

the
2012 **nut**
report



NUTS & THE BIG FAT MYTH

The positive role for nuts in
weight management





FOREWORD

The health story for tree nuts continues to gain momentum following three major pieces of population research; the Seventh Day Adventist study (1992), Nurses' Health Study (1998) and the Physicians' Health Study (2002), all of which found a relationship between nut consumption and a decreased risk of coronary heart disease. Nuts have also been associated with a decreased risk of type 2 diabetes and are of great interest to us at Weight Watchers when it comes to healthy weight management.

Once a slimmer's foe, nuts are well and truly back on the weight-loss menu. Research shows regular nut eaters can maintain a healthy weight and clinical studies have also shown that people do not gain weight as expected when they add nuts to their diet. On the Weight Watchers program, the protein and dietary fibre content of nuts are promoted for appetite satisfaction or satiety, along with their superior nutrient density and healthy monounsaturated and polyunsaturated fat profile.

In practical terms, our Members learn that a portion controlled, handful (30g) of unsalted nuts is a wise **ProPoints** investment, especially to help keep mid-meal hunger under control. We also utilise nuts in recipes to add flavour and texture to meals, such as a crust for fish with crushed nuts, wholegrain breadcrumbs and fragrant herbs.

We welcome this report and insights to help bust the myth that nuts are to be avoided. In fact, we should encourage their inclusion in the diets of those striving for good health and a healthy weight.

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Director - Program Development & Delivery
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INTRODUCTION

This report addresses the major barrier to nut consumption by Australians – the myth that nuts make you overweight. According to 2012 Consumer Insights research commissioned by Nuts for Life, 98% of Australians do not eat a handful of nuts a day and the number one reason is because they are concerned about nuts' fat content and their potential to cause weight gain.¹

Nuts are a nutrient-dense, whole food that play an important role in healthy diets to help protect against chronic disease and manage body weight. Yet according to the market research, Australians – including some health professionals – are confused about the role nuts can play in weight management diets.

Nuts and The Big Fat Myth considers evidence spanning the last 20 years on nuts and their impact on weight – including weight management in diets designed to achieve other outcomes, such as lowering cholesterol or stabilising blood glucose.

Compared with non-nut eaters, those who eat nuts:

- Tend to have a lower body mass index (BMI)²⁻⁶
- Are less likely to gain weight over time⁷⁻⁹
- Tend to have better diet quality^{10,11} and
- Have less incidence of chronic disease.^{2-6,12-14}

Research also shows including nuts in energy-controlled diets can result in weight loss.¹⁵⁻²⁰

With nearly two thirds of adults and a quarter of Australian children overweight or obese²¹ – a condition fundamentally linked to poor food choice and a lack of exercise – it is essential that we encourage Australians to base their food choices on nutrient-rich, whole foods. It's these foods that should be eaten more often including fruits, vegetables, wholegrains, legumes, seeds and nuts.²²

Nuts for Life is pleased to bring this evidence on nuts and their positive role in weight management to light.

Lisa Yates

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Did you know?

Tree nuts include: almonds, Brazil nuts, cashews, chestnuts, hazelnuts, macadamias, pecans, pine nuts, pistachio and walnuts.



AUSTRALIANS' NUT CONSUMPTION¹

Health Professionals

Despite overwhelming evidence and understanding of the benefits of a handful of nuts a day among health professionals - with 89% of dietitians and 73% of general practitioners agreeing that nuts should be a part of a healthy daily diet - this does not translate to their own behaviour.

While 2% of the general public consume a handful of nuts a day, only 1% of general practitioners meet the daily recommendation and 16% include nuts in their weekly diets. Dietitians fare marginally better, with 4% saying they eat a handful of nuts a day and 22% eating them weekly.

One of the key reasons for low nut consumption among some health professionals may be that they are confused about the role nuts can play in weight management diets. When asked about the potential negatives associated with including nuts in a daily diet, the biggest responses from health professionals were around the energy and fat content of nuts.

However, the potential role for nut consumption in chronic disease protection is well understood – with 99% dietitians and 93% GPs agreeing that nuts have a role in preventing heart disease and 89% dietitians and 79% GPs agreeing that nuts have a role in preventing diabetes. Additionally, 81% and 90% of GPs and dietitians respectively believe nuts play a positive role in lowering cholesterol.

When asked about the role of nuts in overweight and obesity, 90% of dietitians agreed that nuts have a role in preventing overweight and obesity and 77% agreed that nuts have a role in managing overweight and obesity.

GPs were not so sure, with 64% saying nuts had a role in preventing overweight and obesity, and 54% saying they had a role in managing overweight and obesity. Nearly a quarter of GPs (24%) saying they didn't know whether nuts can play a role in either.

When it comes to recommending nuts to their patients, only 19% of GPs frequently did so, with 42% rarely or never recommending them. Dietitians are significantly more likely to recommend their patients eat nuts – with 78% frequently recommending them compared to 8% who never or rarely recommend them.



General Public

Nut consumption among Australians is low. The majority of Australians (58%) eat nuts monthly or less frequently, with 11% eating them fortnightly, 14% eating them weekly and 9% eating them everyday – although only 2% eat a handful (30g) of nuts a day. The most frequently cited reason for not eating nuts is concern about the fat content of nuts and their potential to cause weight gain.¹

Of those that do eat nuts, the majority eat them at parties (53%), on planes (37%) or pre-dinner with a drink (31%), which suggests an association with nuts as a treat or occasional food.

Cooking with nuts has increased with 14% of respondents saying they cook with nuts on a weekly basis. They report more recipes are using nuts as ingredients.¹ As a result of this Nuts for Life reviewed recipes from food, women's and health magazines to determine how many, and what type of, recipes use nuts as ingredients.²³ Results found that 16% of all recipes use nuts as ingredients but the most common type of recipe to use nut ingredients was cakes and desserts, despite the most common recipe type found in magazines being for main meals.

The market research uncovered that the majority of Australians (70%) have never received advice to eat a handful of nuts a day – not from family or friends, the media or a health professional. Despite this, there is a level of awareness by some that nuts are a healthy snack, and a much healthier option than processed products like potato crisps and muffins.¹ The Australian Government's Swap It. Don't Stop it. campaign website recommends eating a handful of nuts instead of a muffin (www.swapit.gov.au).

The Australian Tree Nut Industry also collates its own apparent consumption data based on wholesale sales and Australians are consuming 47,000 tonnes of tree nuts a year or around 6g per person per day.²⁴ Note this does not include peanuts, which are not actually a nut but a legume.

