

The Acid-Alkaline Imbalance: The Effects, Testing and Treatment

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“Life is a struggle, not against sin, not against the Money Power,
but against hydrogen ions.”

H.L. Mencken

Abstract

Objective: The purpose of this literature review is to compare, contrast and evaluate recent literature regarding clinical aspects, causes and treatment options of Acid-Alkaline Imbalance. This review will explain the disease processes, which the accumulation of the body's waste products can trigger.

Data Collection: The resources utilized included indexed/refereed journal articles, reference books and internet websites. Pubmed, Ebscohost, Chiroweb were the databases used to find articles related to the topics at hand.

Results: The keyword search for Acidosis, Disease and Diet show a result of 311 corresponding articles. Only 39 of these articles were selected and 27 have been used to create this paper.

Conclusion: The natural acid-alkaline balance of the body can be affected by many factors. The most important of all is the diet and lifestyle adopted by the individual. The lungs, kidneys and the skin are the main excretory system of these wastes. Their capacity is, however, limited. With long-term acidification, the body undergoes metabolic acidosis. Adopting an alkaline diet, exercising and minimizing stress can reverse the accumulation of acidic waste.

Key words: Acidosis, Alkaline, Diet, Disease, Body pH, Alkalizing/Acidifying food, Lung/Kidney Function, Excretion.

Introduction

People in our society are unhealthier than ever, and this is attributed to a highly stressful lifestyle accompanied by an irresponsible diet. Unfortunately, today's population do not understand enough of the importance of healthy living. The U.S. population is driven by an industrial mentality; the rhythm of life of approximately all citizens is highly stressful and very demanding; thus, creating a favorable condition for an acidic environment in the body. Half of the population suffers from acidosis and many of them are not even aware of the problem. Their lifestyle, diet, and environment prevent their body to get rid of all the waste that it generates. Gradually, this leftover acidic waste, can accumulate somewhere within the body. After time, the body gets highly acidic because it is not functioning well enough to excrete all this waste.

The body functions at its best when its internal biochemical pH (measured as a whole) is equal to 7.39, which is slightly alkaline. The pH of the body's organic fluids and tissues varies from one part of the body to another. When we say the ideal pH of the body is 7.39, this refers primarily to the pH of the blood and to a lesser extent that of the body's internal environment (meaning all organic fluids such as lymph and extra and intracellular serums). Even the slightest change of blood pH is rapidly corrected by the body, which restores it to the ideal measurement of 7.39. To make it possible, different organs of the body i.e. the lungs, the kidneys and the skin, play an important role. The lungs excrete a high level of carbon dioxide every time we breathe; unfortunately, this method is capable of dealing only with weak acid. Non-volatile acids cannot be eliminated by this way. Uric acid, sulfuric and other acids are filtered out to the bloodstream by the kidneys. The kidneys are limited in their function, and even if they

are working at their maximal capacity, they cannot eliminate more than a certain daily fixed amount. The skin, on the other hand, can excrete strong acids by the utilization of sweat glands.

The body also has an internal buffer system. Storage of acid and alkaline substances is useful in case of pH fluctuation. But when the buffers are no longer available in the bloodstream, the body finds alkaline elements from other areas like tissue and internal organs. A long-term depletion of these acid and alkaline substances is what causes mental and physical disorders to quickly appear. Because an acidic change in the body's pH is more common verses an alkaline change, this paper is going to put more importance toward the acidic phenomenon. The disease process can be described as the accumulation of non-disposed acidic wastes within the body.

This literature review will discuss how an inadequate lifestyle and especially an inadequate diet can create an acidic internal environment. The mechanism of accumulation of waste product will be explained. The multiple effects that these waste products have on different parts of the body and how these waste products create diseases will also be explained. Finally, this paper will introduce the reader to methods to test his or her own body's pH followed by multiple ways to bring it to an ideal level.^{4,8,9,14,1519,22}

Discussion

Acidosis can be induced by an inappropriate diet, lifestyle, or by the malfunctioning of the excretory system. After a long-term acid containing diet accompanied by sedentary habits, the body undergoes an acid-base disturbance induced by a primary decrease in plasma bicarbonate levels, commonly known as metabolic acidosis. Metabolic acidosis is known to induce multiple endocrine and metabolic alterations. When acidosis persists for several hours, the body elicits a hyperventilatory response, which results in hypocapnia and, thus, tends to correct the pH. When this occurs, the person's respiration rate will be increased to allow a better excretion of bicarbonate by the lungs. Because the lungs cannot excrete all the waste the body accumulated, the kidneys will undergo an acid excretory mechanism within a couple of days. Metabolic acidosis results in natriuresis due to inhibition of tubular sodium reabsorption.^{4,7,8,11,13,23}

