[Template:Redirect](/wiki/Template:Redirect" \o "Template:Redirect) [Template:Use British (Oxford) English](/wiki/Template:Use_British_(Oxford)_English) [Template:Use dmy dates](/wiki/Template:Use_dmy_dates) [Template:Infobox](/wiki/Template:Infobox) **Veganism** is both the practice of abstaining from the use of [animal products](/wiki/Animal_product), particularly in diet, and an associated philosophy that rejects the [commodity status of animals](/wiki/Commodity_status_of_animals).[[1]](#cite_note-1) A follower of either the diet or the philosophy is known as a vegan (pronounced [Template:Respell](/wiki/Template:Respell)).

The term *vegan* was coined in 1944 by [Donald Watson](/wiki/Donald_Watson) when he co-founded the [Vegan Society](/wiki/Vegan_Society) in England, at first to mean "non-dairy vegetarian" and later "the doctrine that man should live without exploiting animals".[[2]](#cite_note-2) Interest in veganism increased in the 2010s; vegan stores opened, and vegan options became available in more supermarkets and restaurants in many countries.<ref name=moremainstream/>

Distinctions are sometimes made between several categories of veganism. *Dietary vegans* (sometimes referred to as strict [vegetarians](/wiki/Vegetarianism) or followers of a [plant-based diet](/wiki/Plant-based_diet)) refrain from consuming animal products, not only meat but also [eggs](/wiki/Egg_(food)), [dairy products](/wiki/Dairy_product), and other animal-derived substances. Dietary vegans are often more focused on the health aspects of whole foods, and, as such, may consume honey or wear clothing that include animal products (for example, leather or wool).[[3]](#cite_note-3) The term *ethical vegan* is often applied to those who not only follow a vegan diet, but extend the philosophy into other areas of their lives, and oppose the use of animal products for any purpose.[Template:Refn](/wiki/Template:Refn) Another term is [*environmental veganism*](/wiki/Environmental_vegetarianism), which refers to the avoidance of animal products on the premise that the harvesting or industrial farming of animals is environmentally damaging and [unsustainable](/wiki/Sustainability).<ref name=environmental>Michael Shapiro, ["Sea Shepherd's Paul Watson: 'You don't watch whales die and hold signs and do nothing'"](http://www.guardian.co.uk/environment/2010/sep/21/sea-shepherd-paul-watson-whales), *The Guardian*, 21 September 2010.[Template:Pb](/wiki/Template:Pb) Matthew Cole, "Veganism," in Margaret Puskar-Pasewicz (ed.), *Cultural Encyclopedia of Vegetarianism*, ABC-Clio, 2010 (pp. 239–241), p. [241](https://books.google.com/books?id=3-braqoek0AC&pg=PA241).</ref>

Vegan diets tend to be higher in dietary fibre, magnesium, folic acid, vitamin C, vitamin E, iron, and phytochemicals, and lower in [dietary energy](/wiki/Dietary_energy_supply), saturated fat, cholesterol, long-chain omega-3 fatty acids, vitamin D, calcium, zinc, and vitamin B12.[Template:Refn](/wiki/Template:Refn) Well-planned vegan diets can reduce the risk of some types of [chronic disease](/wiki/Chronic_disease), including heart disease,<ref name=disease/> and are regarded as appropriate for all stages of the life-cycle by the American Academy of Nutrition and Dietetics, the Australian National Health and Medical Research Council, and Dietitians of Canada.<ref name=dietitians/> Because uncontaminated plant foods do not provide [vitamin B12](/wiki/Vitamin_B12) (which is produced by [microorganisms](/wiki/Microorganism) such as [bacteria](/wiki/Bacteria)), [researchers agree](/wiki/#Vitamin_B12) that vegans should eat B12-[fortified](/wiki/Food_fortification) foods or take a supplement.[Template:Refn](/wiki/Template:Refn)

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## History[[edit](/index.php?title=(none)&action=edit&section=1)]

### Strict vegetarians[[edit](/index.php?title=(none)&action=edit&section=2)]

[Template:Further](/wiki/Template:Further) [thumb|upright=1.35|alt=photograph|](/wiki/File:Fruit_lands_Alcott_house,_2015_2.jpg) [Fruitlands](/wiki/Fruitlands_(transcendental_center)), a short-lived vegan community established by [Amos Bronson Alcott](/wiki/Amos_Bronson_Alcott) in Harvard, Massachusetts, in 1844.[[4]](#cite_note-4)

The origin of the English term *vegetarian* is unknown.[[5]](#cite_note-5) The earliest known use is attributed to the actress [Fanny Kemble](/wiki/Fanny_Kemble), writing around 1839 in Georgia in the United States.[Template:Refn](/wiki/Template:Refn) The practice can be traced to [Pythagoras](/wiki/Pythagoras) in 6th-century-BCE [Greece](/wiki/Ancient_Greece). Greek philosophers [Empedocles](/wiki/Empedocles) and [Theophrastus](/wiki/Theophrastus) were vegetarians, as were [Seneca the Younger](/wiki/Seneca_the_Younger), [Ovid](/wiki/Ovid), [Plutarch](/wiki/Plutarch), [Plotinus](/wiki/Plotinus), [Porphyry](/wiki/Porphyry_(philosopher)),<ref name=Dombrowski1984>[Daniel A. Dombrowski](/wiki/Daniel_Dombrowski), ["Vegetarianism and the Argument from Marginal Cases in Porphyry"](http://www.jstor.org/stable/2709335), *Journal of the History of Ideas*, 45(1), January –March 1984, pp. 141–143. [Template:Doi](/wiki/Template:Doi)</ref> and the Arab poet [Al-Maʿarri](/wiki/Al-Maʿarri).[[6]](#cite_note-6) Their arguments were based on health, the [transmigration of souls](/wiki/Transmigration_of_souls), [animal welfare](/wiki/Animal_welfare) and the view, espoused by Porphyry in *De Abstinentia ab Esu Animalium* ("On Abstinence from Animal Food"), that if humans deserve justice so do nonhumans.<ref name=Dombrowski1984/>

