, accumulating data suggests that almond intake reduces risk of chronic degenerative disease beyond cholesterol lowering, especially in those with metabolic syndrome & type 2 diabetes.

#### 4. CONCLUSION

Almond member of Rosaceae family, have long recognized as basis of vital nutrients; seeds are high in demand as nutritious diet among consumers & farmers. Almond macro- & micronutrient composition & characterization studies have shown that nut contains a wide range of nutrients, including fatty acids, lipids, amino acids, carbohydrates, vitamins, proteins & minerals, along with secondary metabolites. Almond nutritional quality is influenced by a number of variables, including genetic & environmental influences. As result, studies examining impact of various variables on almond quality were also included. Almond intake has linked to various curative & preventive health effects in epidemiological research. Clinical trials have confirmed modulatory effects on blood glucose, lipid, & uric acid levels, along with regulatory function on body weight & protective benefits against diabetes, obesity, metabolic syndrome, & cardiovascular disease. Furthermore, new study has verified almonds' prebiotic properties. Purpose of this study was to highlight significance of almonds as nutritious food & source of beneficial components for human health, along with to evaluate variables that influence quality of almond kernel. Previously published papers on almonds in terms of components & bioactivity potentials were investigated using electronic databases such as PubMed, Scopus, Web of Science, & SciFinder, with a special emphasis on clinical trials.

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