Metabolic acidosis induces nitrogen wasting and depresses protein metabolism; it also alters the endocrine system by affecting the growth hormones that we can see as a mild form of primary hypothyroidism and hyperglucocorticoidism. It also induces the resorption of calcium from the bone with a sensitivity to develop kidney stones. Plus, it also results in a decrease of blood phosphate due to abnormal renal function. The calcium and phosphate depletion then exhibits a metabolic bone disease similar to osteoporosis and osteomalacia.^{2,6,7,12,13,23}

There is experimental evidence to support the notion that even mild degrees of acidosis, such as that occurring by ingestion of a high animal protein diet, induces some of these metabolic and endocrine effects.^{3,7,16,23}

Growth and Protein Breakdown

It is now well known that children with tubular acidosis also exhibit growth retardation. Metabolic acidosis has been shown to increase protein breakdown in humans resulting in skeletal muscle wasting. The acidic pH affects the protein metabolism by decreasing their synthesis and accelerating their proteolysis. This proteolysis is the result of the increased activity of glucocorticoids associated with acidosis. A study has shown that normal subject with induced metabolic acidosis lost a significant amount of nitrogen and protein per day. (See Appendix#1) This study also demonstrated the reversible possibility of the growth retardation with alkali treatment.^{13, 23}

Calcium and Phosphate Metabolism

The negative balance of the mineral ions caused by the body's pH change needs to be fixed, and, by doing so, the body then utilizes its best storage of minerals to compensate for the loss: the bone. The bone appears well-suited to this task because it contains a large reservoir of alkaline salts and also has sites on its surface occupied by sodium and potassium ions that are potentially available to buffer retained hydrogen ions.²³ Metabolic acidosis profoundly affects calcium and phosphate metabolism. It induces the dissolution of bone mineral, stimulating osteoclast-mediated bone resorption, and inhibiting osteoblastic-mediated bone formation, thus resulting in calcium loss from bone in association with an increase of calcium in the urine. Hypercalciuria is the result of a decreased renal reabsorption of calcium.^{2,6,7,12,23} This cellular mechanism is poorly understood although the important clinical sequelae of this calcium imbalance are a metabolic bone disease with the feature of osteomalacia, a disorder characterized by defective mineralization, and kidney stones. These stones are formed with the

accumulation of citrate in the proximal tubule of the kidney. Citrate is formed during the metabolism of carbohydrates and its oxidation yields to bicarbonate ions. Because bicarbonate ions are necessary to buffer the acidic pH, the citrate is reabsorbed in the tubular system and its stagnation increases the risk of renal stone formation.^{6,7,11,23} It is also thought that the incidence of urethritis and cystitis is more prevalent in people with a low urinary pH.³ The fragile state of the tissues resulting from the invasive presence of acid makes them vulnerable to microbial or viral infection as well. Lesions of the mucous membrane allow easier penetration and multiplication of the microbes in the tissue.^{8,19} The kidneys are also affected by the metabolic acidosis by a decreased in their function of reabsorption of phosphate.²³ (See Appendix #2)

Thyroid Function

The previous mentioned increased in glucocorticoid activity associated with metabolic acidosis also affects the thyroid function by decreasing the amount of T3 and T4 and increasing the TSH serum concentration causing a mild hypothyroidism.^{7,11,23}

Inflammatory Changes

The corrosive effect of tissue acidosis has also shown to be a dominant factor in inflammatory pain. The hydrogen ion concentrations as seen in inflamed tissue are able to selectively excite and sensitize cutaneous nociceptors and create chronic pain as seen in rheumatism where acidic waste is accumulated in the joints.¹⁰