[Template:AnchorVegetarianism](/wiki/Template:Anchor) established itself as a significant movement in 19th-century England and the United States.[[7]](#cite_note-7) There were [ovo-lacto vegetarians](/wiki/Ovo-lacto_vegetarianism), who avoided meat but ate eggs and dairy; [pescetarians](/wiki/Pescetarianism), who in addition ate fish; and dietary vegans, then called strict vegetarians, who ate no meat, nor animal related products.[[8]](#cite_note-8) In 1813 the poet [Percy Bysshe Shelley](/wiki/Percy_Bysshe_Shelley) published [*A Vindication of Natural Diet*](/wiki/A_Vindication_of_Natural_Diet), advocating "abstinence from animal food and spirituous liquors," and in 1815 William Lambe, a London physician, claimed that a vegan diet could cure a range of diseases from cancer and tuberculosis to acne.[[9]](#cite_note-9) [Sylvester Graham's](/wiki/Sylvester_Graham) meatless Graham diet – mostly fruit, vegetables, water, and bread made at home with stoneground flour – became popular as a supposed health remedy in the 1830s in the United States.[[10]](#cite_note-10) Several vegan communities were established. [Amos Bronson Alcott](/wiki/Amos_Bronson_Alcott), father of novelist [Louisa May Alcott](/wiki/Louisa_May_Alcott), opened the [Temple School](/wiki/Temple_School_(Massachusetts)) in 1834 and [Fruitlands](/wiki/Fruitlands_(transcendental_center)) in 1844 in Massachusetts.[[11]](#cite_note-11) In England in 1838 [James Pierrepont Greaves](/wiki/James_Pierrepont_Greaves) founded the Concordium, a vegan community at [Alcott House](/wiki/Alcott_House) on [Ham Common](/wiki/Ham_Common,_London).<ref name=Latham1999p168/>[[12]](#cite_note-12) In 1843 members of Alcott House created the British and Foreign Society for the Promotion of Humanity and Abstinence from Animal Food, led by Sophia Chichester.[[13]](#cite_note-13)[[17]](#cite_note-17) The consumption of eggs and dairy had become something of an issue within the society. There were regular discussions in its newsletter, the *Vegetarian Messenger*, about the treatment of cows and hens; it appears from the correspondence that many opponents of veganism came from within the vegetarian community.<ref name=WatsonAutumn1965/>[[18]](#cite_note-18) Lacto-vegetarians typically did not oppose veganism on moral grounds, and acknowledged the ethical consistency of the vegan position. However, they regarded a vegan diet as impractical, and were concerned that it might be an impediment to spreading vegetarianism if vegans found themselves unable to participate in social circles where no vegan food might be available. This became the predominant view of the Vegetarian Society.[[16]](#cite_note-16) In August 1944 several members asked that a section of the society's newsletter be devoted to non-dairy vegetarianism. When the request was turned down, [Donald Watson](/wiki/Donald_Watson), secretary of the Leicester Vegetarian Society, set up a new quarterly newsletter, *Vegan News*, in November 1944, priced [tuppence](/wiki/Penny_(British_pre-decimal_coin)). He chose the word *vegan* himself.<ref name=Watsoninterview>George D. Rodger, ["Interview with Donald Watson"](http://www.vegparadise.com/24carrot610.html), *Vegetarians in Paradise*, 11 August 2004. George D. Rodger, ["Interview with Donald Watson"](https://www.vegansociety.com/sites/default/files/DW_Interview_2002_Unabridged_Transcript.pdf), recorded 15 December 2002 (abridged version later published in *The Vegan*).</ref>[Template:Refn](/wiki/Template:Refn) The first edition attracted over 100 letters, including from [George Bernard Shaw](/wiki/George_Bernard_Shaw), who resolved to give up eggs and dairy.<ref name=WatsonAutumn1965>Donald Watson, "The Early History of the Vegan Movement", [*The Vegan*](http://issuu.com/vegan_society/docs/the-vegan-autumn-1965---21st-anniversary-issue), Autumn 1965, pp. 5–7.[Template:Pb](/wiki/Template:Pb) Donald Watson, [*Vegan News*](http://issuu.com/vegan_society/docs/the_vegan_news_1944), first issue, November 1944.</ref> The six members of the new [Vegan Society](/wiki/Vegan_Society) held their first meeting in early November at the Attic Club, 144 [High Holborn](/wiki/High_Holborn), London.[Template:Refn](/wiki/Template:Refn) [World Vegan Day](/wiki/World_Vegan_Day) is held every 1 November to mark the society's creation.[[19]](#cite_note-19) *Vegan News* changed its name to *The Vegan* in November 1945, by which time it had 500 subscribers.[[20]](#cite_note-20) It published recipes, health news and a "vegan trade list" of animal-free products such as [Colgate toothpaste](/wiki/Colgate_(toothpaste)), [Kiwi shoe polish](/wiki/Kiwi_(shoe_polish)), Dawson & Owen stationery and Gloy glue.[[21]](#cite_note-21) Vegan books appeared, including *Vegan Recipes* by Fay K. Henderson, and *Aids to a Vegan Diet for Children* by Kathleen V. Mayo.[[22]](#cite_note-22) The Vegan Society soon made clear that it rejected the use of animals for any purpose, not only as food, and in 1951 it defined *veganism* as "the doctrine that man should live without exploiting animals."<ref name=Cross1951>Leslie Cross, ["Veganism Defined"](http://www.ivu.org/history/world-forum/1951vegan.html), *The Vegetarian World Forum*, 5(1), Spring 1951, pp. 6–7.</ref><ref name=Cole2014p203>Matthew Cole, "'The greatest cause on earth': The historical formation of veganism as an ethical practice," in Nik Taylor, Richard Twine (eds.), *The Rise of Critical Animal Studies: From the Margins to the Centre*, Routledge, 2014 (pp. 203–224), p. 203.</ref> In 1956 Leslie Cross, the society's vice-president, founded the Plantmilk Society to explore commercial [soy milk](/wiki/Soy_milk) production. As Plantmilk Ltd (later [Plamil Foods](/wiki/Plamil_Foods)) it began production in 1965 of one of the first widely distributed soy milks in the Western world.<ref name=Maher1986>Harry Maher, ["The Milk of Human Kindness"](http://www.veganviews.org.uk/vv37/vv37arthurling.html), interview with Arthur Ling, *Vegan Views*, 37, Autumn 1986; ["C Arthur Ling, 1919–2005"](http://www.plamilfoods.co.uk/news/arthurling), Plamil Foods; "The Plantmilk Society", *The Vegan*, X(3), Winter 1956, pp. 14–16.</ref>

The first vegan society in the United States was founded in 1948 by Catherine Nimmo and Rubin Abramowitz in California, who distributed Watson's newsletter.[[23]](#cite_note-23) In 1960 [H. Jay Dinshah](/wiki/H._Jay_Dinshah) founded the [American Vegan Society](/wiki/American_Vegan_Society) (AVS), linking veganism to the concept of [*ahimsa*](/wiki/Ahimsa), "non-harming" in [Sanskrit](/wiki/Sanskrit).[[24]](#cite_note-24)[[25]](#cite_note-25) According to [Joanne Stepaniak](/wiki/Joanne_Stepaniak), the word *vegan* was first published independently in 1962 by the *Oxford Illustrated Dictionary*, defined as "a vegetarian who eats no butter, eggs, cheese or milk."[[26]](#cite_note-26)

## Increasing interest[[edit](/index.php?title=(none)&action=edit&section=4)]

### Countercultural food movement[[edit](/index.php?title=(none)&action=edit&section=5)]

In the 1960s a countercultural food movement emerged in the United States around concerns about diet, the environment and a distrust of food producers, leading to increasing interest in organic gardening and vegetarianism.[[27]](#cite_note-27) [Frances Moore Lappé's](/wiki/Frances_Moore_Lappé) [*Diet for a Small Planet*](/wiki/Diet_for_a_Small_Planet) (1971) sold over three million copies and suggested "getting off the top of the food chain."[[28]](#cite_note-28) From the late 1970s a group of scientists in the US, including physicians [Dean Ornish](/wiki/Dean_Ornish), [Caldwell Esselstyn](/wiki/Caldwell_Esselstyn), [Neal D. Barnard](/wiki/Neal_D._Barnard), [John A. McDougall](/wiki/John_A._McDougall), [Michael Greger](/wiki/Michael_Greger) and biochemist [T. Colin Campbell](/wiki/T._Colin_Campbell), argued that diets based on [animal fat](/wiki/Animal_fat) and animal protein, such as the [Western pattern diet](/wiki/Western_pattern_diet), were detrimental to health.[[29]](#cite_note-29) The following decades saw a series of books recommend vegan or vegetarian diets, including McDougall's *The McDougall Plan* (1983), [John Robbins's](/wiki/John_Robbins_(author)) [*Diet for a New America*](/wiki/Diet_for_a_New_America) (1987), which associated meat eating with environmental damage, and *Dr. Dean Ornish's Program for Reversing Heart Disease* (1990).[[30]](#cite_note-30) In 2003 two major North American dietitians' associations approved the vegan diet as safe for all life stages.[[31]](#cite_note-31) This was followed by the film [*Earthlings*](/wiki/Earthlings_(film)) (2005), Campbell's [*The China Study*](/wiki/The_China_Study) (2005), and Rory Freedman and Kim Barnouin's [*Skinny Bitch*](/wiki/Skinny_Bitch) (2005), as well as [Jonathan Safran Foer's](/wiki/Jonathan_Safran_Foer) [*Eating Animals*](/wiki/Eating_Animals) (2009) and the film [*Forks over Knives*](/wiki/Forks_over_Knives) (2011).[[32]](#cite_note-32)

### Into the mainstream (2010s)[[edit](/index.php?title=(none)&action=edit&section=6)]

[Template:Further](/wiki/Template:Further) [thumb|upright=1.35|alt=chart|Interest in veganism in the 2010s was reflected in increased page views for the topic on Wikipedia.<ref name=pageviews>](/wiki/File:Vegetarianism_and_veganism_page_views,_Wikipedia.jpg)[*Meat Atlas*](http://www.boell.de/sites/default/files/meat_atlas2014.pdf), Heinrich Böll Foundation, Friends of the Earth Europe, 2014, p. 57; Mona Chalabi, ["Meat atlas shows Latin America has become a soybean empire"](http://www.theguardian.com/news/datablog/2014/jan/09/meat-atlas-latin-america-soybean-empire-food), *The Guardian*, 9 January 2014.</ref>

