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Concepts of acid alkaline diet

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Abstract

Eating a more alkaline diet promote the health, more likely to help prevent disease while eating a diet that are more acidic food is conducive to promoting a disease state. The body maintain pH level called acid-alkaline homeostasis. Food's acid or alkaline forming tendency has nothing to do with the actual pH of the food itself. For example, lemons are very acidic, however the end-product they produce after ingestion and assimilation are very alkaline, hence lemon are alkaline forming. In the same way meat taste alkaline but the end product are acidic residue. Adding all colourful fruits and vegetables has health benefit and contain phytochemicals that are necessary for staying healthy active and energetic life. For health restoration, it is recommended that 80% of diet should be alkaline-forming food and 20% of acid forming food. For health maintenance >60% of diet alkaline-forming foods and <40% of diet should be acid forming foods.

Keywords: Acid alkaline diet, acid rich foods

Introduction

The pH is highly controlled in all biological fluids and tissues within a very narrow range. Moreover, each cell or tissue or organ type like in stomach or muscles or blood has their own optimal pH level and the process of keeping pH within a narrow range is called as acid-alkaline balance or acid-alkaline homeostasis (Bruno *et. al.*, 2013) [2].

Alkalizing foods have a tonic effect on the body. The neutralization of acidity in bloodstream with alkaline foods acts as a breath of fresh air to the system regenerating and restoring damaged cells. Diets high in acidic foods cause the body cells to break down prematurely and create acid bombs that circulate in the bloodstream to cause havoc in the system. The identification of foods with alkalizing effect on the body can help in maintaining optimum pH levels in the bloodstream (www.Traverse Bay Farms.com).

Alkaline diet can be defined as focusing on tools required to be given to the body to thrive like the nutrients and nourishment for maintaining health, energy and vitality of the body. Most nourishing foods in nature are alkaline and include leafy leaves, nuts, seeds, healthy oils and fats, oily fish, vegetables like spinach, avocado, cucumber, kale, almonds, salmon, watercress, carrots, celery, lemons, limes, coconut, beets, pumpkin and beans (Bridgeford, 2015) [1].

The improving of body's acid alkaline balance benefits the people have through improved immunity, increased energy levels and reduction of pain. The balance of pH in the body through alkaline diets helped in better control over blood sugar levels, reduction in elevated blood pressure, improved mobility, reduction in cholesterol levels, improved ability to survive cancers, improved skeletal health with reductions in osteoporosis and arthritic pain, improve digestion and the reduction of gastrointestinal pain as a result of acid reflux, ulcers and bowel problems, improved nutrient uptake, better detoxification and weight loss (Roddy, 2012). The human body can be healed of any chronic illness when the blood maintains 'normal or slightly alkaline pH' (www.water-for-health.co.uk>2014/08).

pH levels in the body: The pH scale measures the acidity or alkalinity of a food substance. The scale ranges from 0 to 14, with pH of 7 considered neutral, a pH less than 7 considered acidic and a pH greater than 7 considered alkaline. An important concept in pH is that each whole pH value below 7 is 10 times more acidic than the next higher value and a pH value above 7 is 10 time more alkaline. For example, a pH of 4 is 10 times more acidic than a pH of 5 and 100 times more acidic than a pH of 6. Consequently, even small changes in pH can be significant impact on health (Bruno, 2013) [2].

Acid-alkaline balance: The pH value is controlled in biological fluids and tissues within a

narrow range. Moreover, each cell, tissue or organ type like stomach, muscles or blood has its own optimal pH level. The normal pH range of arterial blood is between 7.35 and 7.45. The process of keeping pH within a narrow range is referred to as acid-alkaline balance or acid-alkaline homeostasis. There are several natural buffer systems in the human body contributing to homeostasis and is maintained through metabolic and respiratory pathways of kidneys, lungs and other tissues. The buffering agents bind the hydrogen ions and reduce the likelihood of changes in pH. It has been reported that acidification of bio-fluids in the human body may result in a number of detrimental effects (Bruno, 2013) [2].