The Origin of Cancer Cells

Many authors believe that the nature of the cancer cells originate from a change of pH of the tissue. The idea comes from the fact that healthy cells need two things; oxygen and amino acids for their repair and regeneration. When it is deprived of these

substances, it either dies and turns into acidic waste or adapts to the new highly acidic environment by becoming malignant. Cancer cells can live in an acidic environment because they obtain energy from fermentation. It is believed that by getting rid of the acid waste in the body, it would stop the normal cells from turning into cancerous ones. Dr. Eugene Blass, an Oxidation Specialist, was cured of his cancer with an oxidative therapy and proclaimed already in 1925: "Oxidation is the source of life; its lack causes impaired health or disease, its cessation death." "For cancer there is only one primary cause which is summarized in a few words. The cause of cancer is the replacement of the respiration of oxygen in normal body cells by the fermentation of sugar. Because no cancer cells exist, the respiration of which is intact, it cannot be despite that cancer could be prevented if the respiration of the body cells would be kept intact." He also claimed that a cell that has not been starved of oxygen and has a normal pH balance cannot become infected with cancer.^{1,5,15,17}

These are only few of the multiple effects that an acidic body states can trigger.

Treatment & Testing

To understand how a change in lifestyle and specifically in dietary habits can be beneficial in the treatment of body acidosis, it is necessary to define what acid and alkaline means.

Acids vs. Alkaline

Chemically, acids are defined as substances that release hydrogen ions when dissolved in water. Some acids give off more hydrogen ions than others. On the other hand, alkaline elements in solution with water give up few or no hydrogen ions. The degree of acidity of a substance is then measured by determining its ability to free

hydrogen ions and graded on a measuring scale of its pH (potential Hydrogen). The pH measuring scale goes from 0 to 14. The number 7 indicates the ideal balance between acid and alkaline substances, which it is called the neutral pH. The range from 6 to 0 is the acidic range with 0 indicating the absolute acidity. The alkaline pH range is from 8 to 14 (Scale in Appendix #3). Acids can be characterized as either strong or weak. In fact, acids are rarely encountered in a free or isolated state because they are most often combined with an alkaline element. Strong acids are much more difficult to stabilize and eliminate from the body than weak acids because of their strong stability and resistance to combination. In nutrition, strong acids come primarily from animal proteins. These acids are eliminated by functions of the liver and the kidney. Because the body can eliminate only a fixed amount of strong acid per day, the excess is stored in the tissues. Weak acids are primarily of plant origin except from those coming from yogurt and whey. These acids are also called volatile acids because they are eliminated by the lungs in the form of carbon dioxide. The body functions at its best when the pH of its internal environment is equal to 7.39.^{4,8,15,19}

Testing

Because the main way the body excretes acidic waste is by the kidneys, the more affordable and easy way to determine the pH of the body is by testing the urine. By testing the degree of acidity of the urine, you can determine whether the body is rejecting a normal quantity of acids. If the pH is low, it is an indication of an overflow of acid waste. Some scientists believe that the pH of the urine is not a good enough representation of the interstitial fluids. But because the abnormally low urine pH signifies a change in the saturation of the internal fluids also, it is assumed that there is a close

enough correlation to determine the situation of the body. A simple way to measure the urine pH at home is done with the use of litmus paper. This specific paper can be purchased in pharmacies or health food stores. One to two inches of paper strip is sufficient enough for the testing. The litmus paper needs to be put in contact with the substance to be tested, in this case: the urine. The easiest method consists of holding the paper in the flow of urine for one to two seconds. The color of the paper is then matched to the color chart included with the purchase of the paper. The zone of optimal health extends only from pH 7.36 to pH 7.42. The level of the pH may fluctuate wildly until the body becomes balanced. A reading of 6 or 6.5 indicates that there is only a slight degree of acidification. If the reading is of 5 or 4.5, the internal environment is then extremely acidic. A reading above 7.5 is usually rare. An alkaline pH is more often seen after a strictly alkaline meal, such as with a vegan or in a person who takes alkaline mineral supplements. Some scientists say that having an alkaline pH greater than 7.5 is good and that it does not present danger for the health of the person. Others say that a constant alkaline pH could be related to some glandular problem. The experts don't always agree on all points. However, they do agree that a well oxygenated and a balanced pH body is a healthy body.