The vegan diet became more mainstream in the 2010s.<ref name=moremainstream>[Template:Cite web](/wiki/Template:Cite_web)[Template:Pb](/wiki/Template:Pb) Kat Tancock, ["Vegan cuisine moves into the mainstream – and it's actually delicious"](http://www.theglobeandmail.com/life/food-and-wine/food-trends/vegan-cuisine-moves-into-the-mainstream/article22430440/), *The Globe and Mail*, 13 January 2015.[Template:Pb](/wiki/Template:Pb) Antonia Molloy, ["No meat, no dairy, no problem: is 2014 the year vegans become mainstream?"](http://www.independent.co.uk/life-style/food-and-drink/features/no-meat-no-dairy-no-problem-is-2014-the-year-vegans-become-mainstream-9032064.html), *The Independent*, 31 December 2013.[Template:Pb](/wiki/Template:Pb) Raman Nijjar, ["From pro athletes to CEOs and doughnut cravers, the rise of the vegan diet"](http://www.cbc.ca/news/canada/story/2011/05/27/f-vegan-power.html), CBC News, 4 June 2011.[Template:Pb](/wiki/Template:Pb) ["Vegan diets becoming more popular, more mainstream"](http://www.cbsnews.com/2100-204_162-7216497.html), Associated Press, 6 January 2011.</ref> Chain restaurants began marking vegan items on their menus, and supermarkets improved their selection of vegan processed food.[[33]](#cite_note-33) The global mock-meats market increased by 18 percent between 2005 and 2010,<ref name=Burt19May2012>Kate Burt, ["Is this the end of meat?"](http://www.independent.co.uk/life-style/food-and-drink/features/is-this-the-end-of-meat-7765871.html), *The Independent*, 19 May 2012.</ref> and in the US by eight percent between 2012 and 2015 to $553 million a year.<ref name=Shah8Jan2016>Allie Shah, ["Nation's first vegan butcher shop to open in Minneapolis Jan. 23"](http://www.startribune.com/nation-s-first-vegan-butcher-shop-to-open-in-minneapolis-jan-23/364641531/), *Star Tribune*, 8 January 2016.</ref> In the UK the [plant milk](/wiki/Plant_milk) market increased by 155 percent in two years, from 36 million litres in 2011 to 92 million in 2013.<ref name=Khomani8Feb2015>Nadia Khomami, ["From Beyoncé to the Baftas, vegan culture gets star status"](http://www.theguardian.com/lifeandstyle/2015/feb/08/veganism-celebrities-baftas-beyonce-health-animal-welfare), *The Guardian*, 8 February 2015.</ref> The European Parliament defined the meaning of *vegan* for food labels in 2010, in force as of 2015.[[34]](#cite_note-34)[[35]](#cite_note-35) Celebrities, athletes and politicians adopted vegan diets, some seriously, some part-time.[[36]](#cite_note-36)\*[**Template:Flag**](/wiki/Template:Flag): According to the [Central Bureau of Statistics](/wiki/Israel_Central_Bureau_of_Statistics) (CBS), 2.6% of Israelis identified as vegetarian or vegan in 2010.<ref name=Sales2014>[Template:Cite news](/wiki/Template:Cite_news)</ref> In a January 2014 poll by the Panels Institute for [MasterChef Israel](/wiki/MasterChef_Israel), (nearly) 5% of respondents said they were vegan (and 8% vegetarian), making it the highest [per capita](/wiki/Per_capita) vegan population in the world.<ref name=Sales2014/>[[51]](#cite_note-51)[[52]](#cite_note-52) In October 2014, activist group Vegan-Friendly claimed that nearly 4% or around 300,000 Israelis were vegan.<ref name=Sales2014/> However, a March 2014 CBS poll found that 1.7% of adults aged 20 or more identify as vegan (and 4.7% vegetarian).[[53]](#cite_note-53)\*[**Template:Flag**](/wiki/Template:Flag): A study found there were about 16,000 vegans (0.1%) in 1996.[[54]](#cite_note-54)[[55]](#cite_note-55) In 2014, the Dutch Society for Veganism (Nederlandse Vereniging voor Veganisme, NVV) estimated there to be 45,000 Dutch vegans (0.27%), based on their membership growth;[[56]](#cite_note-56) in 2016 they estimated the number at 50,000 (0.3%).[[57]](#cite_note-57) Also in 2016, spokesman Pablo Moleman of Viva Las Vega's estimated about 1% (170,000) of the Dutch population to be vegan,[[54]](#cite_note-54)[[58]](#cite_note-58) whereas [Wageningen](/wiki/Wageningen_University_and_Research_Centre) researcher Hans Dagevos put the maximum at 70,000 (0.4%).[[57]](#cite_note-57) There are no recent representative data available, however.[[54]](#cite_note-54)\*[**Template:Flag**](/wiki/Template:Flag): There are no official statistics on veganism in Spain. According to data from a food brand's 2006 market study gathered by the Spanish Vegetarian Union (Unión Vegetariana Española, UVE), around 0.08% or 36,800 Spaniards were vegan.[[59]](#cite_note-59)\*[**Template:Flag**](/wiki/Template:Flag): 4% said they were vegan in a 2014 Demoskop poll amongst 1,000 people aged 15 and over.[[60]](#cite_note-60)\*[**Template:Flag**](/wiki/Template:Flag): There are no recent estimates or official data, but the Swiss Vegan Society (Vegane Gesellschaft Schweiz) presumes that currently around 1% of the Swiss population lives vegan.[[61]](#cite_note-61)\*[**Template:Flag**](/wiki/Template:Flag): In 2006, [*The Independent*](/wiki/The_Independent) reported there to be 600,000 (0.99%) British vegans at minimum, and a million (1.66%) at most, compared to just 100,000 (0.17%) in 1993.[[62]](#cite_note-62) 2% said they were vegan in a 2007 government survey.[[63]](#cite_note-63) A 2016 [Ipsos MORI](/wiki/Ipsos_MORI) study commissioned by The Vegan Society and *Vegan Magazine*, inquiring almost 10,000 people aged 15 or over across England, Scotland and Wales, found that at least 542,000 Britons were vegan, or at least 1.05% of the UK populace; this is 3.5 times as much as the 150,000 in their previous survey of 2006.[[64]](#cite_note-64)\*[**Template:Flag**](/wiki/Template:Flag): Gallup estimated that as of 2012, 2% of people in the United States self-identified as vegan. (Gallup, 2012;[[65]](#cite_note-65) Chemnitz & Becheva, 2014[[57]](#cite_note-57))

## Animal products[[edit](/index.php?title=(none)&action=edit&section=8)]

### Avoidance[[edit](/index.php?title=(none)&action=edit&section=9)]

[Template:Further](/wiki/Template:Further) [Template:Commons category](/wiki/Template:Commons_category) [thumb|alt=photograph|upright=1.35|The](/wiki/File:Veganz,_Schivelbeiner_Straße_34,_Berlin,_June_2012.jpg) [mock meat](/wiki/Meat_analogue) section in [Veganz](/wiki/Veganz), a vegan supermarket in Berlin

Vegans do not eat [beef](/wiki/Beef), [pork](/wiki/Pork), [poultry](/wiki/Poultry), [fowl](/wiki/Fowl), [game](/wiki/Game_(hunting)) or [seafood](/wiki/Seafood), [eggs](/wiki/Egg_(food)), [dairy](/wiki/Dairy_product) or any other [animal products](/wiki/Animal_product), such as gelatin. Dietary vegans might use animal products in clothing (as leather, wool and silk), toiletries and similar.[[66]](#cite_note-66) Ethical veganism extends not only to matters of food but also to the wearing or using of animal products. Ethical vegans reject the [commodification](/wiki/Commodification) of animals.[[67]](#cite_note-67) The British Vegan Society will certify a product only if it is free of animal involvement as far as possible and practical, including [animal testing](/wiki/Animal_testing).[[68]](#cite_note-68) Philosopher [Gary Steiner](/wiki/Gary_Steiner) argues that it is not possible to be entirely vegan, because animal use and products are "deeply and imperceptibly woven into the fabric of human society."[[69]](#cite_note-69) Animal products in common use include [albumen](/wiki/Albumen), [allantoin](/wiki/Allantoin), [beeswax](/wiki/Beeswax), [blood](/wiki/Blood), [bone char](/wiki/Bone_char), [bone china](/wiki/Bone_china), [carmine](/wiki/Carmine), [casein](/wiki/Casein), [cochineal](/wiki/Cochineal), [elastin](/wiki/Elastin), [emu oil](/wiki/Emu_oil), [gelatin](/wiki/Gelatin), [isinglass](/wiki/Isinglass), [keratin](/wiki/Keratin), [lactic acid](/wiki/Lactic_acid), [lanolin](/wiki/Lanolin), [lard](/wiki/Lard), [rennet](/wiki/Rennet), [retinol](/wiki/Retinol), [shellac](/wiki/Shellac), [squalene](/wiki/Squalene), [tallow](/wiki/Tallow)/sodium tallowate, [whey](/wiki/Whey) and [yellow grease](/wiki/Yellow_grease). Some of these are chemical compounds which can be derived from animal products, from plants, or from petrochemicals. Allantoin, lactic acid, retinol and squalene, for example, can be vegan. However, these products and their origins are not always included in the list of ingredients.[[70]](#cite_note-70) Ethical vegans will not buy woollen jumpers, silk scarves, leather shoes, bedding that contains goose down or duck feathers, ordinary soap (usually made of animal fat), or cosmetics that contain animal products. They avoid certain vaccines; the [flu vaccine](/wiki/Influenza_vaccine), for example, is usually grown in hens' eggs, although an effective alternative, Flublok, is widely available in the United States.[[71]](#cite_note-71) Non-vegan items acquired before they became vegan might be donated to charity or used until worn out. Some vegan clothes, in particular leather alternatives, are made of petroleum-based products, which has triggered criticism because of the environmental damage involved in their production.[[72]](#cite_note-72) Some vegetarians argue that the restrictiveness of a vegan lifestyle is impractical, and that vegetarianism is a better goal.[[73]](#cite_note-73)[[74]](#cite_note-74)