The National Health and Medical Research Council (NHMRC) stated in their report *A Modelling System to inform the Revision of the Australian Guide to Healthy Eating* that Australian adults and Australian children (9-18 years) need to increase their nut consumption by on average 350% and 250% respectively to reach the recommended serving size of 30g.²²

“ 98% of Australians do not eat a handful of nuts a day and the number one reason is because they are concerned about nuts' fat content and their potential to cause weight gain.¹ ”

DISPELLING THE MYTH - NUTS AND THEIR WEIGHTY FACTS

In both large population based studies and clinical trials, nut consumption is positively associated with weight management particularly prevention of weight gain. The first step to weight loss is the prevention of any further weight gain. Once weight has been lost it is important to prevent weight re-gain and weight cycling. It appears weight cycling may lead to greater central adiposity.²⁵

Population Studies

Epidemiology research has revealed an inverse association between the frequency of nut consumption and body mass index (BMI), a measure of weight compared to height.²⁻⁶ A review published in 2011 concludes that consumption of nuts is not associated with weight gain in long-term studies.⁹ The PREDIMED Mediterranean Diet study has also found that nut consumption was inversely associated with adiposity independently of other lifestyle variables.²⁶ Children and adolescents who consume nuts are also less likely to be overweight.²⁷

“ There is an inverse association between nut consumption and body mass index (BMI).²⁻⁶ ”



Table 1 (over page) outlines nine studies,^{2,3,5-8,12,26,28} of which seven found an inverse relationship (five statistically significant) and two^{12,28} found no association between nut consumption and weight.

In particular:

- The Seventh-day Adventist Health study of just over 31,000 people was the first to link increased nut consumption with a reduced risk of developing heart disease. It found a statistically significant decrease in BMI in those eating 30g of nuts at least five times a week compared to those eating nuts less than once a week.²
- A cross sectional study of 847 elderly Mediterranean men and women at high cardiovascular risk found that BMI and waist circumference decreased (by 0.78 kg/m² and 2.1cm respectively) with each 30g serve of nuts eaten.²⁶
- Of the two studies that found no immediate association between nut consumption and BMI, one of those – The Sun Study²⁸ – found that those who consumed nuts had a lower risk of weight gain over time. Those who ate 50 grams of nuts at least twice a week were 31% less likely to gain weight over the 28 month follow-up period.
- A more recent 2011 analysis of the Nurses' Health Study, the Nurses' Health Study II (both conducted in women), along with data from men in the Health Professionals Follow-up Study (HPFS) – a total of 120,877 U.S. women and men - found a statistically significant reduction in risk of weight gain over time with nut consumption, comparable to that found with fruit, wholegrains and vegetables.⁸

In addition there have been two observational studies conducted in children and adolescents. In the first 1764 children and adolescents (6-19 years) found that children consuming the highest amount of nuts had on average a 40% reduced risk of being overweight compared to children consuming the lowest amount of nuts.²⁷ A cross-sectional study of 800 schoolgirls in Spain found no relationship between frequency of nut consumption (ranging from never to daily) and body weight.²⁹

SUMMARY

No observational study has reported a higher BMI in nut eaters compared to low or non nut eaters for children and adults. Those who eat nuts tend to have a lower BMI than those that don't, and those that include nuts in their diets are less likely to gain weight over time.

Keep your nuts cold but eat them warm.

To keep your nuts fresh, store them in an airtight container in the fridge. Just like margarine, the oils can go rancid more quickly if left opened in the pantry. Bring them back to room temperature before eating or warm them in the oven. The volatile oils creating the taste and aroma of nuts will be.. well...nuttier.



TABLE 1: EFFECT OF NUT CONSUMPTION ON BODY WEIGHT

Study	Number of Subjects (gender)	Nut Consumption Frequency	BMI (kg/m ²)	Trends
Nurses' Health Study ^{5,6}	83,818 (F)	Almost Never ≥ 5 serves/week	24.8 23.4	BMI decreased with increased nut consumption
Iowa Women's Health Study ⁷	34,111 (F)	< 1 serve/month >5 serves/week	27.1 26.2	BMI decreased with increased nut consumption
California Seventh Day Adventist Health Study ²	31,208 (M/F)	< 1 serve/month ≥5 serves/week	Figures not given	Statistically significant decrease in BMI with increased nut consumption (P trend P<0.01)
Physicians' Health Study ⁸	21,454 (M)	Rarely/never ≥ 2 serves/week	24.9 24.7	No association between nut consumption and BMI
The Sun Study ³	8865 (M/F)	Rarely/never ≥ 2 serves/week	23.6 22.6	No association between nut consumption and BMI
Nurses' Health Study II ⁴	51,188 (F)	Rarely/never ≥ 2 serves/week	24.4 23.8	Statistically significant lower risk of weight gain & obesity with nut consumption (P for trend <0.001)
PREDIMED ²²	847 (M/F)	9 grams per day 4 grams per day (median)	25.0 34.4	As BMI, weight and waist circumference increased, statistically significant decrease in nut intake (P<0.001)
Continuing Survey of Food Intakes by Individuals (CSFII) ²⁵	12,088 (M/F)	Nut eaters Non nut eaters	23.8 25.0	Nut eaters have a statistically significant lower BMI compared to non nut eaters (P < 0.001)
NEJM analysis ²⁴ (combination of NHS I&II and HP Follow Up Study)	120,877 (M/F)	N/A	N/A	Eating fewer nuts over time results in more weight gain (for each one serve of nuts 0.57lb (0.26kg) of weight change, P=0.005)

Note: P values for changes in BMI were not reported for references 3, 5, results are trends only. Statistically significant findings were reported for references 2, 4, 22, 24, 25.

Intervention Studies

Over the past 20 years more than 60 studies have observed the effects of nut consumption on body weight either directly or indirectly as part of cholesterol lowering studies. The results clearly demonstrate that the inclusion of nuts reduces the risk of weight gain and suggest the inclusion of nuts may contribute to weight loss when consumed as part of energy-controlled diets.

Energy Controlled Diets

Clinical trials have shown weight loss with the inclusion of nuts in energy-controlled diets. Some examples include:

- An almond study with 123 overweight and obese participants were randomized to an almond hypocaloric diet, or a nut free hypocaloric diet, followed for 18 months. The low calorie diet consisted of 1200–1500 kcal/d for women and 1500–1800 kcal/d for men with the addition of two 28g packs of almonds (24 almonds per package) to consume daily. Both groups lost weight at six months, 5.5kg for the almond group and 7.4kg for the nut free group (P=0.04). There was no significant difference in weight loss at 18 months, although the almond group had better blood lipid profiles.¹⁸
- A study of 65 overweight adults over 24 weeks who included 84g of almonds a day as part of a low calorie formula diet, showed those who ate almonds had a 62% greater weight loss than the control group who consumed the same amount of kilojoules with carbohydrate substituted for the almonds (P<0.0001).¹⁵
- An Australian study of 50 patients with type 2 diabetes following an isocaloric diet with 30g of walnuts a day, compared to a control diet, found that weight loss appeared more sustainable when walnuts were included.¹⁶

- Another study of 25 overweight or obese adults over 12 weeks found that by adding a 53g snack of pistachios to their weight loss diet resulted in a significantly greater drop in BMI compared to a similar diet with pretzels as a snack.¹⁷

SUMMARY

To date energy-controlled diets that include 40-80g of nuts can result in greater weight loss compared to those that don't include nuts. While more research is needed in other types of nuts, the simple message to include a 30g handful of nuts a day is an easy, sensible recommendation to make.

