Healthy choices on raw vegan diets

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A raw food vegan diet may be defined in various ways, but usually entails at least 80% by weight being raw plants. Many people report feeling healthier and more energetic on adopting such diets, but there are too few long-term raw food vegans for direct evaluation of the success of raw vegan diets versus other diets. We can, however, evaluate such diets against known human nutritional requirements to gain a better understanding of the ways in which appropriate raw vegan diets could benefit health.

Raw vegan diets comprise three key food groups: sweet fruit, high-fat plants and green leafy vegetables. Raw food authorities differ in the proportions recommended, some suggesting that 2% of calories from green leafy vegetables (about 300 g of lettuce per day) is sufficient while others recommend that about 30% of calories should come from green vegetables. Similarly, recommendations on high fat foods such as avocados, olives, nuts, seeds and cold-pressed oils range from a few percent to about 40% of calories. The Hallelujah diet founded by George Malkmus puts particular emphasis on carrot juice and barley grass, which contribute about 15% of calories.

Getting 30% of calories from green vegetables is probably unrealistic for most people, even with the use of blended salads and juices. For instance, 900 g of lettuce plus 450 g of kale provides just 300 kcal or about 15% of calories. Fortunately, however, such high intakes are unnecessary for nutritional adequacy. Green leafy vegetables and broccoli contain higher levels of zinc, calcium and protein than fruit and are therefore an important part of raw diets, but about 500 g per day of green vegetables, including a mixture of lettuces, broccoli and darker leaves such as kale and spinach, is sufficient to bring mineral and protein intakes into line with general recommendations. Such vegetables also provide vitamin K, which promotes healthy bones. Other raw vegetables can be useful: for instance, carrots are a good source of calcium and peas a good source of zinc and protein.

The best balance between sweet fruit and fatty foods is probably a matter of individual constitution. Some people experience dental problems with a very high fruit intake. This can be a particular problem for young children. Many people will struggle to maintain weight if they do not include significant amounts of high fat foods. More than 10% of calories as polyunsaturated fat is not recommended. Olives, avocados, almonds, hazelnuts and macadamias are all dominated by monounsaturated fats, which are the safest fats to consume in large quantities. Obtaining up to 40% of calories from these foods according to individual energy needs should be perfectly healthful. It is also important to include a good source of omega-3 fats such as crushed flax seed or its oil. Selenium can be low if the food is grown in selenium deficient soil, so a Brazil nut a day provides a useful insurance policy.

In selecting fruits, there is no need to rely on unusual or exotic items. Bananas are a good energy food, being relatively low in fibre and high in potassium. Oranges are rich in calcium, folate, potassium and vitamin C. The high potassium and low sodium content of raw vegan diets reduces the need for calcium by reducing calcium losses and can be expected to reduce blood pressure and risk of stroke.

The various raw vegan dietary schools differ in their approach to B12. Some recommend that B12 supplements should not be taken unless clear deficiency symptoms occur. David Wolfe (Nature's First Law) recommends seven different potential B12 sources, including unwashed or wild plants, nori, spirulina, fermented foods or a probiotic, with a B12 supplement as an alternative if these are not available. George Malkmus has recommended regular use of a B12 supplement since a study of

Hallelujah dieters showed signs of inadequate B12 in most of them and showed that a B12 supplement or fortified nutritional yeast corrected this reliably while probiotics did not.

The confusion in this area arises from a conceptual error. Many raw food or natural hygiene advocates believe that our evolutionary diet and that of our great ape relatives did not include an external source of B12 and then conclude that humans shouldn't need such a source. In fact, all the other great apes - even the gorillas - consume insects incidentally along with their normal diet of fruits, shoots, leaves and nuts. Chimpanzees show particular enthusiasm for collecting and eating termites, which have high measured levels of B12. After capture, the blood B12 levels of most primates drops rapidly when they are fed on a hygienically grown and prepared plant-based diet. It is therefore not surprising that humans also need an external source of B12.

