

IN THE SPOTLIGHT: EMERGING NUTRITION RESEARCH

The Almond Board of California has always been a leader in nutrition research with nearly 200 published studies to date. This module details three new nutrition research frontiers that we are investigating. Being on top of breaking science is important for topical media interviews as well as providing new content for stand-out speaking engagements.



Research Areas Covered in this Almond Academy Module

Skin Health

- How almond consumption supports the skin's internal defenses against UVB rays
- How eating almonds improves both facial wrinkles and skin pigmentation

Vascular Health

- An increase in endothelium-dependent vasodilation from almond snacking – a new research finding
- The resulting positive effect on cardiovascular disease relative risk

Diet Quality

- New analysis of almond consumption's impact on improved dietary intake
- New finding about positive benefits for heart health risk factors



TAKING SKIN HEALTH IN NEW DIRECTIONS

The Almond Board of California has been supporting skin health research for several years, but recently two new peer-reviewed papers have shifted the paradigm of how eating almonds impacts skin. One team at University of California, Los Angeles conducted an innovative study¹ about how almond consumption supports the skin's internal defenses against harmful UVB rays.

Researchers investigated whether daily almond intake could increase resistance to UVB light and improve skin texture. They recruited 29 Asian women (18 to 45 years old) with skin types that ranged from “burns and does not tan easily” to “burns a little and tans easily,” technically classified as Fitzpatrick skin types II, III or IV. Women were randomly assigned to one of two groups for a 12-week period: Group 1 ate: 42 grams (246 calories) of almonds daily for 12 weeks and Group 2 ate: 51 grams (200 calories) of pretzels daily for 12 weeks.

The researchers measured each person's skin response to UVB rays—the type of rays known to cause sunburn—at the beginning and end of the study by quantifying their individual minimal erythema dose (MED). MED is the lowest dose of UVB light needed to cause slight skin reddening to a specific site on the skin—in this case, inner-arm skin was chosen because it has little exposure to the sun. Skin reddening is the first indication of skin photodamage, so increased MED indicates improved protection against and resistance to UVB photodamage.



At the beginning of the study, there were no differences in MED between groups. **After the 12-week intervention, there was an increase in both MED (~20%) and exposure time to reach minimal reddening for women in the almond group compared to the pretzel group.** No statistically significant changes in MED or exposure time were observed in the pretzel group. No differences in skin texture, sebum or hydration were seen in these measures over time or between groups.

Limitations: A smaller study population was included than originally planned, due to the exclusion of those participants found to be UVB resistant at the dose and exposure time selected. This study did not investigate the effect of sunlight exposure in general or UVA exposure; findings are limited to protection against UVB radiation. This study also investigated a younger population. Further research is needed to investigate the effects of almond consumption for older subjects with moderate-to-severe photoaged skin and for other Fitzpatrick skin types.

IMPROVING WRINKLES AND SKIN TONE

Researchers at the University of California, Davis, investigated the effects of daily almond eating on facial wrinkles and skin pigmentation.² Forty-nine (49) healthy postmenopausal women with Fitzpatrick skin types I or II (the skin types most susceptible to sunburn) completed this six-month study.

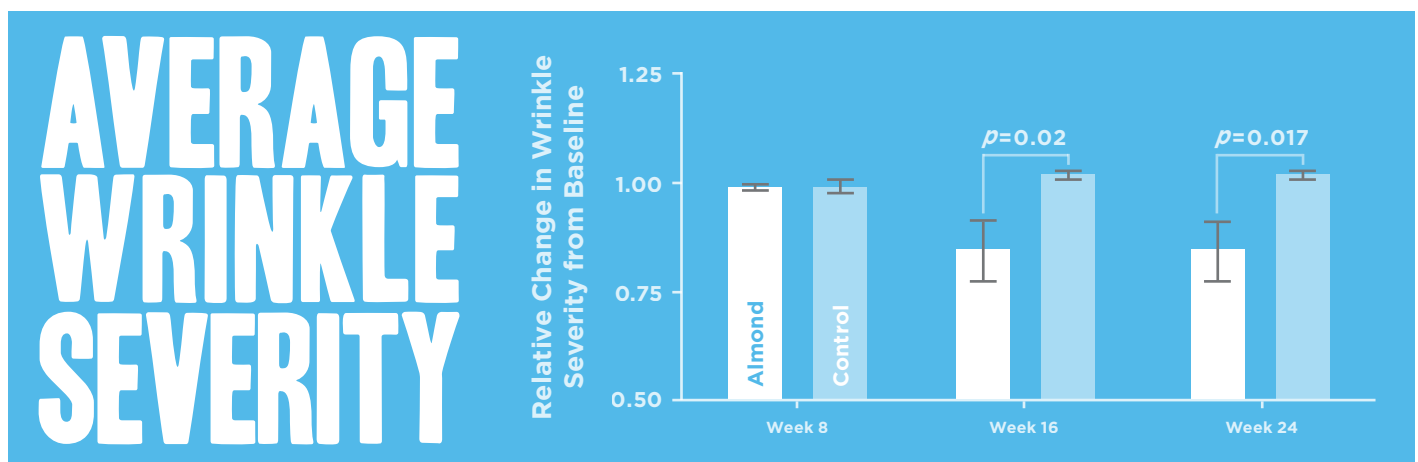
The women were randomly assigned to one of two groups:

- The intervention group, which ate almonds as a snack, accounting for 20% of total daily calorie intake, or 340 calories per day on average (about 2 30-gram servings).
- The control group, which ate a nut-free snack that also accounted for 20% of calories: a fig bar, granola bar or pretzels.

Aside from these snacks, study participants ate their regular diets and did not eat any nuts or nut-containing products. Skin assessments were made at the start of the study and at 8 weeks, 16 weeks and 24 weeks. At each of these visits, facial wrinkles and facial pigment intensity were assessed using high-resolution facial imaging and validated 3-D facial modeling and measurement. Skin hydration, transepidermal water loss (TEWL) and sebum excretion were also assessed.

Researchers found significant reductions in wrinkle severity and in overall facial pigment intensity in the group consuming almonds:

- **Wrinkle severity decreased by 15% at week 16 and by 16% at the end of the study**
- **Overall facial pigment intensity decreased by 20% at week 16 and remained so at week 24**



Limitations: Include that the results do not provide insight into durations of eating almonds longer than 24 weeks. Additionally, the study participants were postmenopausal women with sun-sensitive Fitzpatrick skin types I and II, so results cannot be generalised to younger, male or higher Fitzpatrick skin type populations. Although the snacks in both groups were calorie-matched, they were not macronutrient matched.

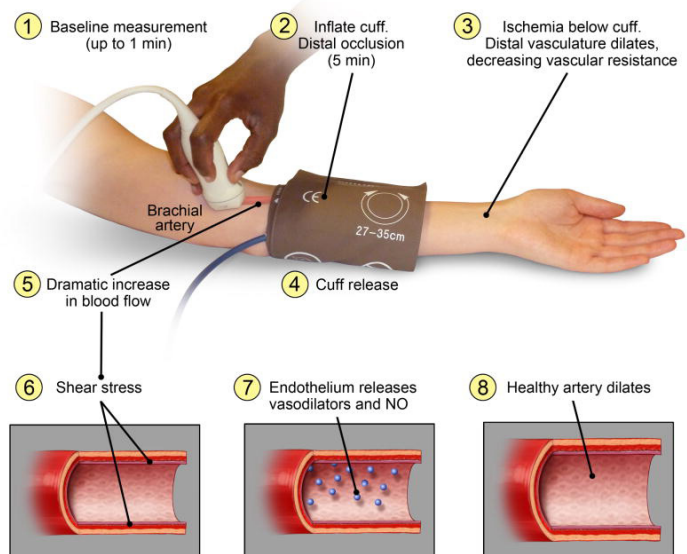
IMPROVING VASCULAR HEALTH

A novel discovery for almonds found that eating them improved endothelial function, which is a key indicator of vascular health. This cutting-edge finding joins previous research about other measures of heart health including cholesterol reduction and hypertension. The study³ was a 6-week randomized control, parallel-arm trial, where participants (with above average cardiovascular disease risk) consumed almonds or a calorie-matched control snack providing 20% of each participants' estimated daily energy needs.

The research team then compared cardiometabolic health markers between the two groups. They found that the almond group, compared to the control group, had increased endothelium-dependent vasodilation by a 4% unit increase (measured through flow mediated dilation or FMD), which is a strong predictor of the initiation and progression of the disease atherosclerosis. Improved FMD means that arteries can dilate more easily in response to increased blood flow, which is a strong indicator of cardiovascular health. LDL-cholesterol levels decreased in the almond group relative to the control group. There was no difference between the two groups in liver fat and several other measures (triglycerides, HDL-cholesterol, glucose, insulin and others).