Swap It Don't Stop it. The Australian Government's *Swap It. Don't Stop it.* campaign website suggests eating a handful of nuts instead of a muffin.
www.swapit.gov.au



Adding Nuts to Existing Diets

When nuts are consumed in addition to usual food intake *without adjusting kilojoule input or energy output* their inclusion shows mixed results - no change in weight, weight loss or a slight weight gain.

For instance:

- The PREDIMED Mediterranean Diet study (commenced in 2003 with final results due to be published in 2012/13), is a long term trial comparing a Mediterranean diet (no energy restriction) enriched with 30g of mixed nuts a day or 50mL per day virgin olive oil compared to a low fat diet. To date, researchers have found:
 - 1) participants saw no change in BMI or waist circumference after three months³⁰
 - 2) daily nut consumption caused a beneficial effect on waist circumference reducing the prevalence of abdominal obesity after one year³¹
 - 3) those with a specific genotype had a higher body weight at baseline but after three years of consuming the Mediterranean diet enriched with 30g of mixed nuts a day resulted in lower weight gain than the other participants³²
 - 4) there was a minor weight loss in both the nut and low fat diet groups after four years.³³
- A crossover trial of 90 healthy and overweight individuals showed that including 17–56g walnuts a day (equivalent to 493kJ–1624kJ) to the participants' usual diet increased body weight by 400g (P=0.01) over six months.³⁴
- A crossover study of 20 healthy subjects, randomised to an almond diet (1440kJ or 55g of almonds added to the usual diet) or a control diet over a 10 week period, followed by a three week washout period before crossing over to the alternative diet, did not find any evidence of weight gain.³⁵ Interestingly researchers found evidence of increased faecal fat excretion after consuming nuts resulting in less energy absorption, which has been shown in other studies.³⁶⁻³⁹
- A study of 81 healthy and overweight participants showed that over six months, adding an average of 54g of almonds a day to the participants' usual diet resulted in a non-significant 400g weight gain (P=0.09).⁴⁰ Interestingly, participants with a higher baseline BMI lost weight throughout the almond intervention.

SUMMARY

Adding up to ~55g of nuts to your existing diet without removing other foods, or increasing energy expenditure, may either result in no weight change or slight weight gain. Recommend eating nuts in place of less healthy snacks.



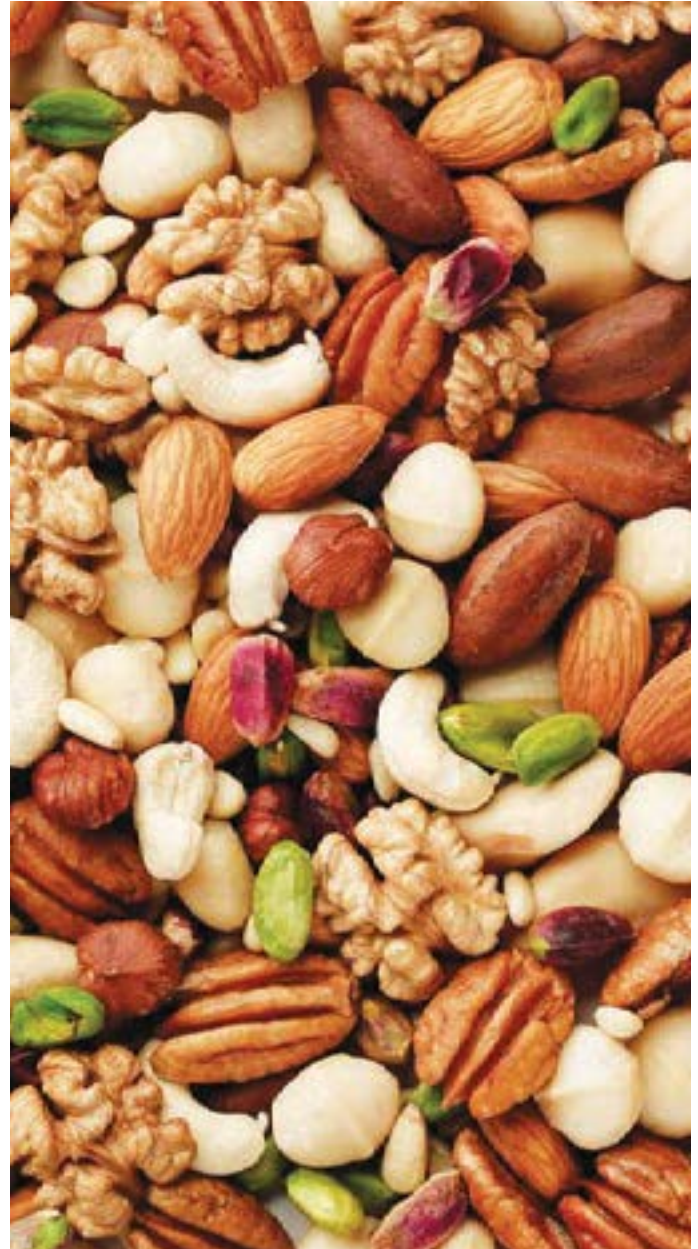
Cholesterol-Lowering Diets

There are 33 different medium and high quality studies involving healthy and hypercholesterolemic participants, with and without diabetes, following nut cholesterol-lowering diets that have measured weight as an outcome.^{16,41-84}

- The vast majority showed there is no change in weight by including 30-100g of nuts a day in short-term cholesterol lowering diets and all showed improvements in total and/or LDL cholesterol without negatively affecting HDL cholesterol.
- A high quality meta-analysis of 12 walnut and cholesterol lowering studies where participants consumed 30-108g walnuts over 4-24 weeks found a small non significant weight loss. Adding walnuts to a cholesterol lowering diet does not cause weight gain.⁸⁵
- Five studies showed that when subjects consumed a nut containing diet, weight decreased despite the study aiming to prevent changes in body weight.^{16,42,56,57,61}

SUMMARY

Incorporating 30-100g of nuts a day into a cholesterol-lowering diet may contribute to weight loss and in general does not lead to weight gain.



“ Enjoying a 30g handful of nuts at least five times a week can significantly reduce the risk of developing heart disease by 30-50%.^{2,3,5,12,13}

”

Diets for Diabetes

Investigating the effects of nut consumption on weight in people with Type 2 Diabetes Mellitus (T2DM) has found that the inclusion of nuts may improve diabetes control measures with no change in weight, or a small weight loss.

- A 12-week randomised crossover clinical trial of 20 men and women with T2DM found the addition of 56g almonds per day significantly reduced body fat determined by bioelectrical impedance analysis.⁵⁷
- 30g of walnuts were included as part of a kilojoule-controlled diet in 17 T2DM participants over six months, with results showing no effects on body weight or HbA1c but improvements in blood lipids.⁸⁶
- 50 overweight adults with T2DM were assigned to a low fat diet, with and without 30g of walnuts each day, for one year resulting in 1-2kg weight loss and reduced fasting insulin.¹⁶
- In a crossover study of 24 people with T2DM, 56g of walnuts each day for eight weeks resulted in no change in body weight and improvements in endothelial function.⁸⁷
- 65 adults with pre-diabetes, given 60g of almonds daily for 16 weeks found insulin sensitivity and LDL cholesterol levels improved with no change in body weight.⁵⁶

- 117 adults with T2DM were randomised into three diet groups one with 73g mixed nuts a day, one muffin, or half serves of both a day for three months. The full nut serve group saw reductions in HbA1C whilst maintaining body weight.⁵⁰
- Interestingly, a sub group of 418 non-diabetic participants of the PREDIMED Mediterranean Diet study consuming a Mediterranean diet enriched with 30g mixed nuts a day, found a 52% reduced risk of diabetes in the absence of significant changes in body weight or physical activity.³³

SUMMARY

For people with type 2 diabetes, the inclusion of up to 60g nuts a day (two handfuls) may improve diabetes control measures with either no change in weight, or a small weight loss, however more research is needed.



