



Just over 1 million Australians reported having type 2 diabetes in the last National Health Survey (2014/15)¹ and it's estimated 2 million Aussies are at high risk of developing it in the future.² Avocado is a whole plant food with nutrients people with diabetes need and including avocado in meals and snacks can positively effect blood glucose and insulin levels.

DIABETES-FRIENDLY NUTRIENTS IN AVOCADOS

**AVOCADO = GOOD FATS + FIBRE + VITAMINS C&E +
CAROTENOIDS + GLYCAEMIC BENEFITS**

Healthy fats

Diets containing monounsaturated fats like those in avocado may reduce the risk of developing type 2 diabetes (T2D)³ and for those who already have T2D monounsaturated fat diets decrease fasting blood glucose⁴, decrease glycosylated haemoglobin (HbA1c)⁵, lower fasting insulin⁶, improve insulin sensitivity⁶ and decrease postprandial insulin response.⁷

Dietary fibre

Higher intakes of dietary fibre especially from fruits and green/yellow vegetables is associated with a reduced risk of T2D.⁸

Vitamin C

A New Zealand study found people with T2D may have higher vitamin C requirements⁹ and vitamin C supplements have been shown to help glucose control in those with T2D.¹⁰ A 50g serve or ¼ avocado contains 14% of the RDI for vitamin C.

Vitamin E

Avocado also contains vitamin E (10% RDI) and it's helpful that vitamin C and E are present together as vitamin E requires vitamin C to help it regenerate its antioxidant ability.¹¹ Higher intake of vitamin E is also associated with a reduced risk of T2D.¹²

Carotenoids

Avocado contains colourful carotenoid pigments beta carotene, lutein and zeaxanthin. Higher intake of these carotenoids is associated with a reduced risk of T2D.^{12,13} Lutein and zeaxanthin may also protect against diabetic retinopathy, a complication of T2D.¹⁴

Polyphenols

Diets high in polyphenols may help reduce the risk of developing T2D by positively affecting glucose metabolism.¹⁵ For those with T2D, polyphenols help lower HbA1c¹⁶ and reduce oxidative stress and inflammation thereby improving insulin resistance.¹⁷

Glycaemic benefits

Adding healthy fats to meals with carbohydrate reduces the glycaemic impact of the meal. Fat content is estimated to predict 31% of the variability of postprandial glycaemia and insulinaemia.¹⁸ A reduced glycaemic impact has been demonstrated for other high monounsaturated fat spreads peanut butter¹⁹ and hummus²⁰ so there's no reason why avocado wouldn't have the same effect. Smashed avo on toast anyone?

Sugars

Avocado contains a unique sugar D-manno-heptulose that does not contribute energy and may help blood glucose control by reducing glycolysis.^{21,22}

AVOCADO AND METABOLIC HEALTH

People with diabetes have twice the risk of cardiovascular disease as those without T2D.²³ Avocado can assist those with T2D through improving blood lipid levels – triglycerides and total, LDL and HDL cholesterol.^{24,25}

LAST RESEARCH ON AVOCADO AND METABOLIC HEALTH

Blood lipids

Two studies have examined the effects of avocado in people with T2D. A small randomised crossover study involving 12 women with T2D found after four weeks each of a high monounsaturated fat diet (with an avocado a day, a third at each meal) and a high carbohydrate diet, there was minor cholesterol lowering in both diets but the avocado diet was associated with a greater decrease in blood triglycerides (20% vs. 7% in the high-carbohydrate diet). Glycaemic control was similar during both diets. Researchers concluded that including avocado in the diet of those with T2D could help reduce cholesterol and triglycerides.²⁴

The second study followed 37 participants with hypercholesterolemia (half with T2D) who consumed a diet enriched with 300g of avocado to replace all other fats for a week. In those with T2D, total and LDL cholesterol was reduced by about 20% and reductions in blood glucose levels were seen for most participants although only a third were clinically significant.²⁵

For more heart health benefits see the Avocado for a *Healthy Heart fact sheet*.

Blood glucose

In people with type 2 diabetes replacing some carbohydrate with avocado helps to maintain blood glucose control.²⁴ Studies in healthy or overweight people have found either no compromise in blood glucose with avocado consumption^{26,27} or significant reductions in post prandial glycemia after a half serve (68g) or full serve (136g) of avocado.²⁸ Lower post prandial insulin has also been shown in several studies.^{26,28,29} These results are promising, and more research is needed.

Animal research is uncovering mechanisms to explain the beneficial glycaemic effects of avocado. Avocado extracts have been found to:

- modulate the activities of carbohydrate metabolic enzymes in rats,^{30,31}
- inhibit enzymes such as α -amylase and reduce oxidative stress in rat pancreas,³²
- increase glucose uptake in the liver and normalise liver enzyme levels.^{33,34}

Avocado oil has been shown to improve glucose tolerance and insulin resistance in rats fed high sucrose diets.³⁵

AVOCADO = LOWER BLOOD LIPIDS + BETTER BLOOD GLUCOSE CONTROL + LOWER INSULIN LEVELS

6 DIABETES-FRIENDLY MEAL IDEAS WITH AVOCADO:

1. Easy avo and baked beans on wholegrain toast for a high fibre, low GI breakfast
<http://australianavocados.com.au/recipes/avocado-and-baked-beans-toast>
2. Spread your wholegrain bread, roll, wrap or crispbread with avocado instead of butter
<http://australianavocados.com.au/recipes/multigrain-bread-smoked-fish-avocado-cucumber-spicy-sauce>
3. Make lean meat, chicken, fish or vege-burgers sing with an avo salsa
<http://australianavocados.com.au/recipes/sweetcorn-and-avocado-salsa-limes-and-tomatoes>
4. Top pasta or vege-noodles with avocado
<http://australianavocados.com.au/recipes/avo-zoodles>
5. Make a lower GI green potato mash with avocado
<http://australianavocados.com.au/recipes/avocado-potato-parsnip-mash-salmon>
6. Viva Mexicana with avo and chilli beans in tacos and tortillas
<http://australianavocados.com.au/recipes/tacos-grilled-chicken-bean-salsa-and-avocado>

Check out more delicious recipes at australianavocados.com.au



NUTRITION INFORMATION

Servings per package: 4 serves per avocado
 Serving size: 50g or ¼ avocado

	Average Quantity per Serving	Average Quantity per 100g
Energy	430kJ (102Cal)	860kJ (205Cal)
Protein, total	1.0g	2.0g
Fat, total	10.7g	21.4g
– saturated	2.4g	4.8g
– trans	0g	0g
– polyunsaturated	1.4g	2.7g
– monounsaturated	7.4g	12.8g
Carbohydrate	<1g	<1g
– sugars	<1g	<1g
Dietary fibre, total	2.5g	5.0g
Sodium	2mg	4mg
Potassium	255mg	509mg
Vitamin C	5.5mg (14% RDI)	11mg
Vitamin E	1mg (10% RDI)	2mg
Polyphenols	71mg GAE	142mg GAE
Beta carotene	14ug	27ug
Cryptoxanthin	59ug	117ug
Lutein & zeaxanthin	136ug	271ug



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