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Fig 1: pH Balance chart

Food affecting the pH of urine but not blood:

- Food can definitely change the pH of the urine.
- The body regulates blood pH by excreting acids in the urine is the common way.
- An acidic pH can occur from an acid forming diet, emotional stress, toxic overload, lack of exercise and/or immune reactions or any process that deprives the cells of oxygen and other essential nutrients.
- The body will try to compensate for acidic pH by using alkaline minerals.
- If the diet does not contain enough minerals to compensate, a buildup of acids in the cells will occur (Leech, 2016) [7].

Factors making diets alkaline

- **Fresh food:** Fresh foods are generally more alkali forming with all nutrients intact and may be made acidic through processing sometimes but not in all cases. This is especially true of foods containing oils that become toxic through rancidity with exposure to heat, light and air.
- **Mineral content:** Alkaline foods are alkaline

predominantly because they contain a lot of alkaline minerals. The most alkaline minerals are calcium, magnesium, potassium, sodium bicarbonate, manganese and iron.

- **Low in sugar:** Sugar is sugar and all sugar no matter whether it is glucose, fructose, dextrose is highly acid-forming in the body. Fruits contain high levels of fructose and so are acid forming and should be eaten in moderate amounts.
- **Vegetable:** Almost all vegetables are mildly to very alkaline forming and hence can be eaten abundantly.
- **High water content:** High water content foods are generally more alkali forming in nature.
- **Green colour food:** Green foods containing chlorophyll are also very alkaline.

Factors that make a diet acidic

- **Sugar content:** Sugar is the biggest contributor to whether a food is acidic or alkaline. Avoid sugar as much as possible.
- **Yeast:** Similar to sugar, yeast is next on the ‘avoid’ list as yeast based fermented foods are highly acidic.
- **Fermented food:** Fermentation makes foods acidic and some of the acid forming foods include miso, tempeh, apple cider vinegar, kombucha, sauerkraut.
- **Dairy products:** Dairy products can be acidic and mucous forming in nature.
- **Refined foods:** The more ‘processed’ and ‘refined’ a food is, the more likely it is to be acid forming.
- **Gluten content:** Gluten is one of the most inflammatory and acidifying substances known to man. The avoidance of gluten containing foods as much as possible is ideal.

(Bridgford, 2015) [1].

Food cannot change the pH of the body: This is actually a truth that food cannot change the body pH. The body has a very important regulatory mechanism to maintain the pH of the blood (and other cells) at a pH of 7.35. If anything threatens to change that, the body will go to extreme lengths to maintain it at 7.35. If it goes to 7.2, the person may die. The body has evolved with a very small ‘alkaline buffering system’ to maintain this slightly alkaline pH. The normal bodily functions like metabolism cause a small amount of acidity in the body and this buffering system is present to neutralize it.

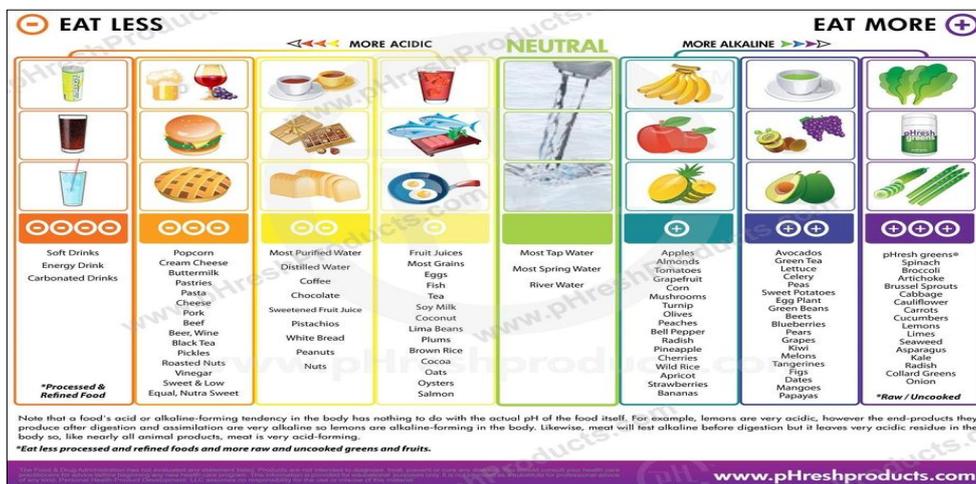


Fig 2: ACID/Alkaline food comparison chart

The 'standard American diet' followed in many western countries like Europe and Australia contains excessive amounts of sugar, wheat, dairy products, red meats, trans fats, refined and junk foods causing the body to be overrun with acidity. The alkaline buffering system can be exhausted even before breakfast is digested and so the body has to maintain the alkaline pH in a much more devastating manner.

