Weight loss and energy density
A whole food plant-based diet

Which would fill you up more?
Each of these contains 1000kJ of energy

2 heads of broccoli = 700g
1 cup organic chicken = 224g
4T cheddar cheese = 59g
2T olive oil = 30g

Energy balance
You may have heard “Energy in vs energy out” and of course this is correct: If you bring in more total energy (calories) than you use, you will gain weight. If you use more calories than you eat, you will lose weight.

<table>
<thead>
<tr>
<th>% total daily energy</th>
<th>In</th>
<th>Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All of your energy intake (in the left blue bar) is from your “diet”: foods and drink.

Most of the energy you use daily is not from exercise. In fact, this normally is around 10% of total energy. The remaining 90% is a combination of metabolism and other.*

Should you just “eat less”?
Well, no. Reducing your total energy intake can be from:
1. Eating less food. “Starve yourself thin”
2. Eating the same amount of food, or more food, but choosing foods with less energy in them. “Whole food plant-based”

Option 1. “Starve yourself thin”
Simply not eating as much food is sometimes recommended for weight loss. Eating less food can of course help to lose weight in the short term, but you will be hungry. And, as soon as you stop this “diet” and go back to eating the way you were before, the weight comes back.

Option 2. “Whole foods plant-based”
We think the best approach is eating less calories but not going hungry. It sounds too good to be true, but the whole food plant based diet allows for you to eat as much as you want whenever you want, and lose weight. This is because of a lower total energy density in the food and you fill up well before you start to gain weight.

Is moving more better than eating less?
If eating a plant-based diet is helpful, is exercise better? Which should you choose between whole food plant based and exercising more?

Exercise is fantastic for health, but not for weight loss.
Recommendations are for you to have around 150 minutes per week of moderate to vigorous activity. With exercise alone, you might expect up to 2kg weight loss over two months.²

Energy balance

How to lose weight
1. “Eat less” - Consume less food.
2. “Move more” - Expend more total energy.
3. “Diet and exercise” - Combination of the two.

*Metabolism is ‘resting energy expenditure’ and is the automatic functions of life; pumping blood, growing cells, etc. Heat from digestion is ‘thermic effect of feeding’. Non-exercise activity thermogenesis (NEAT) includes walking, fidgeting, etc.

Option 1. "Starve yourself thin"
1. 2 heads of broccoli = 700g
2. 1 cup organic chicken = 224g
3. 4T cheddar cheese = 59g
4. 2T olive oil = 30g

Each of these contains 1000kJ of energy.
Here we see a **40% reduction** in total caloric intake when switching to a whole food plant-based diet.\(^3\) **This is roughly equivalent to 100 minutes of vigorous exercise daily.**\(^4,5\)

Part of the reason why exercise is not effective for weight loss is that exercise makes you more hungry, and especially when you exercise intensely, this can lead to poor food choices.

**Why are some people overweight but not others?**

Just like there is a bell curve distribution for how tall people are, there are genetic differences in how people process foods (their ‘metabolism’).

When you eat foods, your body will break them down. E.g. Fat receptors will send a message back to the brain saying ‘I have eaten enough calories’. If we eat foods we didn’t evolve with, sometimes this message can be tricked.

If a lean person and an overweight person both eat the same amount of fatty food, each will process these foods differently. The lean person gets the message to stop eating at the right time, but the overweight person does not.

**Surely, people just overeat?**

Not so! Most people who are obese or overweight get there slowly, by having a tiny bit too much energy per day. If a person gained 8 kg between the age of 25 and 35, this would be 100 kJ of energy per day - less than 3 grams of fat!

\(^*\) People eat around 10,000 kJ a day, so 100 kJ is only 1\% too much energy. Those who are staying the same weight during this time are regulating energy intake to within 0.1%.

Some people have excellent receptors, and could eat a very high fat diet without gaining weight. Most people cannot. Your mechanisms to regulate how much you eat are very close but not usually perfect.

