

DIET AND URINARY PH: A PRELIMINARY STUDY AND BRIEF DISCUSSION OF RELEVANCE TO INFECTIOUS DISEASE

David McMillin, MA

Meridian Institute

Abstract

BACKGROUND: Acid-alkaline balance is emphasized in many complementary and alternative health systems. In particular, Edgar Cayce, an influential figure in the development of holistic philosophy, espoused an alkaline-producing diet in the prevention and treatment of a wide range of conditions, including infectious disease. Measurement of urine pH was specifically encouraged as a practical means of monitoring acid-alkaline balance.

OBJECTIVE: To determine whether eating a diet with relatively high levels of alkaline-producing foods affects urine pH.

METHODS: Sixteen individuals provided 472 urine samples during a health conference while following a diet recommended by Edgar Cayce. The samples were tested for pH.

RESULTS: As the conference proceeded, there was a notable trend for the group as a whole to produce higher levels of alkaline urine with regard to total number of samples that reached neutral (7.0) or above (alkalinity). Also, the percentage of individuals whose urine reached 7.0 or above increased during the conference.

DISCUSSION: Implications for the prevention and treatment of viral infection that require an acidic environment for fusion with host cells are discussed. Eating a predominately alkaline-producing diet may help to decrease the incidence of certain viral infections and increase the effectiveness of medications for such infections.

BACKGROUND

Acid/alkaline balance has assumed a prominent status among complementary and alternative medicine (CAM) approaches. The increasing use of biological terrain assessment (BTA), the Heidelberg acid test, and functional medicine techniques attest to the emphasis placed on acid/alkaline by many CAM practitioners (1-3). Commonly referred to as "pH" (potential for hydrogen), the acid/alkaline continuum ranges from 0 - 14 with 7 as neutral. The lower end of the scale (below 7) is acid and above 7 is alkaline.

Acid/alkaline balance is extremely important to normal physiology. For example, the blood will maintain a slightly alkaline range of 7.35 to 7.45. Extended pH imbalances of any kind are not well tolerated by the body. The management of the pH factor is so important that the body's primary regulatory systems (especially breathing, circulation, eliminations) closely regulate acid-alkaline balance in every cell and system.

This brief report discusses a preliminary study involving the measurement of urinary pH in conjunction with certain dietary modifications. Conceptually, this study is based on ideas from the work of Edgar Cayce, a medical intuitive credited in a JAMA editorial as a primary influence in the development of modern holistic medicine (4). Cayce

emphasized the importance of maintaining a balanced pH with a slight tendency toward alkalinity. According to Cayce, numerous factors can increase acidity including negative emotional states, inadequate mastication of food, and poor eliminations. The most common factor cited by Cayce is diet. Eating acid-producing foods or combining foods improperly (even alkaline-producing foods) is said to lead to systemic hyperacidity. Cayce linked increased acidity (as measured via urine and saliva) to higher risk of developing infectious disease such as cold and flu (9). Reilly and Brod (5) and Mein (6) have provided excellent reviews of Cayce's views on diet and acid-alkaline balance.

A diet consisting of 80% alkaline-producing foods (e.g., fruits and vegetables) and 20% acid-producing foods (e.g., meats and grain) was often recommended by Cayce. Some foods (such as citrus) may be acid outside the body, but produce an alkaline effect when eaten. Cayce insisted that acid/alkaline balance could be easily checked and encouraged the measurement of pH balance in saliva and urine as an objective means of monitoring this crucial aspect of physiology.

METHODS

A research conference provided an excellent opportunity to apply Cayce's suggestions and measure the results. The conference participants included seven people suffering from arthritis, three persons with high blood pressure, a man with diabetes, and five support persons. We asked these individuals to provide urine samples during eight days of the conference (Nov 13 - Nov 21, 1998). Each person collected a sample at each urination; a total of 472 samples were collected and measured for pH. We requested that the samples be taken to an office within 30 minutes after urination during office hours (7am - 9pm). Overnight samples were delivered to the office by 8 am the next morning. pH measurements were performed within 60 minutes of arrival of the sample. We used simple digital testers (pH Testr 2, Davis Instruments, Baltimore, MD) to measure the pH of the urine. We decided not to test saliva, as the instruments require a significant amount of material, making urine much more practical for a large group of individuals. Although potential risks for this design were minimal, all participants were informed and provided written consent.

Participants were given a notebook containing information on acid/alkaline balance, recommendations for maintaining a tendency toward alkalinity, and an extensive list of acid-producing and alkaline producing foods based on standards described by Mein (1995). In general, an alkaline diet consists primarily of vegetables except dried beans, lentils, asparagus tips, and garbanzos; fresh fruits except cranberries, plums, olives, prunes, and blueberries; almonds, chestnuts, Brazil nuts, and hazelnuts. Acid-producing foods include meats; grains, cereals, and bakery products except for soybeans; dairy except buttermilk, yogurt, raw milk and whey; peanuts, pecans, and walnuts.