### Eggs, dairy, honey, silk[[edit](/index.php?title=(none)&action=edit&section=10)]

The main difference between a vegan and vegetarian diet is that vegans exclude eggs and dairy products. Ethical vegans avoid them on the premise that their production causes animal suffering and premature death. In egg production, most male [chicks are culled](/wiki/Chick_culling) because they do not lay eggs.<ref name=egg>S. Aerts, et al., "Culling of day-old chicks: opening the debates of Moria?" in Kate Millar, Pru Hobson West, Brigitte Nerlich (eds.), *Ethical Futures: Bioscience and Food Horizons*, Wageningen Academic Publishers, 2009, p. [117](https://books.google.com/books?id=cFwbq035LsQC&pg=PA117); ["Egg Production & Welfare"](http://www.vegsoc.org/page.aspx?pid=587), Vegetarian Society, accessed 17 December 2012.</ref> To obtain milk from [dairy cattle](/wiki/Dairy_cattle), cows are made pregnant to induce [lactation](/wiki/Lactation); they are kept pregnant and lactating for three to seven years, then slaughtered. Female calves are separated from their mothers within 24 hours of birth, and fed milk replacer to retain the cow's milk for human consumption. Male calves are slaughtered at birth, sent for [veal](/wiki/Veal) production, or reared for beef.<ref name=milk>[Lori Gruen](/wiki/Lori_Gruen), *Ethics and Animals*, Cambridge University Press, 2011, pp. 85–86; Erik Marcus, *Veganism: The New Ethics of Eating*, McBooks Press, 2000, pp. [128–129](https://books.google.com/books?id=ONYfgAGyvPQC&pg=PA128).</ref>

Vegan groups disagree about insect products.[[75]](#cite_note-75) Neither the Vegan Society nor the American Vegan Society considers honey, silk and other insect products as suitable for vegans,[[76]](#cite_note-76) while Vegan Action and Vegan Outreach view it as a matter of personal choice.[[77]](#cite_note-77) [Agave nectar](/wiki/Agave_nectar) is a popular vegan alternative to honey.[[78]](#cite_note-78)

## Vegan diet[[edit](/index.php?title=(none)&action=edit&section=11)]

[Template:Cookbook-inline](/wiki/Template:Cookbook-inline)

### Soy[[edit](/index.php?title=(none)&action=edit&section=12)]

[thumb|upright=1.2|alt=photograph|Warm](/wiki/File:Warm_Tofu_with_Spicy_Garlic_Sauce.jpg) [tofu](/wiki/Tofu) (soybean curd) with garlic sauce. Soybeans are a source of [complete protein](/wiki/Complete_protein).

Vegan diets are based on [grains](/wiki/Food_grain) and other [seeds](/wiki/Seed), [legumes](/wiki/Legume) (particularly [beans](/wiki/Bean)), [fruits](/wiki/Fruit), [vegetables](/wiki/Vegetable), [edible mushrooms](/wiki/Edible_mushroom), and [nuts](/wiki/Nut_(fruit)).[[79]](#cite_note-79) [Meat analogues](/wiki/Meat_analogue) (mock meats) based on [soybeans](/wiki/Soybean) (tofu), or wheat-based [seitan](/wiki/Seitan)/[gluten](/wiki/Gluten), are a common source of plant protein, usually in the form of [vegetarian sausage](/wiki/Vegetarian_sausage), mince and [veggie burgers](/wiki/Veggie_burger).

Dishes based on soybeans are a staple of vegan diets because soybeans are a [complete protein](/wiki/Complete_protein); this means they contain all the [essential amino acids](/wiki/Essential_amino_acid) for humans and can be relied upon entirely for protein intake.[Template:Refn](/wiki/Template:Refn) They are consumed most often in the form of [soy milk](/wiki/Soy_milk) and [tofu](/wiki/Tofu) (bean curd), which is soy milk mixed with a coagulant. Tofu comes in a variety of textures, depending on water content, from firm, medium firm and extra firm for stews and stir-fries, to soft or silken for salad dressings, desserts and shakes. Soy is also eaten in the form of [tempeh](/wiki/Tempeh), [seitan](/wiki/Seitan) and [texturized vegetable protein](/wiki/Texturized_vegetable_protein) (TVP); also known as textured soy protein (TSP), the latter is often used in pasta sauces.[[80]](#cite_note-80)

### Plant milk, cheese, mayo{{anchor|Plant milk, ice-cream and cheese}}[[edit](/index.php?title=(none)&action=edit&section=13)]

[Template:Commons category](/wiki/Template:Commons_category)

|  |  |  |  |
| --- | --- | --- | --- |
| **Nutritional content of cows', soy and almond milk** | | | |
| **| Cows' milk (whole, vitamin D added)**[**[81]**](#cite_note-81) | **Soy milk (unsweetened; calcium, vitamins A and D added)**[**[82]**](#cite_note-82) | **Almond milk (unsweetened)**[**[83]**](#cite_note-83) |  |
| Dietary energy per 240 mL cup | [Template:Convert](/wiki/Template:Convert) | [Template:Convert](/wiki/Template:Convert) | [Template:Convert](/wiki/Template:Convert) |
| Protein (g) | 7.69 | 6.95 | 1 |
| Fat (g) | 7.93 | 3.91 | 2.5 |
| Saturated fat (g) | 4.55 | 0.5 | 0 |
| Carbohydrate (g) | 11.71 | 4.23 | 2 |
| Fibre (g) | 0 | 1.2 | 1 |
| Sugars (g) | 12.32 | 1 | 0 |
| Calcium (mg) | 276 | 301 | n/a |
| Potassium (mg) | 322 | 292 | 170 |
| Sodium (mg) | 105 | 90 | 180 |
| Vitamin B12 (µg) | 1.10 | 2.70 | n/a |
| Vitamin A (IU) | 395 | 503 | n/a |
| Vitamin D (IU) | 124 | 119 | n/a |
| Cholesterol (mg) | 24 | 0 | 0 |

[thumb|upright=1.2|alt=photograph|*(Left to right)*:](/wiki/File:Plant_milk_cartons,_September_2010.jpg) [almond milk](/wiki/Almond_milk), [hemp milk](/wiki/Hemp_milk), [soy milk](/wiki/Soy_milk), [coconut milk](/wiki/Coconut_milk), [rice milk](/wiki/Rice_milk). 240 mL (1 cup) of fortified, unsweetened soy milk contains 300 mg of calcium, 6.95 g of protein and [Template:Convert](/wiki/Template:Convert).[[84]](#cite_note-84)

[Plant milks](/wiki/Plant_milk)—such as soy milk, [almond milk](/wiki/Almond_milk), [grain milks](/wiki/Grain_milk) (oat milk and [rice milk](/wiki/Rice_milk)), [hemp milk](/wiki/Hemp_milk), and [coconut milk](/wiki/Coconut_milk)—are used in place of cows' or goats' milk.[Template:Refn](/wiki/Template:Refn) Soy milk provides around 7 g of protein per [cup](/wiki/Cup_(unit)) (240 mL or 8 fl oz), compared with 8 g of protein per cup of cow's milk. Almond milk is lower in dietary energy, carbohydrates and protein.<ref name=Reinagel2011p20-21>[Monica Reinagel](/wiki/Monica_Reinagel), *Nutrition Diva's Secrets for a Healthy Diet*, Macmillan 2011, pp. [20–21](https://books.google.com/books?id=cvJ4-qB0hOUC&pg=PA20).</ref> Soy milk should not be used as a replacement for breast milk for babies. Babies who are not breastfed need commercial [infant formula](/wiki/Infant_formula), normally based on cows' milk or soy. The latter is known as [soy-based infant formula](/wiki/Soy-based_infant_formula) or SBIF.[[85]](#cite_note-85) Flaxseeds will do the same: replace each egg with one [tablespoon](/wiki/Tablespoon) of flaxseed meal mixed with three tablespoons of water.<ref name=Esselstyn2007p266/> For pancakes a tablespoon of [baking powder](/wiki/Baking_powder) can be used instead of eggs.[[93]](#cite_note-93) Other ingredients include (to replace one egg): one tablespoon of [soy flour](/wiki/Soy_flour) and one tablespoon of water; a quarter cup of mashed bananas, mashed prunes or apple sauce; or in [batter](/wiki/Batter_(cooking)) two tablespoons of white flour, half a tablespoon of vegetable oil, two tablespoons of water and half a tablespoon of baking powder.<ref name=Mangels2011p445/> Silken (soft) tofu and mashed potato can also be used.[[94]](#cite_note-94)Bean brine, known as [aquafaba](/wiki/Aquafaba), can be used to replace egg whites in meringues, ice cream and baking.