KEY FINDINGS

- Nut eaters tend to weigh less than non-not eaters and those that include nuts in their diets are less likely to gain weight over time.
- Energy-controlled diets that include 40-80g of nuts result in greater weight loss than those that don't include nuts.
- Adding nuts to a usual diet without removing food to adjust for energy intake may increase weight, so eating nuts in place of unhealthy snacks is a key recommendation.
- Incorporating 30-100g of nuts into a kilojoule-controlled, cholesterol-lowering diet may contribute to weight loss and at least doesn't lead to weight gain.
- For people with type 2 diabetes, the inclusion of up to 60g nuts a day (two handfuls) may improve diabetes control measures with either no change in weight, or a small weight loss.
- More research in the areas of hypocaloric diets and diabetes is needed.

MECHANISMS: HOW DO NUTS WORK TO HELP MANAGE WEIGHT?

The mechanisms by which nuts help to manage body weight and may help to reduce weight have been examined in scientific research conducted over the last 20 years.

Reducing Appetite

Research shows that the fat content of nuts may have an action in releasing satiety hormones^{36,88-90} such as cholecystokinin (CCK) in the digestive system.

In addition, the high levels of protein and fibre in nuts may also act to satisfy hunger and reduce appetite.^{91,92} Cracking nuts from the shell can also help to reduce intake.^{93,94}

Energy Absorption

The fat and energy content of nuts as determined in the laboratory is greater than the amount absorbed by the body, with research suggesting that up to 15% of the energy in nuts is excreted.³⁶⁻³⁹ Many studies have found nut eaters excrete more fat in their stools, so less fat and energy is absorbed.^{36,37,39,95,96} More recently, research has found the Atwater factors used to calculate the energy in foods may not be accurate for nuts. When applied to almonds, Atwater factors resulted in a 32% overestimation of their measured energy content, so a 30g serve of almonds actually contains 580kJ rather than 760kJ.⁹⁶ Similarly the measured energy density of pistachios was found to be 22.6kJ/g, which is 5% less than the currently accepted energy value of 23.7kJ/g, as calculated using the Atwater factors.⁹⁷ It could be the behaviour of nut oil bodies in the intestine that makes them more resistant to digestion.⁹⁸

Increased Metabolism

A review of intervention trials found, metabolism increases immediately after consuming nuts, and this increase can account for up to 10% of their energy content.³⁸

Low Glycaemic Index (GI) effect

Although nuts in general do not have a GI ranking as they have too little carbohydrate to be GI tested, nuts have a GI lowering effect by slowing the digestion of a carbohydrate rich meal. This results in a slower rise in blood glucose after the meal, satisfying the appetite for longer.^{50,99-106}

Cashews have been GI tested and have a low GI of 25.¹⁰⁷ Chestnuts are more like a grain than a nut - low in healthy fats and rich in low GI carbohydrates. While whole chestnuts have not been GI tested, chestnut meal or ground chestnut has, with a low to moderate GI of 54.¹⁰⁸ Since GI is affected by particle size whole chestnuts would most likely have a low GI.

Insulin Effects

Insulin resistance is linked to weight gain through chronic inflammation.¹⁰⁹ Nuts have been shown to reduce insulin levels and improve insulin sensitivity in intervention trials, which may help explain effects on weight.^{16,36,56,95,100} Nuts have also been shown to help reduce inflammation markers.¹¹⁰

Better Compliance

Research has shown that weight management diets that include nuts are considered more palatable and enjoyable, and as a result those on these diets are more likely to comply with their eating plan for longer – and have greater success.¹¹¹⁻¹¹³



Chew Less. If you chew nuts less you absorb less fat.³⁶ Similarly if you eat whole nuts instead of nut butters less fat is absorbed.³⁹

GENERAL HEALTH

Nuts are a natural plant food, and like fruits and vegetables, they are a vital part of a healthy diet. Misunderstanding the importance of the fat in nuts and being confused about the role fat plays in weight management are stopping many Australians from enjoying nuts on a daily basis.¹

The unique combination of healthy fats, combined with a broad range of vitamins, minerals, protein, fibre and phytochemicals with antioxidant and anti-inflammatory effects, make nuts a nutrition powerhouse that help to:

- reduce the risk of heart disease^{2,3,5,12,13}
- lower cholesterol¹¹⁴
- reduce the risk of type 2 diabetes^{4,33}
- control blood glucose^{50,99-106} and
- manage weight.

Swap It. If you swap a 50g bag of potato crisps for 50g of nuts you will get three times more protein, with nearly half the saturated fat, a fraction of the sodium, twice the fibre, plus vitamin E, magnesium, calcium, iron, zinc, copper, manganese and selenium.

Diet Quality

Nut eaters have been found to have better diet quality than non-nut eaters.^{10,11,115,116}

- In a 2011 US study, the diets of 'out-of-hand' tree nut consumers were compared with non-tree nut consumers on measures of fibre, vitamin E, calcium, magnesium, potassium and sodium. Tree nut consumers had significantly better diet quality, with a higher overall diet quality score and improved nutrient intakes. The researchers concluded that 'out-of-hand' nut consumption should be encouraged by health professionals.¹⁰
- Another 2011 study investigated the impact of different snacks - including hazelnuts, chocolate, or potato crisps compared to a control group receiving no snacks for twelve weeks. Effects on body weight and composition, blood lipids and lipoproteins, resting metabolic rate (RMR), appetite indices, and dietary quality were compared. At week 12, there was no significant difference in any of the outcome measurements between the groups except for dietary quality, which improved significantly in the nut group.¹¹
- A postpartum diet quality study reviewed the diet quality of Australian women following a gestational diabetes pregnancy and found that those not consuming nuts/legumes, grains and fruits had the poorest diet quality scores.¹¹⁵ Given these foods are important for chronic disease risk reduction the authors concluded that health professional advice and follow up is essential.

“ Eating a handful of nuts (30g) at least five times a week may also lower the risk of developing Type 2 Diabetes by around 25%.⁴ ”

Heart Disease

Studies show enjoying a 30g handful of nuts at least five times a week can significantly reduce the risk of developing heart disease by 30-50%.^{2,3,5,12-14} Even those who eat nuts once a week have less heart disease than those who don't eat any nuts.² Frequent nut consumption is associated with lower levels of inflammatory markers,^{109,110} which may partially explain the lower risk of both heart disease and diabetes.^{2,3,5,12-14} In general, you can achieve an 8.3% reduction in risk of death from coronary heart disease with each additional weekly serving of nuts.¹¹⁷

Cholesterol Lowering

A meta analysis combining the results of 25 nut and cholesterol-lowering studies found that around two handfuls of nuts – 67g on average each day – significantly reduced total and LDL cholesterol by 5% and 7% respectively.¹¹⁴ This is supported by two other meta analyses specifically on almonds¹¹⁸ and walnuts⁸⁴, which also support eating at least a 30g handful a day to significantly lower total and LDL cholesterol.