Energy density (kJ/g) for various foods

<table>
<thead>
<tr>
<th>vegetable and fruit</th>
<th>starchy food</th>
<th>most meat</th>
<th>cheese</th>
<th>oil and fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>raw iceberg lettuce</td>
<td>raw iceberg lettuce</td>
<td>raw iceberg lettuce</td>
<td>raw iceberg lettuce</td>
<td>raw iceberg lettuce</td>
</tr>
<tr>
<td>cherries</td>
<td>cherries</td>
<td>cherries</td>
<td>cherries</td>
<td>cherries</td>
</tr>
<tr>
<td>pasta</td>
<td>pasta</td>
<td>pasta</td>
<td>pasta</td>
<td>pasta</td>
</tr>
<tr>
<td>baked potatoes</td>
<td>baked potatoes</td>
<td>baked potatoes</td>
<td>baked potatoes</td>
<td>baked potatoes</td>
</tr>
<tr>
<td>boiled egg</td>
<td>boiled egg</td>
<td>boiled egg</td>
<td>boiled egg</td>
<td>boiled egg</td>
</tr>
<tr>
<td>macaroni and cheese</td>
<td>macaroni and cheese</td>
<td>macaroni and cheese</td>
<td>macaroni and cheese</td>
<td>macaroni and cheese</td>
</tr>
<tr>
<td>fried chicken</td>
<td>fried chicken</td>
<td>fried chicken</td>
<td>fried chicken</td>
<td>fried chicken</td>
</tr>
<tr>
<td>french fries</td>
<td>french fries</td>
<td>french fries</td>
<td>french fries</td>
<td>french fries</td>
</tr>
<tr>
<td>cheddar cheese</td>
<td>cheddar cheese</td>
<td>cheddar cheese</td>
<td>cheddar cheese</td>
<td>cheddar cheese</td>
</tr>
</tbody>
</table>
Traffic light diet chart

Red – stop
- Fried animal foods
- Eggs
- Dairy: cow’s milk, yoghurt, cheese
- Meat: including fish and chicken

Fats and oils
- Inc. butter, margarine, coconut, olive oil

Orange – caution
High fat foods
- Fake meats
- Tempeh / tofu
- Avocado, olives, coconut cream
- Nuts and seeds

Alcohol, fizzy and diet drinks
- Coffee
- Plant-based milks without added oil
- Refined flours
- Dried fruits or fruit juice

Green – everyday
- Starches, complex carbohydrates
- Fruits
- Vegetables
- Spices and herbs
- Vitamin B12
- Omega 3 from flaxseed, or chia seed

Why are plant foods so low in energy?
Plant foods are rich in fibre, water, and carbohydrates. These mean they are low in density.

- Water and fibre take up a lot of space in the stomach, but only a small amount of energy is provided by fibre.
- Carbohydrates/sugars have half the energy of fats.

Vegetables, e.g. broccoli or potatoes contain fibre and water which stretch out the stomach. They have protein, carbohydrates and fats in the quantities the body was designed to digest and store. To gain enough energy through lower density plant-based foods, we evolved eating a lot of starches.

Results from BROAD study
Under optimal conditions, people can expect a lot of weight loss.

<table>
<thead>
<tr>
<th></th>
<th>Start</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>94.8</td>
<td>82.7</td>
</tr>
<tr>
<td>BMI</td>
<td>34.5</td>
<td>30.2</td>
</tr>
<tr>
<td>HbA1c</td>
<td>42</td>
<td>37</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>5.4</td>
<td>4.2</td>
</tr>
<tr>
<td>Medications</td>
<td>29% decrease</td>
<td></td>
</tr>
<tr>
<td>BP</td>
<td>No change</td>
<td></td>
</tr>
</tbody>
</table>

HbA1c: >50 is diagnostic for diabetes, 41-49 is prediabetes, up to 40 is normal.
Cholesterol is total, guidelines are for less than 4 mmol/L (equivalent to 154 mg/dl).

Final thoughts
The advice for the past half century to limit refined fats, and animal foods is correct. Healthy starches have been overlooked.

A body with 15% fat is from eating 15% fat
As an example, if you want to work towards 15% fat (just above the level that many athletes maintain) then eat foods with 15% fat in them. This % allows for fruits, grains, cereals, potatoes and some high fat foods.

Maintenance of weight loss
Maintenance of weight loss is low for all approaches, similar to how most people do not maintain smoking cessation on their first try. The maintenance rates we’ve seen for whole foods plant-based diet are around 30-50% long term.