### Vegan food groups[[edit](/index.php?title=(none)&action=edit&section=15)]

[Template:Further](/wiki/Template:Further) [Template:Multiple image](/wiki/Template:Multiple_image) Since 1991 the [Physicians Committee for Responsible Medicine](/wiki/Physicians_Committee_for_Responsible_Medicine) (PCRM) has recommended a no-cholesterol, low-fat vegan diet based on what they call the New Four Food Groups: fruit, [legumes](/wiki/Legume), grains and vegetables. Legumes include peas, [beans](/wiki/Beans), lentils and peanuts.<ref name=foodgroups/>

PCRM recommends three or more servings a day of fruit (at least one of which is high in vitamin C, such as citrus fruit, melon or strawberries); two or more of protein-rich legumes (such as soybeans, which can be consumed as soy milk, tofu or tempeh); five or more of [whole grains](/wiki/Whole_grain) (such as corn, barley, rice and wheat, in products such as bread and tortillas); and four or more of vegetables (dark-green leafy vegetables such as broccoli, and dark-yellow and orange such as carrots or sweet potatoes).<ref name=foodgroups>["The New Four Food Groups"](http://www.pcrm.org/health/diets/vsk/vegetarian-starter-kit-new-four-food-groups), Physicians Committee for Responsible Medicine, accessed 16 January 2013.</ref>

The New Four Food Groups was created as an alternative to the [Four Food Groups](/wiki/Four_Food_Groups) – meat, milk, vegetables and fruit, and cereal and breads – recommended by the [United States Department of Agriculture](/wiki/United_States_Department_of_Agriculture) (USDA) from 1956 until 1992.[[95]](#cite_note-95) In 1992 the USDA replaced this with the [food guide pyramid](/wiki/Food_guide_pyramid) and in 2011 with [MyPlate](/wiki/MyPlate), which is consistent with a vegan diet. MyPlate is divided into five groups: grains, vegetables, fruits, dairy (or calcium-fortified soymilk), and protein. The protein includes meat, poultry, seafood, beans and peas, eggs, processed soy products, nuts and seeds.[Template:Refn](/wiki/Template:Refn) In the UK the [National Health Service](/wiki/National_Health_Service) recommends the [Eatwell Plate](/wiki/Eatwell_plate), also with five groups and consistent with a vegan diet: fruit and vegetables; potatoes, bread and other starchy foods; dairy or non-dairy alternatives; meat, fish, eggs or beans for protein; and fat and sugar.<ref name=Eatwell/>

### Nutrients[[edit](/index.php?title=(none)&action=edit&section=16)]

#### Protein[[edit](/index.php?title=(none)&action=edit&section=17)]

[Template:Further](/wiki/Template:Further) [thumb|upright=1.2|alt=photograph|](/wiki/File:Rainbow_Rice_and_Beans.jpg)[Rice and beans](/wiki/Rice_and_beans) is a common vegan [protein combination](/wiki/Protein_combining).

[Proteins](/wiki/Protein) are composed of [amino acids](/wiki/Amino_acid). Vegans obtain all their protein from plants, [omnivores](/wiki/Omnivore) usually a third and ovo-lacto vegetarians half.[[96]](#cite_note-96) Sources of plant protein include legumes such as soy beans (consumed as tofu, tempeh, texturized vegetable protein, soy milk and [edamame](/wiki/Edamame)), peas, peanuts, black beans and chickpeas (the latter often eaten as [hummus](/wiki/Hummus)); grains such as [quinoa](/wiki/Quinoa) (pronounced *keenwa*), brown rice, corn, barley, bulgur and wheat (the latter eaten as bread and seitan); and nuts and seeds. Combinations that contain high amounts of all the essential amino acids include [rice and beans](/wiki/Rice_and_beans), corn and beans, and hummus and whole-wheat pita.[[97]](#cite_note-97) Soy beans and quinoa are known as [complete proteins](/wiki/Complete_protein) because they each contain all the essential amino acids in amounts that meet or exceed human requirements,[[98]](#cite_note-98)[Template:Refn](/wiki/Template:Refn) Vegans are unable in most cases to obtain B12 from their diet.[Template:Refn](/wiki/Template:Refn) Vegetarians are also at risk, as are older people and those with certain medical conditions.<ref name=PawlakMay2014>Roman Pawlak, et al., "The prevalence of cobalamin deficiency among vegetarians assessed by serum vitamin B12: a review of literature," *European Journal of Clinical Nutrition*, 68(5), May 2014, pp. 541–548. [Template:Doi](/wiki/Template:Doi) PMID 24667752</ref>[[102]](#cite_note-102) A 2013 study found that "vegetarians develop B12 depletion or deficiency regardless of demographic characteristics, place of residency, age, or type of vegetarian diet. Vegetarians should thus take preventive measures to ensure adequate intake of this vitamin, including regular consumption of supplements containing B12."[Template:Refn](/wiki/Template:Refn)

Increased hygiene in the food supply is probably the cause of B12 depletion from plant-based diets.[[103]](#cite_note-103)[Template:Refn](/wiki/Template:Refn) Neither plants nor animals make B12; it is produced by microorganisms, such as bacteria, fungi and algae. Plants not washed properly may contain B12 from bacteria in the soil, often from faeces, and drinking water may be similarly contaminated, particularly in the developing world. Animals obtain it by eating contaminated plants, other animals, or their own faeces, and become sources of B12 if eaten themselves.<ref name=MangelsB12/>[Template:Refn](/wiki/Template:Refn) Intensively farmed animals are often given B12 supplements or injections, particularly pigs and poultry, because when raised indoors they have no access to plants and less access to their own faeces.[[104]](#cite_note-104) Bacteria in the human digestive tract produce B12, but most is expelled in the faeces. The mouth is another source, but in small amounts and possibly analogue (not biologically active).<ref name=Mangels2011p188/>[Template:Refn](/wiki/Template:Refn)

Japanese researchers say that around 4 g of dried purple [nori](/wiki/Nori), an [edible seaweed](/wiki/Edible_seaweed), supplies the adult [RDA](/wiki/Dietary_Reference_Intake) of 2.4 [mcg](/wiki/Microgram) (µg) of B12. [Tempeh](/wiki/Tempeh), a fermented soybean food, is cited as another source, perhaps because of contamination during production.<ref name=Watanabe2014>Fumio Watanabe, et al., ["Vitamin B12-Containing Plant Food Sources for Vegetarians"](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4042564/), *Nutrients*, 6(5), 5 May 2014, pp. 1861–1873. [Template:Doi](/wiki/Template:Doi) PMID 24803097

Fumio Watanabe, et al., "Biologically active vitamin B12 compounds in foods for preventing deficiency among vegetarians and elderly subjects," *Journal of Agriculture and Food Chemistry*, 61(280), 17 July 2013, pp. 6769–6775. [Template:Doi](/wiki/Template:Doi) PMID 23782218

Martin T. Croft, et al., "Algae acquire vitamin B12 through a symbiotic relationship with bacteria," *Nature*, 438(7064), 3 November 2005, pp. 90–93. [Template:Doi](/wiki/Template:Doi) PMID 16267554</ref>[Template:Refn](/wiki/Template:Refn) One tablespoon of [Red Star](/wiki/Red_Star_Yeast) Vegetarian Support Formula [nutritional yeast](/wiki/Nutritional_yeast) delivers the adult RDA of B12.[[105]](#cite_note-105)[Template:Refn](/wiki/Template:Refn) There is no gold standard for assessing B12 status and few studies exist of long-term vegans who have not used supplements or fortified foods.[[106]](#cite_note-106) Studies of vegans not taking supplements or eating fortified food have found low B12 levels and clinical signs of deficiency; low B12 levels without signs of a deficiency; and neither.<ref name=Mangels2011p183-185>Mangels, Messina and Messina 2011, pp. [183–185](https://books.google.com/books?id=eJ10HoYQ2woC&pg=PA183).</ref><ref name=Key2006>Timothy J. Key, Paul N. Appleby, Magdalena S. Rosell, "Health effects of vegetarian and vegan diet," *Proceedings of the Nutrition Society*, 65(1), February 2006, pp. 35–41. [Template:Doi](/wiki/Template:Doi) PMID 16441942</ref> Nevertheless, the consensus among researchers is that vegans and vegetarians should use supplements, or eat B12-fortified foods such as plant milk or [breakfast cereal](/wiki/Breakfast_cereal).<ref name=PawlakMay2014/>[[107]](#cite_note-107) Mangels et al. say: "It is likely that all Western vegans consuming unsupplemented diets will eventually develop vitamin B12 deficiency, although it may take decades for this to occur."<ref name=Mangels2011p183>Mangels, Messina and Messina 2011, pp. [183](https://books.google.com/books?id=eJ10HoYQ2woC&pg=PA183).</ref> No animal products are involved in the production of B12 supplements.<ref name=MangelsB12/>

#### Calcium[[edit](/index.php?title=(none)&action=edit&section=19)]

[Template:Further](/wiki/Template:Further) [thumb|upright=1.2|alt=photograph|Vegan cheeses](/wiki/File:Vegan_Cheeses_(4107837884).jpg)

[Calcium](/wiki/Calcium) is needed to maintain [bone health](/wiki/Bone_density) and for several [metabolic](/wiki/Metabolism) functions, including [muscle function](/wiki/Muscle#Function), [vascular contraction](/wiki/Muscle_contraction) and [vasodilation](/wiki/Vasodilation), nerve transmission, [intracellular signalling](/wiki/Cell_signaling) and [hormonal](/wiki/Hormone) secretion. Ninety-nine percent of the body's calcium is stored in the bones and teeth.<ref name=calcium-NIH>["Calcium"](http://ods.od.nih.gov/factsheets/Calcium-HealthProfessional/), Office of Dietary Supplements, National Institutes of Health. The [RDA](/wiki/Recommended_Dietary_Allowance) for adults is 1,000 mg for 19–50 years, 1,000 mg for 51–70 years (men) and 1,200 mg (women), and 1,200 mg for 71+. The RDA for eighteen years and under is 200 mg for 0–6 months, 260 mg for 7–12 months, 700 mg for 1–3 years, 1,000 mg for 4–8 years, 1,300 mg for 9–18 years.