Diabetes

Eating a handful of nuts (30g) at least five times a week may also lower the risk of developing Type 2 Diabetes by around 25%.⁴ A Mediterranean Diet enriched with 30g of nuts a day may also reduce the risk of developing diabetes by 52%.³³ As described earlier, nuts lower the glycemic index of a meal and improve insulin sensitivity. This in turn may improve blood glucose control and therefore, reduce the risk of developing diabetes.



Nuts are an important source of essential fats. While all nuts, apart from chestnuts, are high in fats (49-74%), they are predominantly the healthy monounsaturated and polyunsaturated fat, with very low proportions of saturated fat. It's these healthy fats that help manage cholesterol and maintain heart health.

TABLE 2: FAT CONTENT OF TREE NUTS

	Total Fat (g)	Saturated Fat (g)	Monounsaturated Fat (g)	Polyunsaturated Fat (g)	Omega-3 fat as ALA (mg)
Almond	54.7	3.7	35.9	12.8	0
Brazil Nut	68.5	14.8	21.8	29.0	0
Cashew	49.2	8.4	31.1	7.5	0
Chestnut	0.6	0.1	n/a	n/a	n/a
Hazelnut	61.4	2.7	48.8	7.2	120
Macadamia	74.0	10.0	59.8	3.8	99
Peanut	47.1	7.0	22.9	14.9	3
Pecan	71.9	4.5	39.3	25.0	620
Pine Nut	70.0	4.2	23.0	39.8	0
Pistachio	50.6	5.8	26.7	15.8	0
Walnut	69.2	4.4	12.1	49.6	6280
Mixed Nuts	63.3	6.5	33.2	21.2	791

Source: NUTTAB 2010 and USDA Standard Release 24, 2012 (n/a = data not available)



“ Australian adults need to increase their nut consumption by 350% to reach the recommended serving size of 30g a day.²² ”

NUTS AND AUSTRALIAN DIETARY GUIDELINES

The National Health and Medical Research Council (NHMRC) state in the draft Australian Dietary Guidelines document that *“...nuts are rich in energy (kilojoules) and nutrients. In addition to protein and dietary fibre, nuts contain significant levels of unsaturated fat and are also rich in polyphenols and micronutrients, including folate, several valuable forms of vitamin E, selenium, magnesium and other minerals. They are useful protein alternatives to meat, fish and eggs, and are particularly important in plant-based, vegetarian and vegan meals and diets.”*¹¹⁹

The evidence report that underpins the dietary guidelines states that *“consumption of nuts and seeds may help reduce the risk of heart disease” and that the “evidence suggests that consumption of nuts (65–110g per day) is associated with a reduction in serum cholesterol, a surrogate marker for cardiovascular disease (Grade C, Section 8.2 in Evidence Report).”*¹¹⁹

The consumption of nuts is also not associated with weight gain if total energy (kilojoule) intake is controlled with the *“evidence suggesting that the consumption of nuts (65–110g per day) does not lead to weight gain, at least in the short term (Grade C, Section 8.1 in Evidence Report)”*.

CONCLUSION

One of the biggest diet myths is busted – eating nuts does not lead to weight gain.

In fact in the past 20 years, there has been scientific evidence supporting the role of tree nuts in energy-controlled diets for weight loss, as well as both short and long-term weight management.

People with a regular nut habit have lower BMIs, are less likely to gain weight, have healthier diets, and are at lower risks of chronic disease than people who do not eat nuts.

The misconception among the general public and health professionals that nuts are high in fat and therefore fattening is a key hurdle stopping 98% of Australians from eating their recommended handful of nuts a day.

This report notes that since the previous dietary guidelines, the evidence of a lack of association with weight gain is a new development. *“Proposed mechanisms for effects on weight control include increased satiety, increased faecal fat excretion, increased thermogenesis and increased fat oxidation.”*¹¹⁹

Since nut intakes have traditionally been low, the intake for children over eight years of age needs to triple and adult intakes need to increase substantially.¹¹⁹ In the NHMRC report *A Modelling System to inform the Revision of the Australian Guide to Healthy Eating* it states that Australian adults need to increase their nut consumption by 350%²² to reach the proposed recommended serving size of 30g.¹¹⁹

Frequency of this 30g handful is dependent on age, gender, life stage and energy needs, however is generally between 2-14 serves a week and can be either as whole nuts or nut pastes where needed. A general message of eating a handful of nuts (30g) a day is easier for health professionals to recommend and for the general public to remember.

Given the epidemic prevalence of diet-related chronic disease in Australia, it is vital that Australians are encouraged to consume more nutrient-rich, whole foods – fruit, vegetables, mushrooms, wholegrains, legumes, seeds and nuts. In fact the NHMRC suggests Australian adults increase their nut consumption by 350% to reach the recommended serve size of 30g a day.

In addition to helping weight management, the strength of scientific evidence supports eating a handful or two of nuts a day to reduce the risk of heart disease, diabetes and obesity, as well as to treat many of their biomarkers.

Working with Government, health authorities, health professionals and industry, Nuts for Life is committed to sharing evidence based advice on the health benefits of tree nuts and educating Australians on why and how to reach the recommended intake of a handful or two of nuts a day.