A single measurement is not enough to draw any valid conclusion about the state of the internal environment. The pH can vary at different times of the day because of activity, meal, physical effort, stress, and so forth. The measurement must then be taken several times a day for at least 4 days in succession. The data should be recorded to obtain an average. Specific data regarding the activities or meals or events preceding each reading should also be recorded. Again, some authors are arguing about the first

urination of the day. Some think that the first urine of the morning is utilized to set a baseline and others think that it is misleading because of the accumulation of acidic waste during the night. For this reason, it would then be better to avoid the reading of the first urination of the day. (15,19)

Signs & Symptoms

The following symptoms are characteristic problems from body acidification.^{8,11}

A person suffering from acidification should suffer from more than one of these:

- Lack of energy
- Lower body temperature
- Weight loss
- Tendency to get infection
- Sleep disturbance
- Allergies
- Abnormal blood pressure
- Mood shift
- Digestive problems
- Stress and tension
- Skin problem
- Headaches
- Breathing difficulties
- Heartburns
- Fungal problems
- Premature aging

Treatment

The best way to regulate the blood pH is by changing one's lifestyle. Many aspects must be taken in consideration. A change in dietary habits is probably the most important thing. Taking an alkaline supplement is also an option. Drainage of acid by the kidney, lung, and skin is also efficient. Managing stressful situations and disturbing thoughts are also important.

1-Alkaline and Acid Food

It is important that there is a proper ratio between acid and alkaline foods in the diet. The natural ratio in a normal healthy body is approximately 4 to 1 (four parts alkaline to one part acid) or 80% to 20%. The degree of acidity of food is determined by its pH, thus here strongly acid foods and weak acid foods as well as weak alkaline foods and strong alkaline foods.

The degree of acidity of food can also be determined by analyzing its mineral content. The principal acidic minerals are sulfur, chlorine, phosphorus, fluoride, iodine and silicone. The alkaline minerals include calcium, sodium, magnesium, cobalt and copper.

Acidifying food are those that are rich in proteins, carbohydrates, and fats. Food rich in proteins are acidifying because their digestion produces amino acids that end up as acidic byproducts after digestion. The same appends with the digestion of carbohydrates where the poor transformation of the long chain of glucose results in the formation of acid instead of alkaline as it is suppose to. Two of the most important constituents of animal meat are phosphorus and sulfur previously said to be acid minerals.

Among the multitude of acidifying food, the most important one are:

- Meat,
- Animal fat,
- Poultry,
- Fish and Seafood,
- Eggs,
- Cheeses,
- Whole and Refined Grains,
- Bread, Pasta, Cereal flakes,
- White Sugar
- Sweets (syrup, pastry, chocolate, candy, jelly)
- Oleaginous Fruits (walnuts, hazelnuts, pumpkin seeds)
- Coffee and Sodas
- Condiments (mayonnaise, mustard, ketchup)

(Chart in Appendix #4)

White sugar, a carbohydrate that consist of only two molecules, is also acidifying but for a different reason. All foods containing refined sugar (cookies, candies, chocolate) are acidifying because of the elimination of the trace elements, vitamins, and enzymes that resumed from the process. The natural sugars contained in fruits and vegetables are not acidifying because their tissues contain all these necessary composites. Nuts are acidifying also due to their high content of fats, protein, phosphorus and sulfur. The leguminous plants (soybeans, chickpeas), coffee, tea and cocoa are also acidifying because of their high content in purines.

Among the multitude of alkalizing food, the most important one are:

- Potatoes,
- Green Vegetables,
- Raw or cooked salad, green beans, cabbage,
- Colored vegetables (carrots, beets),
- Corn,
- Milk, cottage cheese, cream, butter,
- Banana
- Almonds, Brazil nuts,
- Chestnuts,
- Dried Fruits (dates, raisins),
- Alkaline mineral waters,
- Almond milk,
- Black olives (preserved in oil only),
- Avocado,
- Natural sugar

The potato is well known as a remedy for stomach acidity. It is one of the most powerful anti-acidifying agents. Another good alkalizing food is the chestnut.

From all the fruits, the banana is the only one that all researchers agree to be alkalizing. The acid it contains is so weak that it cannot create acidification. For some, the melons are really alkalizing, and for others, it is a weak acid. Some say that even if melons contain only weak acids, it can become acidifying if the quantity ingested is too

great. Dried fruits, dates, and raisins are known to be alkalizing because of the loss of their acid content during the drying process.

Many would think that water has a neutral pH. But with the addition of chlorine, it becomes acid. Mineral water is also acidic because of its carbonation with carbonic acid. But some water have been alkalized. Water with a pH higher than 7 can be determined by reading the label of the bottle.

It is important to take in consideration of all nutrients included in the meal to end up with alkaline food. Always remember the rule of 80% - 20%. A meal should never consist solely of acidifying elements. The amount of the alkalizing food should be greater than the amount of acidifying food. (8,19)

2-Alkaline Supplements

Some scientists believe that even a strict alkaline diet cannot remove all the waste accumulated in the body. Alkalizing diets are thought to deal only with the body's current need for alkaline substance.⁴

The main supplements that should be added to the diet are:
Calcium,
Potassium,
Magnesium,
Iron
and Manganese.