Mangels, Messina and Messina 2011, p. [109ff](https://books.google.com/books?id=eJ10HoYQ2woC&pg=PA109).</ref><ref name=Ross2011>Catherine A. Ross, et al. (eds.), ["DRI Dietary Reference Intakes, Calcium, Vitamin D"](http://books.nap.edu/openbook.php?record_id=13050), Committee to Review Dietary Reference Intakes for Vitamin D and Calcium, Institute of Medicine, 2011.</ref>[Template:Rp](/wiki/Template:Rp)

Vegans are advised to eat three servings a day of a high-calcium food, such as fortified plant milk, fortified tofu, almonds or hazelnuts, and to take a supplement as necessary.<ref name=dietitians/> Plant sources include broccoli, turnip, [bok choy](/wiki/Bok_choy) and [kale](/wiki/Kale); the bioavailability of calcium in spinach is poor.<ref name=calcium-NIH/> Vegans should make sure they consume enough vitamin D, which is needed for calcium absorption.[[108]](#cite_note-108) A 2007 report based on the Oxford cohort of the [European Prospective Investigation into Cancer and Nutrition](/wiki/European_Prospective_Investigation_into_Cancer_and_Nutrition), which began in 1993, suggested that vegans have an increased risk of bone fractures over meat eaters and vegetarians, likely because of lower dietary calcium intake. The study found that vegans consuming at least 525 mg of calcium daily have a risk of fractures similar to that of other groups.[Template:Refn](/wiki/Template:Refn)[[109]](#cite_note-109) A 2009 study found the bone mineral density (BMD) of vegans was 94 percent that of omnivores, but deemed the difference clinically insignificant.[[110]](#cite_note-110)[Template:Refn](/wiki/Template:Refn)

#### Vitamin D[[edit](/index.php?title=(none)&action=edit&section=20)]

[Template:Further](/wiki/Template:Further) [thumb|left|upright=1.35|alt=photograph|Most people can obtain enough vitamin D from sunlight in the spring, summer and fall.<ref name=VitD-NIH/>](/wiki/File:Sunbaker_maxdupain_cropped.jpg)

[Vitamin D](/wiki/Vitamin_D) (calciferol) is needed for several functions, including calcium absorption, enabling mineralization of bone, and bone growth. Without it bones can become thin and brittle; together with calcium it offers protection against [osteoporosis](/wiki/Osteoporosis). Vitamin D is produced in the body when ultraviolet rays from the sun hit the skin; outdoor exposure is needed because UVB radiation does not penetrate glass. It is present in salmon, tuna, mackerel and cod liver oil, with small amounts in cheese, egg yolks and beef liver, and in some mushrooms.<ref name=VitD-NIH>["Vitamin D"](http://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/), Office of Dietary Supplements, National Institutes of Health; Mangels et al. 2011, pp. [204–209](https://books.google.com/books?id=eJ10HoYQ2woC&pg=PA204); [Ross et al. (Institute of Medicine) 2011](http://books.nap.edu/openbook.php?record_id=13050), pp. 75–124.</ref>

Most vegan diets contain little or no vitamin D without fortified food. People with little sun exposure may need supplements. The extent to which sun exposure is sufficient depends on the season, time of day, cloud and smog cover, skin [melanin](/wiki/Melanin) content, and whether sunscreen is worn. According to the [National Institutes of Health](/wiki/National_Institutes_of_Health), most people can obtain and store sufficient vitamin D from sunlight in the spring, summer and fall, even in the far north. They report that some researchers recommend 5–30 minutes of sun exposure without sunscreen between 10 am and 3 pm, at least twice a week. Tanning beds emitting 2–6 per cent UVB radiation have a similar effect, though tanning is inadvisable.<ref name=VitD-NIH/>[[111]](#cite_note-111) Vitamin D comes in two forms. [Cholecalciferol](/wiki/Cholecalciferol) (D3) is synthesized in the skin after exposure to the sun, or consumed in the form of animal products; when produced industrially it is taken from [lanolin](/wiki/Lanolin) in sheep's wool. [Ergocalciferol](/wiki/Ergocalciferol) (D2) is derived from [ergosterol](/wiki/Ergosterol) from UV-exposed mushrooms or yeast and is suitable for vegans. Conflicting studies have suggested that the two forms may or may not be bioequivalent.[[112]](#cite_note-112) According to researchers from the [Institute of Medicine](/wiki/Institute_of_Medicine), the differences between D2 and D3 do not affect metabolism, both function as [prohormones](/wiki/Prohormone), and when activated exhibit identical responses in the body.[[113]](#cite_note-113)

#### Iron[[edit](/index.php?title=(none)&action=edit&section=21)]

[Template:Further](/wiki/Template:Further) [thumb|upright=1.2|alt=photograph|](/wiki/File:Oatmeal,_blueberries_and_almond_milk.jpg)[Oatmeal](/wiki/Oatmeal) with blueberries, toasted almonds and almond milk; one packet of instant oatmeal contains 8.2 mg of iron.[[114]](#cite_note-114)

Vegetarian and vegan diets usually contain as much iron as animal-based diets, or more. Vegan diets generally contain more iron than vegetarian diets because dairy products contain very little. There are concerns about the bioavailability of iron from plant foods, assumed by some researchers to be 5–15 percent compared to 18 percent from a nonvegetarian diet.[[115]](#cite_note-115) [Iron deficiency anaemia](/wiki/Iron_deficiency_anaemia) is found as often in nonvegetarians as in vegetarians, though studies have shown vegetarians' iron stores to be lower.[[116]](#cite_note-116) Mangels et al. write that, because of the lower bioavailability of iron from plant sources, the Food and Nutrition Board of the [National Academy of Sciences](/wiki/National_Academy_of_Sciences) established a separate [RDA](/wiki/Recommended_Dietary_Allowance) for vegetarians and vegans of 14 mg for vegetarian men and postmenopausal women, and 33 mg for premenopausal women not using oral contraceptives.[[117]](#cite_note-117) Supplements should be used with caution after consulting a physician, because iron can accumulate in the body and cause damage to organs. This is particularly true of anyone with [hemochromatosis](/wiki/Hemochromatosis), a relatively common condition that can remain undiagnosed.[[118]](#cite_note-118) High-iron vegan foods include soy beans, black-strap molasses, black beans, lentils, chickpeas, spinach, tempeh, tofu and lima beans.[[119]](#cite_note-119)<ref name=Mangels2011p142/> Iron absorption can be enhanced by eating a source of vitamin C at the same time,[[120]](#cite_note-120) such as half a cup of cauliflower or five fluid ounces of orange juice. Coffee and some herbal teas can inhibit iron absorption, as can spices that contain [tannins](/wiki/Tannin) (turmeric, coriander, chillies and tamarind).<ref name=Mangels2011p142>Mangels, Messina and Messina 2011, p. [142](https://books.google.com/books?id=eJ10HoYQ2woC&pg=PA142); Reed Mangels, ["Iron in the Vegan Diet"](http://www.vrg.org/nutrition/iron.htm), The Vegetarian Resources Group.</ref>

#### Omega-3 fatty acids, iodine[[edit](/index.php?title=(none)&action=edit&section=22)]

[Template:Further](/wiki/Template:Further)

[Alpha-linolenic acid](/wiki/Alpha-linolenic_acid) (ALA), an omega-3 fatty acid, is found in leafy green vegetables and nuts, and in vegetable oils such as canola and flaxseed oil.[[121]](#cite_note-121) Vegan Outreach suggests vegans take ¼ teaspoon of flaxseed oil (also known as linseed oil) daily, and use oils containing low amounts of [omega-6 fatty acids](/wiki/Omega-6_fatty_acid), such as olive, canola, avocado or peanut oil.[[122]](#cite_note-122) Vegans may use DHA supplements derived from algae instead of fish oil;[[123]](#cite_note-123)[[125]](#cite_note-125)

### Health effects[[edit](/index.php?title=(none)&action=edit&section=23)]

[Template:Further](/wiki/Template:Further) [thumb|alt=supermarket freezer stocked with packaged food|Vegan products in a supermarket (](/wiki/File:Vegan_processed_food,_July_2014.jpg)[Oceanside, California](/wiki/Oceanside,_California), 2014)

Veganism appears to provide health benefits, including a reduced risk of [type 2 diabetes](/wiki/Type_2_diabetes), [high blood pressure](/wiki/High_blood_pressure), [obesity](/wiki/Obesity) and [heart disease](/wiki/Heart_disease).<ref name=disease>Note: several sources use the word *vegetarian* to refer to a vegan or entirely plant-based diet:

Marian Glick-Bauer, Ming-Chin Yeh, ["The Health Advantage of a Vegan Diet: Exploring the Gut Microbiota Connection"](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4245565/), *Nutrients*, 6(11), November 2014, pp. 4822–4838. [Template:Doi](/wiki/Template:Doi) PMID 25365383