The body to maintain the short-term goal of homeostasis affects the medium and long-term health and perfect balance in the body. The incredible stress put on the body to neutralise these acids is huge. It will overproduce sodium bicarbonate so as to neutralise the acidity from the food and the excessive hydrochloric acid the stomach has to produce to digest these foods. It will draw alkaline minerals from elsewhere in the body like calcium from bones and magnesium from your vital organs leading to inflammatory conditions. Any acidic toxins not expelled from the body will be bound to visceral fat that protect the organs from the acids. These toxic by-products produced on the visceral fat is just the start to a whole lot more inflammation.



Fig 3: Alkaline chart

The goal of the alkaline diet is to give the body everything it needs to keep it alkaline. alkaline diet gives the body all of the nourishment to help support the body, maintain pH and keep the body homeostasis (Bridgeford, 2015) [1].

Should alkaline diets be consumed when the stomach is acid: The stomach produces hydrochloric acid on demand to digest the foods eaten and prepare them for nutrient extraction in the large intestine. The stomach acid does not burn, melt and destroy the foods as seen in *invitro* analysis but simply prepares them for the next stage of digestion wherein the nutrients that include alkaline minerals, antioxidants and vitamins are extracted and dispersed in the body.

The stomach has to produce more hydrochloric acid to digest acidic foods like red wine, sugar, cakes, ice-cream, chocolate, pizza, chips, fast foods and so on than required to digest alkaline foods like celery, spinach, cucumbers, kale, watercress, lettuce, carrots and so on. The constant overproduction of hydrochloric acid and then the process of neutralisation can be hugely stressful to the body. It can result in heartburn and acid reflux being felt and can rapidly get worse (Bridgeford, 2015) [1].

Acidity and cancer: The 'diet-induced' acidosis and cancer do not have any direct link. Despite the evidence, many still believe that cancer grows in an acidic environment and can be treated or even cured with an alkaline diet. But the idea is flawed as food cannot influence blood pH. But, even if

assumed that food can dramatically alter the pH value of blood or other tissues, cancer cells are not restricted to acidic environment. The cancer cells grow in normal body tissue with slightly alkaline pH of 7.4. Many experiments have confirmed this by successfully growing cancer cells in an alkaline environment. Tumours grow faster in acidic environment as the tumours actually create their own acidity. It is not the acidic environment that creates the cancer but cancer itself creates the acidic environment (Leech, 2016) [7].

Learn from ancestral diets: Looking at the acid-alkaline theory from both an evolutionary and scientific perspective revealed that 87% of pre-agricultural humans ate alkaline diets. The Masai and Inuit people were among the first scientific clues that a net-acid diet had little to no impact on overall health. These indigenous populations maintained superb health despite diets based heavily on animal foods. More recent research estimated that half of pre-agricultural humans ate net alkaline forming diets, while the other half ate net acid forming diets.

The ancestors lived in vastly different climates with access to different foods. In fact, acid forming diets were more common as people moved further north of the equator away from the tropics. Although half of hunter-gatherers were eating a net acid forming diet, modern diseases of civilization were virtually non-existent amongst them (Leech, 2016) [7].