It is important to select a product that has been well studied and is well balanced. Some of the minerals, if presented in too great of a quantity, can eliminate the effects of others.⁴

Whey is well known to stimulate renal and intestinal elimination. Combined with an alkaline blend, it is an excellent cleanser. It owes its powerful diuretic effect to its high

potassium content. Potassium forces the excess of salt out of the body draining the accumulation of retained fluids at the same time. Whey is also rich in minerals such as potassium, calcium and magnesium.⁴

3-Draining of acid by the kidney, skin and lungs

An important way to eliminate the strong acid accumulated in the kidney is to increase the amount of liquid consumed every day. By doing so, the blood pressure increases, thus, becoming greater than the pressure in the kidneys, and this pushes the acids through the filter.

Another method to increase the cleansing of the kidney is by the way of medicinal plants, which are diuretic.⁴ These plants not only clean the accumulated waste in the kidneys but also cleanse the blood. Once the blood is clean, it continues its draining properties in the tissues through extension of the capillaries. This effect is achieved only with proper intake. For a better result, these plants should be taken at least three times a day. This therapy should last for a minimum of six weeks followed by a break of two weeks.

These plants should be taken as:

Tea or Infusion,
Decoction,
Tinctures,
Tablets
Or Tisane

The main medicinal plants are:

Black currant,
Artichoke,
Cherry stems,
Linden bark,
Pilosella,
Cranberry,
Cough grass,
Ash.

(Method of preparation in Appendix #5)

Elimination of acids through the skin can be done by physical exercises and sauna.

Elimination of acid through the lungs can be done by periods of deep breathing or more efficiently by exercising. Exercises stimulate larger inhalation and exhalation draining acids.

Stress

Stressors are experiences that the mind or body interprets and internalizes as too much to deal with and, therefore, leaves an acid residue. Even a mild stressor can cause an acid-forming reaction. Under a stressful situation, the body produces excessive amounts of hormones to generate muscle contraction. These hormones even transform the alkaline-forming foods into acid. During the stress mechanism, the cells are deprived of oxygen causing breakdown. The lymphatic system is also affected and waste accumulation is inevitable.

Conclusion

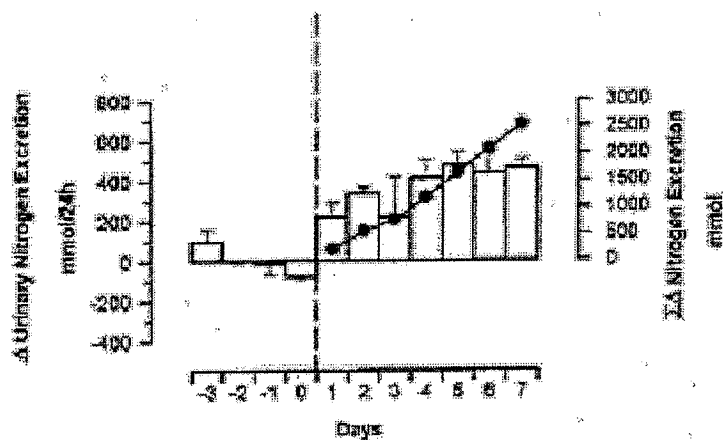
The natural acid-alkaline balance of the body can be affected by many factors, the most important being the diets and lifestyles that a major part of the population in America has adopted. Unhealthy habits create accumulation of acidic waste in the body; this waste is removed by the lungs, kidneys and the skin. However, these systems are limited, and when they are overwhelmed, the wastes return to the body and not disposed of properly. Studies have shown that many negative health effects are created by an increased acidic body state. More recent studies proved that this acidification can be

caused by an acidic diet. The number of studies currently available is unfortunately inadequate for drawing conclusions with confidence, and there is substantial disagreement within the existing literature. The recommended normal range of pH, the acidity level of different foods and their effects on body pH, and the efficacy of currently used tests for pH are all subject to considerable uncertainty. Doctors and patients should be aware of the dangers of acid pH, the benefits of alkalinizing, and the importance of making lifestyle changes that maximize the benefits of a pH. Continued scientific study should provide some of the missing answers in this important area of human health.