["Halt heart disease with a plant-based, oil-free diet"](http://www.health.harvard.edu/heart-health/halt-heart-disease-with-a-plant-based-oil-free-diet-), *Harvard Heart Letter*, 25(2), 1 October 2014, p. 6. PMID 26027024

Gabrielle Turner-McGrievy, Metria Harris, "Key elements of plant-based diets associated with reduced risk of metabolic syndrome," *Current Diabetes Reports*, 14(9), August 2014, p. 524. [Template:Doi](/wiki/Template:Doi) PMID 25084991

Lap Tai Le, Joan Sabaté, ["Beyond Meatless, the Health Effects of Vegan Diets: Findings from the Adventist Cohorts"](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4073139/), *Nutrients*, 6(6), June 2014, pp. 2131–2147: "In summary, vegetarians have consistently shown to have lower risks for cardiometabolic outcomes and some cancers across all three prospective cohorts of Adventists. Beyond meatless diets, further avoidance of eggs and dairy products may offer a mild additional benefit. Compared to lacto-ovo-vegetarian diets, vegan diets seem to provide some added protection against obesity, hypertension, type-2 diabetes; and cardiovascular mortality. In general, the protective effects of vegetarian diets are stronger in men than in women." [Template:Doi](/wiki/Template:Doi) PMID 24871675

Philip J. Tuso, et al., ["Nutritional Update for Physicians: Plant-Based Diets"](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3662288/), *The Permanente Journal*, 17(2), Spring 2013, pp. 61–66: "The major benefits for patients who decide to start a plant-based diet [vegetarian or vegan] are the possibility of reducing the number of medications they take to treat a variety of chronic conditions, lower body weight, decreased risk of cancer, and a reduction in their risk of death from ischemic heart disease." [Template:Doi](/wiki/Template:Doi) PMID 23704846

Winston J. Craig, ["Health effects of vegan diets"](http://ajcn.nutrition.org/content/89/5/1627S.full.pdf), *The American Journal of Clinical Nutrition*, 89(5), May 2009 (pp. 1627S–1633S), p. 1627S: "A vegan diet appears to be useful for increasing the intake of protective nutrients and phytochemicals and for minimizing the intake of dietary factors implicated in several chronic diseases." [Template:Doi](/wiki/Template:Doi) PMID 19279075</ref> There is evidence that a vegan diet aids weight loss more effectively than a vegetarian or non-vegetarian diet, particularly in the short term.[[126]](#cite_note-126) Studies of [Adventists](/wiki/Adventists) have suggested that, compared to non-vegetarians, vegans may have a reduced risk of most [cancers](/wiki/Cancer), although a greater risk of [urinary tract](/wiki/Urinary_tract) cancer.[[127]](#cite_note-127) The German Society for Nutrition cautioned against a vegan diet for pregnant women, babies and children as of 2011.<ref name=GermanyDGE/> The [Canadian Pediatric Society](/wiki/Canadian_Pediatric_Society) regards well-planned vegan diets as appropriate "at all stages of fetal, infant, child, and adolescent growth"; attention should be given to nutrient intake, particularly protein, vitamins B12 and D, essential fatty acids, iron, zinc, and calcium.[[128]](#cite_note-128) According to a 2015 [systematic review](/wiki/Systematic_review), there is little evidence available about vegetarian and vegan diets during pregnancy, and a lack of randomized studies meant that the effects of diet could not be distinguished from [confounding](/wiki/Confounding) factors. It concluded: "Within these limits, vegan-vegetarian diets may be considered safe in pregnancy, provided that attention is paid to vitamin and trace element requirements."[[129]](#cite_note-129) A daily source of vitamin B12 is important for pregnant and lactating vegans, as is vitamin D if there are concerns about low sun exposure.[Template:Refn](/wiki/Template:Refn) Researchers have reported cases of vitamin B12 deficiency in lactating vegetarian mothers that were linked to deficiencies and [neurological](/wiki/Neurology) disorders in their children.[[130]](#cite_note-130)[[131]](#cite_note-131) A doctor or registered dietitian should be consulted about taking supplements during pregnancy.[[132]](#cite_note-132)

### Raw veganism[[edit](/index.php?title=(none)&action=edit&section=25)]

[Template:Main article](/wiki/Template:Main_article)

**Raw veganism** is a diet that combines the concepts of veganism and [raw foodism](/wiki/Raw_foodism). It excludes all food and products of [animal origin](/wiki/Animal_product), as well as food cooked at a temperature above 48 °C (118 °F). A raw vegan diet includes raw vegetables and fruits, nuts and nut pastes, [grain and legume sprouts](/wiki/Sprouting), seeds, plant oils, sea vegetables, herbs, mushrooms, and fresh juices. There are many different variations of the diet, including [fruitarianism](/wiki/Fruitarianism), juicearianism, and sproutarianism.

## Personal items[[edit](/index.php?title=(none)&action=edit&section=26)]

### Toiletries, household[[edit](/index.php?title=(none)&action=edit&section=27)]

[Template:Further](/wiki/Template:Further) [thumb|](/wiki/File:Oliiviöljysaippua.JPG)[Soap](/wiki/Soap) made from [olive oil](/wiki/Olive_oil); soap is usually made from [tallow](/wiki/Tallow) (animal fat)

Ethical vegans will not use toiletries or household cleaners that contain animal products. Animal ingredients are ubiquitous because they are cheap. After animals are slaughtered for meat, the leftovers are put through the [rendering](/wiki/Rendering_(animals)) process, and some of that material, particularly the fat, ends up in toiletries. Common ingredients include [tallow](/wiki/Tallow) in soap, and [glycerine](/wiki/Glycerine) (derived from [collagen](/wiki/Collagen)), used as a lubricant and [humectant](/wiki/Humectant) in haircare products, moisturizers, shaving foam, soap and toothpaste; there is a plant-based form but it is usually animal-based.<ref name=toiletries/>

[Lanolin](/wiki/Lanolin) from sheep's wool is found in lip balm and moisturizers. [Stearic acid](/wiki/Stearic_acid) is a common ingredient in face creams, shaving foam and shampoos; as with glycerine, it can be plant-based but is usually animal-derived. [Lactic acid](/wiki/Lactic_acid), an [alpha-hydroxy acid](/wiki/Alpha-hydroxy_acid) derived from animal milk, is used in moisturizers, as is [allantoin](/wiki/Allantoin), from the comfrey plant or cows' urine, in shampoos, moisturizers and toothpaste.<ref name=toiletries>*Animal Ingredients A to Z*, E. G. Smith Collective, 2004, 3rd edition; Lars Thomsen and Reuben Proctor, *Veganissimo A to Z*, The Experiment, 2013 (first published in Germany, 1996).

Also see ["Animal ingredients list"](http://www.peta.org/living/vegetarian-living/animal-ingredients-list.aspx), PETA.</ref> [Carmine](/wiki/Carmine) from [scale insects](/wiki/Scale_insect), such as the female [cochineal](/wiki/Cochineal), is used in food and cosmetics to produce red and pink shades.<ref name=cochineal>Rosie Mestel, ["Cochineal and Starbucks: Actually, this dye is everywhere"](http://articles.latimes.com/2012/apr/20/news/la-heb-cochineal-starbucks-20120420), *Los Angeles Times*, 20 April 2012; Raymond Eller Kirk, Donald Frederick Othmer, *Kirk-Othmer Chemical Technology of Cosmetics*, John Wiley & Sons, 2012, p. 535.</ref>

[Template:Quote box](/wiki/Template:Quote_box)

The British Vegan Society's sunflower logo and [PETA's](/wiki/PETA) bunny logo mean the product is certified vegan, which includes no [animal testing](/wiki/Animal_testing). The leaping-bunny logo signals no animal testing, but it might not be vegan.[[133]](#cite_note-133) The Vegan Society criteria for vegan certification are that the product contain no animal products, and that neither the finished item nor its ingredients have been tested on animals by, or on behalf of, the manufacturer or by anyone over whom the manufacturer has control. Its website contains a list of certified products,[[134]](#cite_note-134) as does Australia's Choose Cruelty Free website.[[135]](#cite_note-135) *Animal Ingredients A to Z* (2004) and *Veganissimo A to Z* (2013) list which ingredients might be animal-derived.