REFERENCES

1. Consumer Insights Research. Nuts for Life 2012. Research Report: Understanding the attitudes to nut consumption help by health professionals and consumers. Victoria 2012.
2. Fraser GE, et al. A possible protective effect of nut consumption on risk of coronary heart disease. The Adventist Health Study. *Arch Intern Med* 1992;152(7):1416-24.
3. Hu FB, et al. Frequent nut consumption and risk of coronary heart disease in women: prospective cohort study. *BMJ* 1998;317(7169):1341-5.
4. Jiang R, et al. Nut and peanut butter consumption and risk of type 2 diabetes in women. *JAMA* 2002;288(20):2554-60.
5. Ellsworth JL, et al. Frequent nut intake and risk of death from coronary heart disease and all causes in postmenopausal women: the Iowa Women's Health Study. *Nutr Metab Cardiovasc Dis* 2001;11(6):372-7.
6. Sabaté J. Nut consumption and body weight. *Am J Clin Nutr*. 2003 Sep;78(3 Suppl):647S-650S.
7. Bes-Rastrollo M, et al. Prospective study of nut consumption, long-term weight change, and obesity risk in women. *Am J Clin Nutr* 2009;89(6):1913-9.
8. Mozaffarian D, et al. Changes in diet and lifestyle and long-term weight gain in women and men. *N Engl J Med*. 2011 Jun;364(25):2392-404.
9. Martínez-González MA, Bes-Rastrollo M. Nut consumption, weight gain and obesity: Epidemiological evidence. *Nutr Metab Cardiovasc Dis*. 2011 Jun;21 Suppl 1:S40-5.
10. O'Neil CE, et al. Out-of-hand nut consumption is associated with improved nutrient intake and health risk markers in US children and adults: National Health and Nutrition Examination Survey 1999-2004. *Nutr Res*. 2012 Mar;32(3):185-94.
11. Tey SL, et al. Nuts improve diet quality compared to other energy-dense snacks while maintaining body weight. *J Nutr Metab*. 2011;2011:357350.
12. Albert CM, et al. Nut consumption and decreased risk of sudden cardiac death in the Physicians' Health Study. *Arch Intern Med* 2002;162(12):1382-7.
13. Blomhoff R, et al. Health benefits of nuts: potential role of antioxidants. *Brit J Nutr* 2007;96(Suppl2):S52-S60
14. Li TY, et al. Regular consumption of nuts is associated with a lower risk of cardiovascular disease in women with type 2 diabetes. *J Nutr*. 2009 Jul;139(7):1333-8.
15. Wien MA, et al. Almonds vs complex carbohydrates in a weight reduction program.[erratum appears in *Int J Obes Relat Metab Disord*. 2004;28(3):459]. *International Journal of Obesity & Related Metabolic Disorders: Journal of the International Association for the Study of Obesity* 2003;27(11):1365-72.
16. Tapsell LC, et al Long-term effects of increased dietary polyunsaturated fat from walnuts on metabolic parameters in type II diabetes. *Eur J Clin Nutr*. 2009 Aug;63(8):1008-15.
17. Li Z, et al. Pistachio nuts reduce triglycerides and body weight by comparison to refined carbohydrate snack in obese subjects on a 12-week weight loss program. *J Am Coll Nutr*. 2010;29(3):198-203.
18. Foster GD, et al. A randomized trial of the effects of an almond-enriched, hypocaloric diet in the treatment of obesity. *Am J Clin Nutr*. 2012 Aug;96(2):249-54
19. Wang X, et al. Effects of pistachios on body weight in Chinese subjects with metabolic syndrome. *Nutr J*. 2012 Apr 3;11(1):20.
20. McManus K, et al. A randomized controlled trial of a moderate-fat, low-energy diet compared with a low fat, low-energy diet for weight loss in overweight adults. *Int J Obes Relat Metab Disord* 2001;25(10):1503-11.
21. Australian Institute of Health & Welfare. Australia's Health 2012. Cat No AUS 156. Canberra. AIHW.
22. National Health and Medical Research Council A Modelling System to Inform the Revision of the Australian Guide to Healthy Eating (Modelling System) Dec 2011 ISBN online: 1864965398 Canberra NHMRC cited www.eatforhealth.org.au
23. Nuts for Life Magazine Recipe Review 2010 report, Nuts for Life North Sydney Australia.
24. Nuts for Life Australian Nut Industry statistics June 2012, Nuts for Life North Sydney Australia.
25. Cereda E et al. Weight cycling is associated with body weight excess and abdominal fat accumulation: a cross sectional study. *Clin Nutr* 2011; 30(6): 718-23.
26. Casas-Agustench P, et al. Cross-sectional association of nut intake with adiposity in a Mediterranean population. *Nutr Metab Cardiovasc Dis*. 2011 Jul;21(7):518-25.
27. Matthews VL, Wien M, Sabaté J. The risk of child and adolescent overweight is related to types of food consumed. *Nutr J*. 2011 Jun 24;10:71.
28. Bes-Rastrollo M, et al. Nut consumption and weight gain in a Mediterranean cohort: The SUN study. *Obesity (Silver Spring)* 2007;15(1):107-16.
29. Soriguer FJ, et al. Does the intake of nuts and seeds alter the appearance of menarche? *Acta Obstet Gynecol Scand* 1995;74:455-61.
30. Fito M, et al, Effect of a traditional Mediterranean diet on lipoprotein oxidation: a randomized controlled trial. *Arch Intern Med*. 2007;167(11): 1195-203.
31. Salas-Salvadó J et al. Effect of a Mediterranean diet supplemented with nuts on metabolic syndrome status: one-year results of the PREDIMED randomized trial. *Arch Intern Med*. 2008;168:2449-2458
32. Razquin C et al. A 3-year intervention with a Mediterranean diet modified the association between the rs9939609 gene variant in FTO and body weight changes. *Int J Obes (Lond)*. 2010 Feb;34(2):266-72.
33. Salas-Salvadó J et al. Reduction in the incidence of type 2 diabetes with the Mediterranean diet. *Diabetes Care* 2011; 34(1):14-19.