Appendix #1

Figure 1

Effect of metabolic acidosis on nitrogen excretion. Subjects lost more than 2500 mmol of nitrogen over a period of one week. Induction of acidosis was performed by oral ingestion of NH_4Cl resulting in steady-state bicarbonate concentrations of around 15 mmol/l ([6], with permission, The Journal of Clinical Investigation).

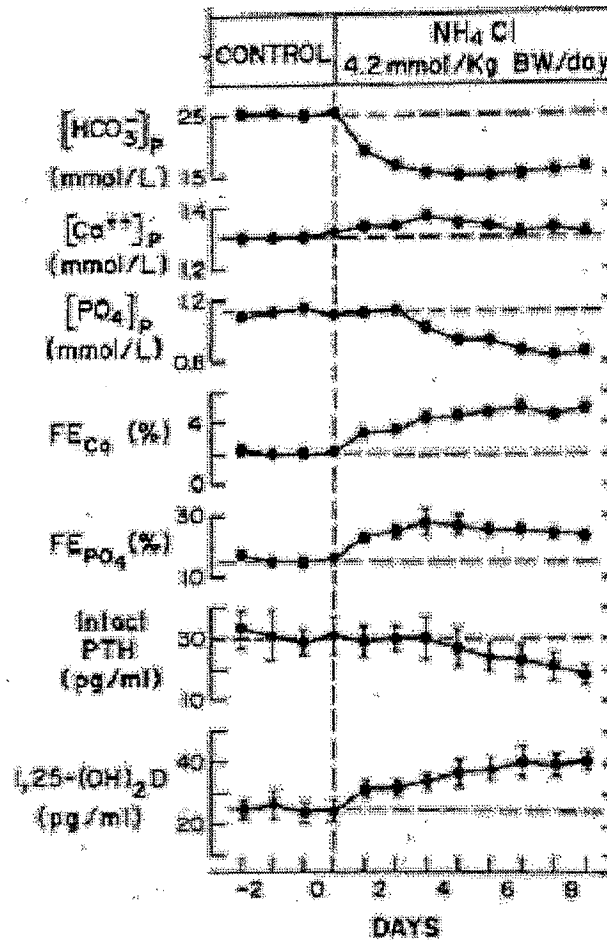


(23)

Appendix #2

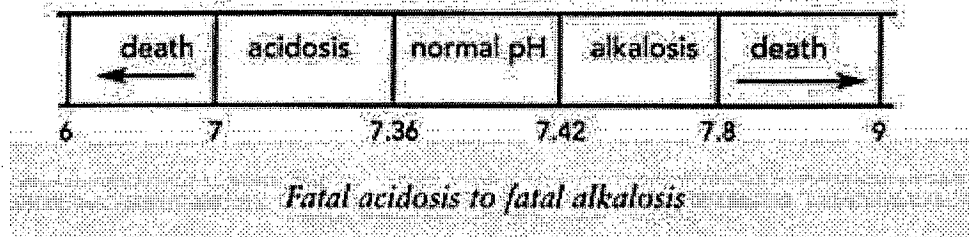
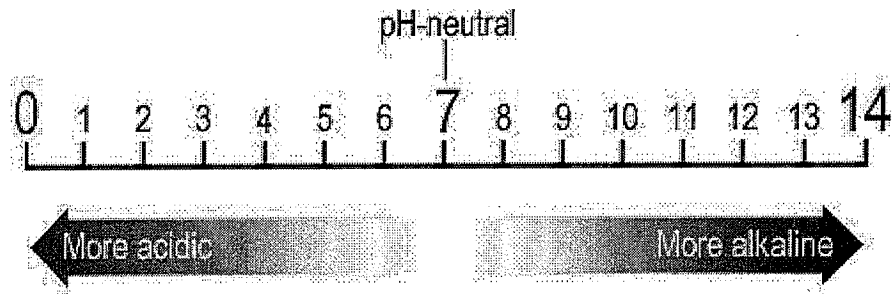
Figure 2

Effect of metabolic acidosis (induced by NH_4Cl ingestion) on bicarbonate, plasma ionised calcium and plasma phosphate concentrations, the fractional excretion rates of calcium and phosphate as well as intact PTH and $1,25\text{-(OH)}_2\text{ vitamin D}$ levels ([24], with permission, The Journal of Clinical Investigation).