[Beauty Without Cruelty](/wiki/Beauty_Without_Cruelty), founded as a charity in 1959, was one of the earliest manufacturers and certifiers of vegan toiletries.[[136]](#cite_note-136) Several international companies stock large vegan ranges, including Kiss My Face, MuLondon and [Lush](/wiki/Lush_(company)).[[137]](#cite_note-137) Law professor [Gary Francione](/wiki/Gary_Francione), a rights theorist and prominent abolitionist, argues that all sentient beings should have the right not to be treated as property, and that adopting veganism must be the baseline for anyone who believes that non-humans have intrinsic moral value.[[141]](#cite_note-141)[Template:Refn](/wiki/Template:Refn) Pursuing improved welfare conditions is like campaigning for "conscientious rapists" who will rape without beating, he argues.<ref name=Francione2013p150/> Philosopher [Tom Regan](/wiki/Tom_Regan), also a rights theorist, argues that animals possess value as "subjects-of-a-life," because they have beliefs, desires, memory and the ability to initiate action in pursuit of goals. The right of subjects-of-a-life not to be harmed can be overridden by other moral principles, but pleasure, convenience and the economic interests of farmers are not weighty enough.[[142]](#cite_note-142) On the other hand, Katherine Wayne argues that while the property status of animals should be abolished, and veganism is a moral obligation in present circumstances, there could be conditions under which it may be morally appropriate to collect, consume, sell, or otherwise use animal products, though not to slaughter animals. She writes that relationships of use between asymmetrically dependent parties are essential to the functioning of cooperative society, and are therefore desirable.[[143]](#cite_note-143) [thumb|alt=photograph|](/wiki/File:Singer1.jpg)[Peter Singer](/wiki/Peter_Singer)

Philosopher [Peter Singer](/wiki/Peter_Singer), a prominent protectionist and utilitarian, argues that there is no moral or logical justification for failing to count animal suffering as a consequence when making decisions, and that killing animals should be rejected unless necessary for survival.[[144]](#cite_note-144) Despite this, he writes that "[e]thical thinking can be sensitive to circumstances," and that he is "not too concerned about trivial infractions."[[145]](#cite_note-145) An argument proposed by [Bruce Friedrich](/wiki/Bruce_Friedrich), also a protectionist, holds that strict adherence to veganism harms animals, because it focuses on personal purity, rather than encouraging people to give up whatever animal products they can.[[146]](#cite_note-146) For Francione, this is similar to arguing that, because human-rights abuses can never be eliminated, we should not defend human rights in situations we control. By failing to ask a server whether something contains animal products, we reinforce that the moral rights of animals are a matter of convenience, he argues. He concludes from this that the protectionist position fails on its own consequentialist terms.[[147]](#cite_note-147) Another view is that ethical veganism remains "subtly human-centred." Philosopher [Val Plumwood](/wiki/Val_Plumwood) saw ethical veganism, which she called "Ontological Veganism," as an example of human/nature dualism in that it views humanity as separate from the rest of nature; ethical vegans want to admit non-humans into the category that deserves special protection, rather than recognize the "ecological embeddedness" of all.[[148]](#cite_note-148) Plumwood maintained that animal food may be an "unnecessary evil" from the perspective of the consumer who "draws on the whole planet for nutritional needs," and she strongly opposed factory farming, but for anyone relying on a much smaller ecosystem, it is very difficult or impossible to be vegan, she argued.[[149]](#cite_note-149)

### Environmental veganism[[edit](/index.php?title=(none)&action=edit&section=31)]

[Template:Further](/wiki/Template:Further) [left|thumb|alt=photograph|](/wiki/File:Paul_Watson_(cropped).jpg)[Paul Watson](/wiki/Paul_Watson)

Environmental vegans focus on [conservation](/wiki/Conservation_(ethic)), rejecting the use of animal products on the premise that fishing, hunting, trapping and farming, particularly [factory farming](/wiki/Factory_farming), are environmentally unsustainable.<ref name=environmental/> Around 30 percent of the planet's surface is devoted to the livestock sector. In the United States ten billion land animals are killed every year for human consumption, and in 2005 48 billion birds were killed globally.<ref name=Matheny2003/>[[150]](#cite_note-150) A 2006 UN report, [*Livestock's Long Shadow*](/wiki/Livestock's_Long_Shadow), concluded that livestock farming (mostly of cows, chickens and pigs) affects the air, land, soil, water, [biodiversity](/wiki/Biodiversity) and [climate change](/wiki/Climate_change).[[151]](#cite_note-151) [Paul Watson](/wiki/Paul_Watson) of the [Sea Shepherd Conservation Society](/wiki/Sea_Shepherd_Conservation_Society) called pigs and chicken "major aquatic predators," and said that all Sea Shepherd ships are vegan for environmental reasons.<ref name=environmental/> In 1999 222 million [tonnes](/wiki/Tonnes) of meat were produced globally.[[152]](#cite_note-152) Livestock consumed 1,174 million tonnes of food in 2002, including 7.6 million tonnes of fishmeal and 670 million tonnes of cereals, one-third of the global cereal harvest.[[153]](#cite_note-153) In 2001 they consumed 45 million tonnes of roots and vegetables and 17 million tonnes of pulses.[[154]](#cite_note-154) As of 2006 the livestock industry accounted for 9 percent of anthropogenic [carbon dioxide](/wiki/Carbon_dioxide) emissions, 37 percent of [methane](/wiki/Methane), 65 percent of [nitrous oxide](/wiki/Nitrous_oxide), and 68 percent of [ammonia](/wiki/Ammonia); livestock waste emitted 30 million tonnes of ammonia a year, which is involved in the production of [acid rain](/wiki/Acid_rain).[[155]](#cite_note-155)[[156]](#cite_note-156) Greenhouse gas emissions are not limited to animal husbandry. Plant agriculture such as rice cultivation can also cause environmental problems.[[157]](#cite_note-157) [thumb|alt=photograph|](/wiki/File:Gestcrate01.jpg)[Sows](/wiki/Domestic_pig) in [gestation crates](/wiki/Gestation_crate). Vegans view animal agriculture as an environmental threat.[[158]](#cite_note-158)

A 2007 Cornell University study concluded that vegetarian diets use the least land *per capita*, but require higher quality land than is needed to feed animals.[[159]](#cite_note-159) A 2010 UN report, [*Assessing the Environmental Impacts of Consumption and Production*](/wiki/Priority_Products_and_Materials_report), argued that animal products "in general require more resources and cause higher emissions than plant-based alternatives."<ref name=UNEP2010>[*Assessing the Environmental Impacts of Consumption and Production*](http://www.unep.org/resourcepanel/Portals/24102/PDFs/PriorityProductsAndMaterials_Report.pdf), International Panel for Resource Management, United Nations Environment Programme, June 2010.</ref>[Template:Rp](/wiki/Template:Rp) It argued that a move away from animal products is needed to reduce environmental damage.[Template:Refn](/wiki/Template:Refn)[[160]](#cite_note-160) Steven Davis, a professor of [animal science](/wiki/Animal_science), argued in 2003 that, applying the least-harm principle, human beings should convert to a [ruminant](/wiki/Ruminant)-based rather than plant-based diet, because of the animals killed by crop production.<ref name=Davis2001/> Based on a finding that wood-mouse populations fell from 25 to five per hectare after harvest, Davis estimated that 10 animals per hectare are killed from crop farming every year. If all [Template:Convert](/wiki/Template:Convert) of cropland in the continental United States were used for a vegan diet, 500 million animals would die, but if half the land were used for ruminant pasture the number would be 900,000. This assumes that people switch to beef, lamb and dairy products from the eight billion poultry killed each year.<ref name=Davis2001>S. L. Davis, "The Least Harm Principle May Require That Humans Consume a Diet Containing Large Herbivores, Not a Vegan Diet," *Journal of Agricultural and Environmental Ethics*, 16(4), 2003, pp. 387–394 ([courtesy link](http://www.letstalkfarmanimals.ca/2009/07/13/least-harm-principle-suggests-meat-dairy-diet/)); also see George Schedler, ["Does Ethical Meat Eating Maximize Utility?](http://secure.pdcnet.org/soctheorpract/content/soctheorpract_2005_0031_0004_0499_0512)" *Social Theory and Practice*, 31(4), 2005, pp. 499–511. [Template:Doi](/wiki/Template:Doi)

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Philosopher Andy Lamey argued that, to include nonhuman deaths in the moral cost of veganism, Davis must also include human deaths caused by his proposed diet.[[161]](#cite_note-161) Economist [Gaverick Matheny](/wiki/Jason_Gaverick_Matheny) wrote that Davis had miscalculated the animal deaths, basing his figures on land area rather than per consumer. In addition, by focusing on numbers rather than welfare, and by excluding factory-farmed animals, Davis had equated lives with lives worth living. His argument ignored the harm done to farmed animals: pain from branding, dehorning and castration, confinement, transport without food or water to a slaughterhouse, and a frightening death. Matheny argued that (strict) vegetarianism probably allows for a greater number of animals with lives worth living.<ref name=Matheny2003>Gaverick Matheny, "Least Harm: A Defense of Vegetarianism from Steven Davis's Omnivorous Proposal," *Journal of Agricultural and Environmental Ethics*, 16(5), 2003, pp. 505–511 ([courtesy link](http://www.veganoutreach.org/enewsletter/matheny.html)). Matheny uses the terms *vegetarianism*, *strictly vegetarian (vegan)*, and *vegan-vegetarian* to refer to dietary veganism.</ref>

## Bibliography[[edit](/index.php?title=(none)&action=edit&section=32)]

### Notes[[edit](/index.php?title=(none)&action=edit&section=33)]

[Template:Reflist](/wiki/Template:Reflist)

### References[[edit](/index.php?title=(none)&action=edit&section=34)]

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## Further reading[[edit](/index.php?title=(none)&action=edit&section=35)]

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## External links[[edit](/index.php?title=(none)&action=edit&section=36)]

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