Many of David Wolfe's proposed B12 sources have been directly tested and shown to be inadequate. Nori and spirulina failed to correct deficiency in macrobiotic children and did not maintain adequate blood B12 levels in a Finnish raw food community. Probiotics did not consistently correct low B12 availability in Hallelujah dieters. A UK raw food vegan went B12 deficient while growing his own food and eating it unwashed: based on measured B12 levels in soil this is unsurprising. Other proposed sources have not been tested so directly, but the only two published studies of B12 levels in raw food vegans both showed inadequate B12 levels. Low B12 levels give rise to elevated homocysteine levels with an associated increased risk of many illnesses, including stroke and heart disease, without any classical B12 deficiency symptoms. In children the onset of full-blown deficiency can be very rapid with much greater risk of long-term damage or even death. At least 3 micrograms per day of B12 from fortified foods or supplements is needed to minimise homocysteine levels in adults. Breast milk is an adequate source for infants only if the mother's intake is adequate.

The main argument for the desirability of high raw diets derives from comparison with our evolutionary diet and the diets of our great ape relatives. All the great apes eat diets centred on raw fruit (chimps, bonobos, orangutans, lowland gorillas) or raw leaves (highland gorillas) and including a mixture of fruit (including large amounts of seeds), leaves, shoots, insects and often nuts. Use of cooked foods and large amounts of grains is unique to humans. It is further suggested that a return to a diet more like that of our ape relatives would bring great benefits to health as it is the diet to which we are evolutionarily adapted. This is a plausible argument and the nutrient content of such a diet matches modern nutritional knowledge in many ways: e.g. high folate, vitamin C, vitamin K, potassium and magnesium intakes along with low saturated fat and cholesterol. However, there are important limitations to using the plant content of great ape diets as a model for ideal human diets.

Firstly, insects cannot be part of a vegan diet and are probably the key source of B12 in most primate diets. As all B12 comes from bacteria, the absence of insects is readily compensated for by using B12 produced by bacteria in commercial fermenters and used in fortified foods and supplements.

Secondly, human exposure to sunlight at high latitudes and when spending most of the day indoors is greatly reduced compared with our evolutionary exposure. During the UK winter, vitamin D from foods fortified with the vegan form (ergocalciferol, D2) can help to compensate for limited light exposure. A trip to sunnier climes during the winter allows the vitamin D to be topped up more naturally. Infants are particularly vulnerable to vitamin D deficiency due to the high rate of bone building taking place and should always receive a vitamin D supplement in winter. Breast milk is not an adequate source: we are designed to live nearer the equator.

Thirdly, the human gut is smaller overall than that of the other great apes and the human colon takes up just 20% of the digestive system compared with 50% in the other great apes. This results in a dramatically reduced capability to process fibre, indicating that humans are adapted to a lower fibre diet than the other great apes, who consume several hundred grams of fibre per day. Our palaeolithic ancestors consumed around 100 g of fibre per day. Simply copying the other great apes

is therefore not an option. There are three candidate explanations for this reduced capacity to process fibre: increased reliance on soft fruit, increased consumption of meat, and increased food processing. The former is unlikely to have been the primary factor as it represents a restriction of diet rather than an expansion. Increased meat consumption probably started with homo erectus about 2 million years ago, but may only have become a major factor about 20,000 years ago with an explosion in sophisticated hunting techniques. All the great apes show some use of food processing. Chimps often use stones to crack nuts and chew fibrous foods to remove the juice before discarding the fibre. Stone tool use by human ancestors became common about two million years ago, but most forms of food processing would leave little trace, so it is difficult to verify how big a role such processing played. However, it is plausible that food processing, including cooking, played a major part in the changes in the human digestive system compared with the other great apes. Humans may have evolved to rely on food processing.

Food processing destroys some nutrients, but can also inactivate toxins and increase the availability of other nutrients. Conservative cooking such as steaming or boiling causes only modest loss of some nutrients, such as folate, while enhancing the bioavailability of others, such as carotenoids. Lycopene, which appears to have profound protective effects on health, is better absorbed from cooked than from raw tomatoes. Liquidising or juicing also increases carotenoid availability from carrots. Cooking increases the energy available from starchy foods such as potatoes and grains and inactivates certain food toxins, thereby increasing the range of foods available to us. Whether such foods belong in an optimal diet remains to be established. The longest-living population in the world, the Japanese Okinawans, make extensive use of cooked grains, sweet potatoes, vegetables and soy products and little use of raw fruit. However, there is no large group of long-term raw food vegans to provide a direct comparison.