34. Sabate J, et al. Does regular walnut consumption lead to weight gain? *Brit J Nutr* 2005;94(5):859-64.
35. Hollis J, et al. Effect of chronic consumption of almonds on body weight in healthy humans. *Brit J Nutr* 2007; 98(3):651-6.
36. Cassady BA, et al. Mastication of almonds: effects of lipid bioaccessibility, appetite, and hormone response. *Am J Clin Nutr*. 2009;89(3):794-800.
37. Ellis, PR, et al. Role of cell walls in the bioaccessibility of lipids in almond seeds. *Am J Clin Nutr*. 2004;80:604-13.
38. Mattes, R. The energetics of nut consumption. *Asia Pac J Clin Nutr* 2008; 17(S1): 337-9.
39. Traoret CJ, et al. Peanut digestion and energy balance. *Int J Obes (Lond)*. 2008;32(2):322-8.
40. Fraser GE, et al. Effect on body weight of a free 76 Kilojoule (320 calorie) daily supplement of almonds for six months. *J Am Coll Nutr* 2002;21(3):275-83.
41. Jenkins DJ, et al. Dose response of almonds on coronary heart disease risk factors: blood lipids, oxidized low-density lipoproteins, lipoprotein(a), homocysteine, and pulmonary nitric oxide: a randomized, controlled, crossover trial. *Circulation* 2002;106(11): 1327-32.
42. Jenkins DJ et al. The effect of combining plant sterols, soy protein, viscous fibers, and almonds in treating hypercholesterolemia. *Metabolism*. 2003 Nov;52(11):1478-83.
43. Jenkins DJ et al. Effect of a very-high-fiber vegetable, fruit, and nut diet on serum lipids and colonic function. *Metabolism*. 2001 Apr;50(4):494-503.
44. Jenkins, D.J.A et al. Assessment of the longer-term effects of a portfolio of cholesterol-lowering foods in hypercholesterolemia. *Am J Clin Nutr*. 2006;83:582-91.
45. Jenkins, D.J.A et al. Direct comparison of dietary portfolio vs statin on C-reactive protein. *Eur J Clin Nutr*. 2005;59:851-860.
46. Jenkins D.J. et al. Direct comparison of a dietary portfolio of cholesterol-lowering foods with a statin in hypercholesterolemic participants. *Am J Clin Nutr* 2005;81(2):380-7.
47. Jenkins DJ, et al. Effect on hematologic risk factors for coronary heart disease of a cholesterol reducing diet. *Eur J Clin Nutr*. 2007;61(4):483-92.
48. Jenkins DJ, et al. Long-term effects of a plant-based dietary portfolio of cholesterol-lowering foods on blood pressure. *Eur J Clin Nutr*. 2008;62(6):781-8.
49. Jenkins DJ et al. Effect of a dietary portfolio of cholesterol-lowering foods given at 2 levels of intensity of dietary advice on serum lipids in hyperlipidemia: a randomized controlled trial. *JAMA*. 2011 Aug 24;306(8):831-9.
50. Jenkins DJ, et al. Nuts as a replacement for carbohydrates in the diabetic diet. *Diabetes Care*. 2011 Aug;34(8):1706-11.
51. Gigueux, I, et al. Comparison of a dietary portfolio diet of cholesterol-lowering foods and a statin on LDL particle size phenotype in hypercholesterolemic participants. *Brit J Nutr*. 2007;98(6):1229-1236.
52. Jaceldo-Siegl K, et al. Influence of body mass index and serum lipids on the cholesterol-lowering effects of almonds in free-living individuals. *Nutr Metab Cardiovasc Dis*. 2011 Jun;21 Suppl 1:S7-13.
53. Tamizifar, et al. A low dose almond based diet decreases LDL-C while preserving HDL-C. *Arch Iranian Med* 2005;8(1):45-51.
54. Spiller GA, et al. Nuts and plasma lipids: an almond-based diet lowers LDL-C while preserving HDL-C. *J Am Coll Nutr* 1998;17(3): 285-90.
55. Spiller GA, et al. Effects of plant-based diets high in raw or roasted almonds, or roasted almond butter on serum lipoproteins in humans. *J Am Coll Nutr* 2003;22(3):195-200.
56. Wien M, et al. Almond consumption and cardiovascular risk factors in adults with prediabetes. *J Am Coll Nutr*. 2010;29(3):189-97.
57. Li SC, et al. Almond consumption improved glycemic control and lipid profiles in patients with type 2 diabetes mellitus. *Metabolism*. 2011 Apr;60(4):474-9.
58. Abbey M, et al. Partial replacement of saturated fatty acids with almonds or walnuts lowers total plasma cholesterol and low density- lipoprotein cholesterol. *Am J Clin Nutr* 1994;59(5):995-9.
59. Damasceno NR, et al. Crossover study of diets enriched with virgin olive oil, walnuts or almonds. Effects on lipids and other cardiovascular risk markers. *Nutr Metab Cardiovasc Dis*. 2011;21(suppl):S14-S20.
60. Ros E et al. A walnut diet improves endothelial function in hypercholesterolemic subjects: a randomized crossover trial. *Circulation*. 2004 Apr 6;109(13):1609-14.
61. Sabate J, et al. Effects of walnuts on serum lipid levels and blood pressure in normal men. *N Engl J Med* 1993;328(9):603-7.
62. Zambon D, et al. Substituting walnuts for monounsaturated fat improves the serum lipid profile of hypercholesterolemic men and women. A randomized crossover trial.[erratum appears in *Ann Intern Med* 2000 Oct 17;133(8):659]. *Ann Intern Med* 2000;132(7):538-46.
63. Muñoz S et al. Walnut-enriched diet increases the association of LDL from hypercholesterolemic men with human HepG2 cells. *J Lipid Res*. 2001 Dec;42(12):2069-76.
64. Almario RU, et al. Effects of walnut consumption on plasma fatty acids and lipoproteins in combined hyperlipidemia. *Am J Clin Nutr* 2001;74(1):72-9.
65. Iwamoto M, et al. Serum lipid profiles in Japanese women and men during consumption of walnuts. *Eur J Clin Nutr* 2002;56(7): 629-37.
66. Rajaram S, et al. Walnuts and fatty fish influence different serum lipid fractions in normal to mildly hyperlipidemic individuals: a randomized controlled study. *Am J Clin Nutr*. 2009 May;89(5):1657S-1663S.