The impact of this percentage change in FMD has large cardioprotective potential. The researchers predict that replacing typical snacks with almonds in the long term would result in a 30% reduction in the adjusted relative risk of a cardiovascular event, based on existing data on risk of cardiovascular disease.

Flow Mediated Dilation



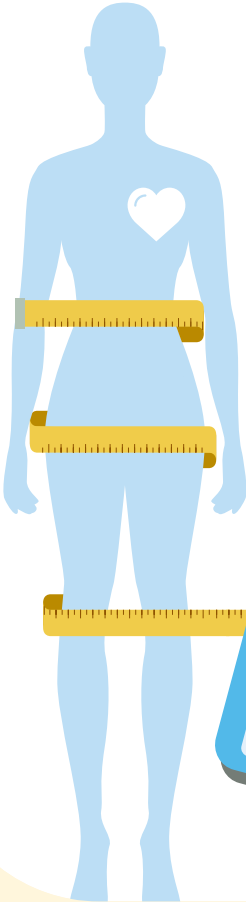
Limitations: there were some differences between groups in cardiometabolic disease risk factors at baseline. The imbalance in recruitment by sex could mean that the results may not be as applicable to men since they made up only 30% of the randomized study population. Also, the participants were free-living, and although almond compliance was confirmed, it is possible there is potential for some inaccuracies in their reported food intake.

UNDERSTANDING DIET QUALITY

Diet quality is a hot topic in nutrition research because measuring diet quality is important on several levels – for disease prevention and for quantifying food scarcity, where macro- and micronutrients may not be properly consumed. The International Dietary Data Expansion Project (<https://index.nutrition.tufts.edu/data4diets/indicator/diet-quality-index-international-dqi-i>) is concerned with synthesizing several diet quality indices to help establish global measures of diet quality. This is an interesting new research development about what constitutes a healthy diet, but diet quality is a powerful way to teach consumers how to choose what to eat to help follow dietary guidelines. This goes back to the principle that dietitians and nutritionists want to drive home: we eat food, not nutrients.

The Almond Board has conducted new research into diet quality in UK and US populations. **A new study⁴ found that British adults who ate almonds regularly had lower body mass index (BMI) and waist circumference measurements than those who did not eat almonds. The reductions in BMI were significantly lower for the almond group by 0.8 kg/m² and waist circumference was lower by 2.1cm.**

However, average almond intake among UK adults remains low and well under the recommended serving size of 30g, or 23 almonds, per day. According to the study, only 7.6% of British adults reported eating whole almonds and average intake was 5g/day. The researchers used the most recent population data from the UK's National Diet and Nutrition Survey (NDNS rolling program, 2008-2017) to determine the higher diet quality scores of almond eaters. Almond consumers reported higher diet quality scores, which compares nutrient intake to dietary recommendations for health, compared to those who reported not consuming almonds. A handful (30g) of these nutrient-rich nuts can elevate overall diet quality for the day.



Almond eaters consumed more fibre, vitamin E and iron to name a few nutrients – with less salt and sugar intake -- than those who skipped almonds. US researchers have found similar diet quality boosts with almonds.⁵ Data from the National Health and Nutrition Examination Survey (NHANES; 2001-2010) was used to look at the association between almond consumption and diet quality of American adults.

- **BMI was significantly lower in almond consumers than in non-consumers** (27.1 vs 28.4).
- **Waist circumference was also significantly lower in almond consumers than in non-consumers** (94.1cm vs. 97.5cm).
- **Diet quality scored higher in those eating almonds due to several healthy habits, including eating more high-fibre foods and less saturated fat.**

ALMOND EATERS HAVE LOWER BMI AND WAIST CIRCUMFERENCE



For almond eaters vs. non-almond eaters, average waist circumference was **94.1cm (vs. 97.5cm)** and BMI was **27.1 (vs. 28.4)**.

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- *. <https://researchimpact.uwa.edu.au/research-impact-stories/a-tailored-prescription-in-exercise/fmd-description-of-flow-mediate-dilation-technique-for-in-vivo-assessment-of-conduit-artery-endothelium-mediated-vasodilation/>