There is good direct evidence that large amounts of refined grains are associated with increased risk of heart disease and diabetes in Western populations. However, higher consumption of whole grains is associated with reduced risk of heart disease and diabetes, so this evidence suggests that grain should be consumed in unrefined (whole) form rather than eliminated altogether, at least for most people. A few individuals have life-threatening adverse reactions to gluten (present in many grains but notably absent from rice). The established effects of gluten range from allergies and coeliac disease to varying degrees of digestive discomfort. In addition, some individuals appear to metabolise gluten poorly with high levels of opioid protein fragments appearing in their urine. This pattern, which also occurs with casein from animal milks, has been found in some studies to be more common in autistic and schizophrenic individuals and the symptoms of such individuals sometimes improve on elimination of gluten and milk. As a raw food diet is often a gluten free diet, it is possible that some of the people finding such diets particularly beneficial may be gluten intolerant in varying degrees.

Raw food has particular environmental advantages in that it often comes from trees (avoiding soil loss from tilling) and requires little packaging and no cooking. These characteristics benefit the health of the planet and all who share it. On the other hand, raw food often requires long-distance transportation and commercial banana production is an environmental disaster with high pesticide use affecting plantation workers and local rivers. The trade-off is not clear cut. It is likely that local sourcing of cooked foods (e.g. Scottish oats) has the environmental edge over Jamaican bananas or airlifted strawberries, but seasonally available local fruits and nuts have the edge over both.

One universally recognised effect of a high raw diet is weight loss, and many leading exponents of raw diets report being overweight on a conventional diet but achieving a desirable weight on switching to a raw vegan diet. This effect is no mystery as raw plant foods are generally low calorie density high fibre foods which are very filling - ideal for weight loss - and was confirmed by a six-month trial in South Africa. A common reason for abandoning raw food diets, however, is excessive weight loss. Including sufficient tropical fruits such as bananas and avocados, or nuts and seeds and cold pressed oils, is important for maintaining a healthy weight once any desired weight loss has been achieved.

Increasing the consumption of raw fruits, nuts and salad vegetables considerably beyond current UK average intakes can be expected to be benefit individual health and to benefit the environment if locally produced. However, evidence to date does not justify a general recommendation of raw vegan diets in the sense of more than 80% of food being consumed raw, particularly for children who need a relatively high calorie density. The Vegan Society recommends the consumption of a wide variety of plant foods, including raw fruit and salads and cooked foods including a wide range of vegetables and whole grains. It also strongly recommends the consumption of 3 micrograms per day of vitamin B12 from fortified foods or supplements for all vegans and the use of vitamin D supplements for infants during the winter.

An example 2000 kcal. raw diet for one day

- Fruit: 100g red peppers, 200g tomatoes, 300g oranges, 200g apples, 500g bananas, 100g pears, 50g peaches, 50g raspberries, 200g kiwi fruit, 100g strawberries, 50g mangos.
- Green leafy vegetables and broccoli: 200g lettuce, 100g kale, 100g spinach, 100g broccoli.
- High-fat foods: 200g avocado, 30g almonds, 20g hazelnuts, 10g flaxseed, 3g Brazil nuts
- Other: 100g carrots, 100g peas.

This provides 700 mg calcium, 700g magnesium, 9mg zinc, 50g protein, 100 micrograms selenium, 3g omega-3 fatty acids, 8,000mg potassium, 1100g folate, 2 mg vitamin B1, 2.4mg B2, 6mg B6, 1100mg vitamin C, 30mg vitamin E, 6000g of vitamin A (from carotenoids) and about 1000g vitamin K. It may be too high (80g) in fibre for some people, particularly the very old or the very young, and it contains arguably too little sodium (270mg). The iodine content may also be low, depending on the soil where the produce is grown.

The balance of fatty acids is excellent. The diet contains no cholesterol or trans-fats and just 4% of calories as saturated fat while providing 5% omega-6, 1.5% omega-3 and 18% monounsaturated fat. Intakes of carotenoids, vitamin C, folate, vitamin K, vitamin E, magnesium, selenium and potassium are all much higher than in conventional diets and can be expected to promote health. Zinc and protein intakes are adequate. The calcium content has been adjusted for the low availability of calcium from some of the foods, particularly spinach, and is probably adequate. **Vitamin B12 and vitamin D must be addressed separately.**