Lifestyle changes are hard, so don’t be disappointed by inevitable set backs. The “you can do it” approach is generally not useful. You may struggle, and need to try a change several times before building enough skills and experience to maintain your lifestyle change.
What to eat?

**STARCHES (COMPLEX CARBOHYDRATES)**

STARCHY VEGGIES (TUBERS): Kumara (sweet potato), Parsnips, Potatoes, Taro, Yams, Squash (pumpkin)

WHOLE GRAINS: Amaranth, Barley, Buckwheat, Corn - including popcorn, Millet, Oats and oatmeal, Quinoa, Rice - brown, coloured and wild, Rye, Sorghum, Teff, Triticale, Wheat - including Durum, Einkorn, Emmer, Farro, Kamut, Spelt, and forms like: Bulgur, Cracked, and Wheatberries.

LEGUMES:
- Beans: Black, Pinto, Garbanzo (Chickpeas), Lima, Soy
- Lentils: Green, Brown, Red
- Peas: Split green and yellow, Black-eyed

**OTHER VEGETABLES**

GREEN LEAFY: Bokchoy, Brussels sprouts, Cabbage, Collard greens, Kale/Cavolo nero, Lettuce, Silverbeet, spinach, watercress (puha).

BULBS: Artichokes, Fennel, Garlic, Leeks, Onions, Shallots, Spring (green) onions.

FLOWERS: Broccoli, Cauliflower.

FRUITS

CITRUS: Grapefruit, Lemon, Lime, Mandarin, Orange, Tangerine.

NON-CITRUS: Apple, Banana, Blackberries, Capsicum, Chilli peppers, Chokos, Clementine, Cherries, Courgettes (Zucchini) Cucumber, Eggplant, Feijoa, Grapes, Guava, Kiwifruit, Mango, Nectarine, Okra, Pear, Passionfruit, Pineapple, Plum, Pomegranate, Peach, Raspberry, Rockmelon (Cantaloupe), Tomatoes, Watermelon.

HERBS, SPICES AND SAUCES

HERBS AND SPICES: Allspice, Basil, Bay leaf, Cajun mix, Caper, Caraway, Cardamom, Cayenne, Chives, Cinnamon, Clove, Coriander, Cumin, Dill, Fennel, Fenugreek, Garlic, Ginger, Lemongrass, Marjoram, Mint, Mustard, Nutmeg, Nutritional yeast, Oregano, Paprika, Pepper, Peppermint, Rosemary, Saffron, Sage, Sumac, Tarragon, Thyme, Vanilla, Wasabi - and many more.

SAUCES: Balsamic vinegar, Barbecue, Chilli sauces, Mustard, Soy, Tamari soy, Worcestershire.

---

### Meal planner example:

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breakfast</strong></td>
<td>Cereal</td>
<td>Oatmeal with fruit</td>
<td>Oatmeal with fruit</td>
<td>Cereal</td>
<td>Smoothie</td>
<td>Farmer’s market fruits</td>
<td>Pancakes / Muffins</td>
</tr>
<tr>
<td><strong>Snack</strong></td>
<td>Toast with hummous</td>
<td>Veggie smash wrap</td>
<td>Baked potato</td>
<td>Fruit / carrots</td>
<td>Baked potato</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lunch</strong></td>
<td>Veggie wrap</td>
<td>Green salad</td>
<td>Mexican pick and mix</td>
<td>Soba noodles</td>
<td>Sushi</td>
<td>Salad</td>
<td>Macaroni ‘cheese’</td>
</tr>
<tr>
<td><strong>Dinner</strong></td>
<td>Lentil loaf</td>
<td>Soup / Stew</td>
<td>Leftovers</td>
<td>Roast potatoes with falafel</td>
<td>Pizza</td>
<td>Change weekly</td>
<td>Curried vegetables and rice</td>
</tr>
<tr>
<td><strong>Dessert</strong></td>
<td>Fresh fruit</td>
<td>Custard with fruit</td>
<td></td>
<td>Banana ice cream</td>
<td></td>
<td>Rhubarb crumble</td>
<td></td>
</tr>
</tbody>
</table>

---

Further

Please feel free to use any images or text for any purpose with attribution to plantbasedvideos.com.

References