(23)

Appendix #3



Appendix #4

Alkaline Fruits:

Apples	Apricots	Avocados	Bananas
Berries	Breadfruit	Cactus	
Cantaloupe			
Carob	Cherries	Citron	
Currant	Dates	Figs	
Gooseberry	Grapes		
Grapefruit	Guavas	Kiwis	
Kumquats			
Lemons	Limes	Mangos	Melons
Nectarines	Fresh Olives	Oranges	Papaya
Passion Fruit	Peaches	Pears	Persimmons
Pineapple	Pomegranate	Quince	Raisons
Raspberries	Sapodillas		

Alkaline Juices:

Spinach	Parsley	Wheat grass	Kamut
Grass			
Barley Grass	Oat Grass	Carrot	Celery
Beet			

Alkaline Vegetables:

Artichokes	Asparagus	Bamboo shoots	Beets
Broccoli	Brussell sprouts	Cabbage	Carrots
Cauliflower	Celery	Chard	
Chicory			
Collards	Corn	Cucumbers	Daikon
Dandelion greens	Eggplant	Endive	
Escarole			
Ginger	Horseradish	Kale	Kelp
Kohlrabi	Kudzu root	Leeks	
Lettuce			
Mushroom	Mustard greens	Okra	Onions
Oyster plant	Parsley	Parsnips	Peppers
Pumpkin	Radishes	Rhubarb	
Rutabaga			

Salsify	Sauerkraut	Seaweed	Spinach
Squash	Swish chard	Taro	
Tomatoes			
Turnips	Water Chestnuts	Watercress	

Alkaline Beans:

Green	Lima	Peas	Snap
Soybeans	String Beans		

Alkaline Grains:

Amaranth	Millet	Quinoa
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Alkaline Starches:

Arrowroot Flour	Granola	Essene Bread	Potatoes
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Alkaline Nuts:

Almonds	Chestnuts	Coconut
Pignolias		

Acidic Fruits:

Blueberries	Cranberries	Plums	Prunes
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Acidic Grains:

Barley	Basmati Rice	Brown Rice	
Buckwheat			
Corn Meal	Oats	Rye	Spelt
Wheat	White Rice		

Acidic Beans:

Aduki	Black	Broad bean
Garbanzo		
Kidney	Lentils	Mung
Navy		
Pinto	Red	White

Acidic Nuts:

Brazil	Cashews	Dried Coconut
Filberts		
Macadamia	Peanuts	Pecans
Pistachios		
Walnuts		

Acidic Meats:

Bear	Beef	Chicken	Deer
Fish	Shellfish	Goat	Lamb
Pheasant	Pork	Rabbit	Turkey

Acidic Dairy:

Butter	Cheese	Cheese: Mild Cow's Milk
Cream		
Custards	Eggs	Yogurt

Acidic Sugars:

Artificial sweeteners Barley Malt Syrup
Cane (White processed)
Fructose
Honey: Processed, pasteurized

Maple Syrup: Processed
Turinado

Acidic Beverages:

Liquor
Wine
Beer
Coffee
Caffeine drinks
Carbonated drinks
Fruit juice: Sweetened with white sugar
Soft drinks
Tea (Black)

Acidic Condiments:

Gelatin	Ketchup	Mayonnaise	Mustard
Salt: Refined, table	Soy sauce	Vinegar: white, processed	

Based on The Acid Alkaline Diet By Christopher Vasey, N.D. (19)

Appendix #5

PLANT MEDICINES FOR KIDNEY STIMULATION

Method of preparation

Black currant: Make a tea by mixing 1 tablespoon of leaves per cup. Steep at least 10 minutes. Drink 3 cups daily before or between meals.

Artichoke: Mix 1 teaspoon of leaves per cup. Steep for ten min. Drink 3 cups a day before meals.

Cherry stems: Mix 1 handful of stems per quart of water. Make a decoction by boiling for 10 min. Drink 3 cups a day at a minimum.

Linden bark: Make a decoction by mixing 1½ oz (40g) of bark per quart of water. Boil until the liquid is reduced to ¼ of the volume. Drink the decoction during the day. Traditional therapy calls for this beverage to be drunk 20 days a month for several months.

Pilosella: Take 30-50 drops tincture in a little water 3 times a day before meals.

Cranberry: Take 20-40 drops with a little water 3 times a day before meals.

Cough grass: Take 1-3 tablets with a little water 3 times a day just before meals.

Ash: Take 1-3 tablets with a little water 3 times a day just before meals.

(4)

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