67. McKay DL, Chen CY, Yeum KJ, Matthan NR, Lichtenstein AH, Blumberg JB. Chronic and acute effects of walnuts on antioxidant capacity and nutritional status in humans: a randomized, crossover pilot study *Nutr J*. 2010 May 12;9(1):21.
68. Rajaram S, et al. A monounsaturated fatty acid-rich pecan-enriched diet favorably alters the serum lipid profile of healthy men and women. *J Nutr* 2001;131(9):2275-9.
69. Morgan WA, et al. Pecans lower low-density lipoprotein cholesterol in people with normal lipid levels. *J Am Diet Assoc* 2000; 100(3):312-8.
70. Curb JD, et al. Serum lipid effects of a high-monounsaturated fat diet based on macadamia nuts. *Arch Intern Med* 2000;160(8): 1154-8.
71. Yücesan FB, et al. Hazelnut consumption decreases the susceptibility of LDL to oxidation, plasma oxidized LDL level and increases the ratio of large/small LDL in normolipidemic healthy subjects. *Anadolu Kardiyol Derg*. 2010 Feb;10(1):28-35.
72. Tey SL, et al. Effects of different forms of hazelnuts on blood lipids and -tocopherol concentrations in mildly hypercholesterolemic individuals. *Eur J Clin Nutr*. 2011;65(1):117-24.
73. Mercanligil SM et al, Effects of hazelnut-enriched diet on plasma cholesterol and lipoprotein profiles in hypercholesterolemic adult men. *Eur J Clin Nutr*, 2007;61(2):212-20
74. Maranhão PA, et al. Brazil nuts intake improves lipid profile, oxidative stress and microvascular function in obese adolescents: a randomized controlled trial. *Nutr Metab (Lond)*. 2011 May 28;8(1):32.
75. Kocycigit A et al Effects of pistachio nuts consumption on plasma lipid profile and oxidative status in healthy volunteers. *Nutr Metab Cardiovasc Dis*. 2006 Apr;16(3):202-9.
76. Sheridan MJ, et al. Pistachio nut consumption and serum lipid levels. *J Am Coll Nutr*. 2007;26(2):141-8.
77. Sari I, et al. Effect of pistachio diet on lipid parameters, endothelial function, inflammation, and oxidative status: A prospective study. *Nutrition*. 2010 Apr;26(4):399-404
78. Kay CD, et al. Pistachios Increase Serum Antioxidants and Lower Serum Oxidized-LDL in Hypercholesterolemic Adults. *J Nutr*. 2010 Jun;140(6):1093-8.
79. Gebauer SK, et al. Effects of pistachios on cardiovascular disease risk factors and potential mechanisms of action: a dose-response study. *Am J Clin Nutr*. 2008;88(3):651-9.
80. Aldemir M, et al. Pistachio diet improves erectile function parameters and serum lipid profiles in patients with erectile dysfunction. *Int J Impot Res*. 2011 Jan-Feb;23(1):32-8
81. Estruch R, et al. Effects of a Mediterranean-style diet on cardiovascular risk factors: a randomized trial. *Ann Intern Med*. 2006 Jul 4;145(1):1-11.
82. McKiernan F, et al Effects of peanut processing on body weight and fasting plasma lipids. *Brit J Nutr*. 2010 Aug;104(3):418-26.
83. Ghadimi Nouran M et al. Peanut consumption and cardiovascular risk. *Public Health Nutr*. 2010 Oct;13(10):1581-6.
84. Jaceldo-Siegl K et al Influence of body mass index and serum lipids on the cholesterol-lowering effects of almonds in free-living individuals. *Nutr Metab Cardiovasc Dis*. 2011 Jun;21 Suppl 1:57-13.
85. Banel DK, Hu FB. Effects of walnut consumption on blood lipids and other cardiovascular risk factors: a meta-analysis and systematic review. *Am J Clin Nutr*. 2009;90(1):56-63.
86. Tapsell LC, et al. Including walnuts in a low-fat/modified-fat diet improves HDL cholesterol-to total cholesterol ratios in patients with type 2 diabetes. *Diabetes Care* 2004;27(12):2777-83.
87. Ma Y, et al. Effects of Walnut Consumption on Endothelial Function in Type 2 Diabetics: A Randomized, Controlled, Cross-Over Trial. *Diabetes Care*. 2010 Feb;33(2):227-32.
88. Pasmán WJ, et al. The effect of Korean pine nut oil on in vitro CCK release, on appetite sensations and on gut hormones in post-menopausal overweight women. *Lipids Health Dis*. 2008;20:7-10
89. Hughes GM, et al. The effect of Korean pine nut oil (PinnoThin) on food intake, feeding behaviour and appetite: a double-blind placebo-controlled trial. *Lipids Health Dis*. 2008;7:6.
90. Verhoef SP, Westerterp KR. No effects of Korean pine nut triacylglycerol on satiety and energy intake. *Nutr Metab (Lond)*. 2011 Nov 10;8(1):79.
91. Noakes, M. The role of protein in weight management. *Asia Pac J Clin Nutr* 2008; 17(S1): 169-71.
92. Pereira MA, et al. Dietary fiber and body-weight regulation. Observations and mechanisms. *Pediatr Clin North Am*. 2001;48(4):969-80.
93. Kennedy-Hagan K, et al. The effect of pistachio shells as a visual cue in reducing caloric consumption. *Appetite*. 2011 Oct;57(2):418-20.
94. Honselman CS, et al. In-shell pistachio nuts reduce caloric intake compared to shelled nuts. *Appetite*. 2011 Oct;57(2):414-7.
95. Casas-Agustench P, et al. Effects of one serving of mixed nuts on serum lipids, insulin resistance and inflammatory markers in patients with the metabolic syndrome. *Nutr Metab Cardiovasc Dis*. 2011 Feb;21(2):126-35.
96. Novotny JA et al Discrepancy between the Atwater factor predicted and empirically measured energy values of almonds in human diets. *Am J Clin Nutr*. 2012 Aug;96(2):296-301.
97. Baer DJ, et al. Measured energy value of pistachios in the human diet. *Brit J Nutr*. 2012 Jan;107(1):120-5.
98. Gallier S, Singh H. Behavior of almond oil bodies during in vitro gastric and intestinal digestion. *Food Funct*. 2012 May;3(5):547-55
99. Josse AR, et al. Almonds and postprandial glycemia—a dose-response study. *Metabolism*. 2007;56(3):400-4.
100. Jenkins DJ, et al. Almonds decrease postprandial glycemia, insulinemia, and oxidative damage in healthy individuals. *J Nutr*. 2006;136(12):2987-92.
101. Kendall CW, et al. The impact of pistachio intake alone or in combination with highcarbohydrate foods on post-prandial glycemia. *Eur J Clin Nutr*. 2011 Jun;65(6):696-702.
102. Jenkins DJ, et al. Effect of almonds on insulin secretion and insulin resistance in nondiabetic hyperlipidemic subjects: a randomized controlled crossover trial. *Metabolism*. 2008;57(7):882-7.
103. Reis CE, et al Ground roasted peanuts leads to a lower post-prandial glycemic response than raw peanuts. *Nutr Hosp*. 2011 Jul-Aug;26(4):745-51.
104. Kendall CW et al. The glycemic effect of nut-enriched meals in healthy and diabetic subjects. *Nutr Metab Cardiovasc Dis*. 2011 Jun;21 Suppl 1:534-9.
105. Cohen AE, Johnston CS. Almond ingestion at mealtime reduces postprandial glycemia and chronic ingestion reduces hemoglobin A(1c) in individuals with well-controlled type 2 diabetes mellitus. *Metabolism*. 2011 Sep;60(9):1312-7.
106. Mori AM, Considine RV, Mattes RD. Acute and second-meal effects of almond form in impaired glucose tolerant adults: a randomized crossover trial. *Nutr Metab (Lond)*. 2011 Jan 28;8(1):6.
107. Atkinson FS et al International tables of glycemic index and glycemic load values: 2008. *Diabetes Care*. 2008 Dec;31(12):2281-3.
108. Chestnut Growers of Australia IDI GI testing Report, 2005
109. Casas-Agustench P, Bulló M, Salas-Salvadó J. Nuts, inflammation and insulin resistance. *Asia Pac J Clin Nutr*. 2010;19(1):124-30.
110. Salas-Salvadó J et al. The effect of nuts on inflammation. *Asia Pac J Clin Nutr*. 2008;17 Suppl 1:333-6.
111. Mattes RD, et al. Nuts and healthy body weight maintenance mechanisms. *Asia Pac J Clin Nutr*. 2010;19(1):137-41.
112. Mattes RD, et al. Impact of peanuts and tree nuts on body weight and healthy weight loss in adults. *J Nutr*. 2008;138(9):1741S-1745S.
113. Tey SL, et al. Current guidelines for nut consumption are achievable and sustainable: a hazelnut intervention. *Brit J Nutr*. 2011 May;105(10):1503-11
114. Sabaté et al. Nut consumption and blood lipid levels: a pooled analysis of 25 intervention trials. *Arch Intern Med* 2010;170(9):821-7.
115. Morrison MK et al. Postpartum diet quality in Australian women following a gestational diabetes pregnancy. *Eur J Clin Nutr*. 2012 Jul 11. doi: 10.1038/ejcn.2012.84. [Epub ahead of print]
116. O'Neil CE et al Tree nut consumption improves nutrient intake and diet quality in US adults: an analysis of National Health and Nutrition Examination Survey (NHANES) 1999-2004. *Asia Pac J Clin Nutr*. 2010;19(1):142-50.
117. Sabaté, J, Wien M. Nuts, blood lipids and cardiovascular disease. *Asia Pac J Clin Nutr* 2010;19(1):131-136.
118. Phung OJ et al. Almonds have a neutral effect on serum lipid profiles: A Meta-Analysis of randomized trials. *JADA* 2009;109(5): 865-873 (letter to the editor *JADA* 2009;109(9):1521-22.)
119. NHMRC Australian Dietary Guidelines Incorporating the Australian Guide to Healthy Eating Providing the scientific evidence for healthier Australian diets DRAFT FOR PUBLIC CONSULTATION National Health and Medical Research Council December 2011 www.eatforhealth.gov.au





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