Alkaline diets and health conditions: A few reviews are available on inclusion of alkaline diets in various disease conditions as given below:

- The alkaline mineral supplements can suppress disease activity in rheumatoid arthritis (RA) patients thereby improving function and reduce pain. It is an easy and safe addition to the usual treatment of RA patients for improved function and decreased pain in arthritis sufferers (Cseus *et al.*, 2008) [3].
- Vormann (2001) [10] stated that disturbed acid-base balance may contribute to the symptoms of low back pain. In a study with 82 patients with chronic low back pain who received daily 30g of lactose based alkaline multi-mineral supplement, chronic low back pain decreased. The supplementation of magnesium although was less but still it improved the intracellular magnesium levels significantly for proper enzyme system functioning allowing the activation of vitamin D and this in-turn may be a reason for reduction in back pain.
- Dawson *et al.* (2008) [4] stated that as human body ages, there is loss of muscle mass, which predisposes falls and fractures. A three-year study in which diets were supplemented with fruits and vegetables rich in potassium reduced acid load resulting in preservation of muscle mass in elderly.
- There was a conspicuous difference between acidic and alkaline diets in the uric acid concentration in serum as well as in urine. Uric acid in the serum was higher in the acidic group than in the alkaline group, while uric acid in the urine in the acidic group was lower than that in the alkaline group. These changes of uric acid in urine and serum were due to reduced uric acid clearance. An alkaline diet leads to higher alkaline urine along with providing an effective treatment of hyperuricemia / gout alkalizing and helps remove uric acid from the body (Kanbara *et al.*, 2012) [5].
- The naturally alkaline water at pH 8.8 instantaneously

and permanently denatures human pepsin and effectively buffers HCl in the stomach. The *in vitro* studies have shown that alkaline water may be a useful and risk-free adjunctive to treat reflux disease (Koufman and Johnston, 2012) [6].

- In the chronic kidney disease population, metabolic acidosis was prevalent leading to early stages of renal dysfunction. The pathogenesis included the lack of bicarbonate production with the accumulation of

organic/inorganic acids and the development of tubule interstitial damage through ammonium retention and complement deposition. The use of oral sodium bicarbonate can be an interesting therapeutic option which is inexpensive and simple way of treating the progression of kidney disease, protein catabolism, bone disease and mortality in some cases (Ortega *et al.*, 2012) [8].

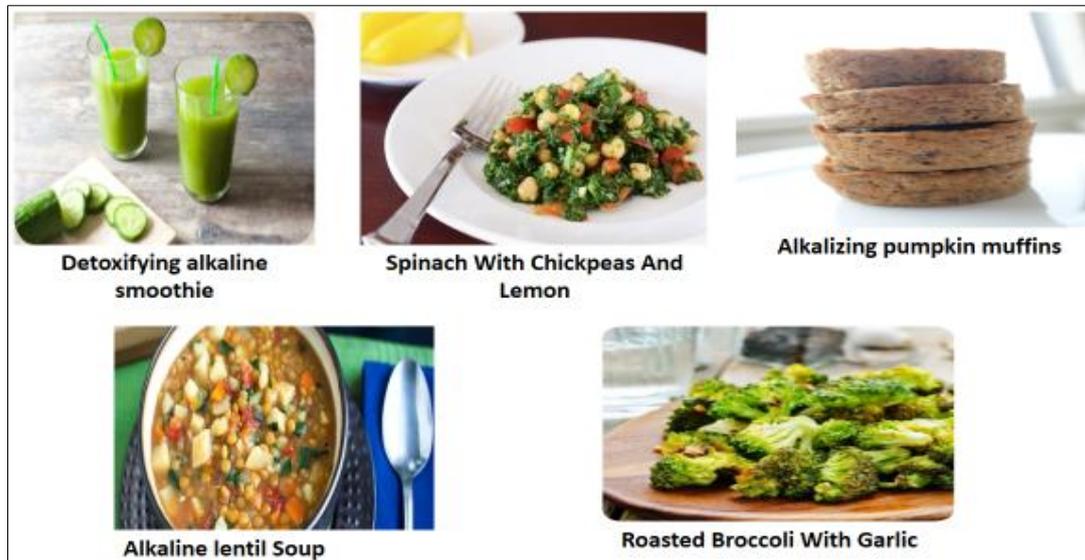


Fig 4: Alkaline food list

Conclusion

The alkaline diet is actually quite healthy encouraging consumption of high quantities of fruits, vegetables and healthy plant foods, while restricting processed junk food. However, the claims about the mechanism behind the diet are not supported by evolutionary evidence, human physiology or any reliable study in humans. Acids are actually some of the most important building blocks of life including amino acids, fatty acids and DNA. The alkaline diet is healthy because it includes fresh and non-processed foods.

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