Participants were also provided a ninety-minute lecture on acid-alkaline balance and how to work with the Cayce diet. A cook experienced in the Cayce diet was hired to prepare all meals during the conference. Meals offered during the conference provided a preponderance of alkaline-producing foods (mainly fruits and vegetables).

RESULTS

As the conference proceeded, there was a trend for the group as a whole to produce higher levels of alkaline urine with regard to total number of samples that reached neutral (7.0) or above (alkalinity). Also, the percentage of individuals whose urine reached 7.0 or above increased during the conference.

Eleven people in the group provided pH data for the full eight days of measurement. They provided a mean of 4.89 (SD = 2.08) urine samples per day. There was some variability in pH with time of day, so daily means for each individual were used for analysis. For each person, we compared the mean pH for the first four days to the mean

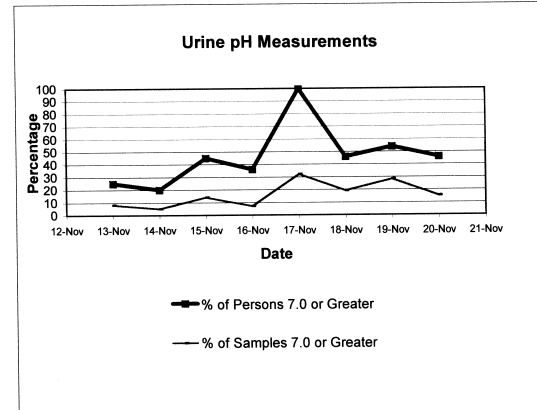


Figure 1
Daily percentage of persons and samples
pH 7.0 or greater.

pH for the second four days. All the participants showed a more alkaline pH; the mean increase in pH was 0.41 (range 0.02 to 0.86). The overall average for the first four days was a pH of 6.13 (SD = 0.25) and the overall average for the second four days was 6.54 (SD = 0.31). A paired t-test demonstrated that this difference was significant at better than the 0.01 level ($t = 4.45$, $p = .0012$, $n = 11$). Thus we can conclude that following the Cayce diet does produce a more alkaline urine.

From a data standpoint, November 17 was particularly noteworthy. On the previous day a lecture was given in which the importance of eating mostly alkaline foods was emphasized. Participants were asked to test one of the ideas from the Cayce readings. Cayce suggested that consuming citrus would have a strong alkalizing effect on the body. Most of the participants agreed to try only citrus for breakfast on November 17. Dramatically, the urine of all of the participants reached 7.0 or above on that day (Figure 1). Apparently, citrus foods have a strong alkalizing effect on urine pH.

DISCUSSION

Acid/alkaline balance is a complex and controversial subject. Views on this topic range from an almost total disbelief that pH is a significant factor in disease to the opposite extreme as exemplified by the book "Alkalize or Die" (7). The experts who acknowledge that a neutral or slightly alkaline pH is good, disagree on what this means with regard to body fluids. For example, some researchers consider a slightly acid urine pH to be normal (healthy) because it might indicate that the body is eliminating acids that are a natural product of metabolism. Other experts maintain that the urine should be close to neutral or slightly alkaline. Cousens takes a relatively moderate position, stating that a pH range of 6.3 to 7.2 is

“healthy.” (8)

Edgar Cayce repeatedly insisted that certain infectious agents (such as cold virus) do not thrive in an alkaline environment. When asked how to prevent colds, Cayce replied, "... by keeping the body alkaline. Only in acids do colds attack the body." (9)

Interestingly, many viruses (10-20), including the rhinoviruses most often responsible for the common cold (21) infect host cells by fusing with the cell membrane at low pH. Thus a mildly acidic environment is required for optimal infectivity of such pH-dependent viruses. Drugs that increase intracellular pH (alkalinity) have been shown to decrease infectivity of rhinovirus (22).

Furthermore, the antimicrobial effects of many substances are pH-dependent. For example, Berberine sulfate, the most active antibacterial alkaloid in goldenseal, is more effective in an alkaline than an acid environment. At a pH of 8.0 (alkaline), its antimicrobial activity *in vitro* is about 2 to 4 times greater than at 7.0 (neutral). At an acid pH of 6.0, the antimicrobial activity is only 1/4 as strong as at a neutral pH (23). Similar patterns of pH-dependency have been noted for several antibiotics (24) and antimicrobial dyes (25).

To this point, almost all the studies on the pH features of infectious diseases have been *in vitro*. The preliminary study described in this article is an initial step in the investigation of *in vivo* pH as related to diet. Future studies may include experimental rhinovirus infection in which experimental and control groups follow different diets (predominately alkaline-producing vs. acid-producing) to measure relative resistance to cold infection.

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