The Value of Bentonite for Diarrhea*

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In a group of 35 cases of acute diarrhea of diverse etiology, the use of a special preparation of bentonite** provided substantial relief in 34 cases (97 percent). The causative factors included virus infections, food allergy, spastic colitis, mucous colitis, and food poisoning.

Nature of Bentonite

Bentonite is a native, colloidal, hydrated aluminum silicate. It occurs as a very fine, odorless, pale buff or cream-colored powder, free from grit, and has a slightly earthy taste. Although it is insoluble in water, it swells to approximately 12 times its volume when added to water. Bentonite magma is prepared by adding 50 gm. of bentonite to a sufficient quantity of purified water to make 1 liter.1

Geologically, bentonite is a rock composed of clay minerals formed by the alteration of minute glass particles that once composed volcanic ash. The name was derived from the Fort Benton series of cretaceous rocks in Wyoming, where it was first found.2

Bentonite has been used extensively, in the form of a gel, as a bulk laxative and also as a base in many dermatological formulations.3 The desirable property of bentonite is its avid adsorption of other substances, both organic and inorganic.4

History of Medical Uses

Hydrated aluminum silicate was used for centuries in China for summer diarrheas and cholera.5 In 1712 Father Deutrecolle, a Jesuit missionary, described the clay works in China and mentioned that the clay was used in treating diarrhea.6

The use of hydrated aluminum silicate with other medications during the Balkan war of 1910 reduced the mortality from cholera among the soldiers from 60 to 3 percent, and it also proved valuable in the 1919 epidemic of cholera in China.7 In India, hydrated aluminum silicate was found useful in the treatment of acute bacterial food poisoning encountered in the British Army.8

Hydrated aluminum silicate has been used as an adsorptive in the symptomatic treatment of various forms of enteritis9 including ulcerative colitis.10

Gastrointestinal adsorbents including hydrated aluminum silicate are presently recommended in acute diarrhea and bacillary dysentery to adsorb the toxins which produce the diarrhea.11 Hydrated aluminum silicate has been used in the treatment of abnormal intestinal fermentation to adsorb gases, toxins and bacteria.12 In a fluid medium it carries down large numbers of bacteria and adsorbs the toxins of cholera, typhoid, dysentery, and apparently of the putrefactive and proteolytic bacteria.13

In vitro studies suggest that the beneficial action of hydrated aluminum silicate in cholera depends on the adsorption of the cholera toxins and inclusion of the bacteria. Later investigations indicate that bentonite adsorbs certain viruses including those of intestinal influenza, as suggested by my successful results in that disease. Bacteriologically, bentonite is used for purification of viruses.14, 15

The specific properties of bentonite have been shown to have an important bearing on its therapeutic uses. 16 A paste made from hydrated aluminum silicate is recommended by Russian radiologist to deactivate hands contaminated by radium salts.17 In Russia, bentonite has been used in the therapy of peptic ulcer.18

Since bentonite has such strong adsorptive powers, its consumption in excessive amounts over a considerable period of time could render vitamin A and other necessary nutrients unavailable by adsorbing them from the alimentary canal. Independent experiments purposely designed to determine how much this adsorption would adversely affect the growth and health of experimental animals indicated no ill effects when the intake of bentonite did not exceed 25 percent of the total diet.19

Present Study

The therapeutic efficacy of bentonite for acute diarrhea of diverse etiology was evaluated in a group of 35 cases. The causative factor was virus infection in 18 cases, food allergy in 8, spastic colitis in 4, mucous colitis in 3, and food poisoning in 2.

The symptoms were diarrhea in 35 cases (watery stools in 29, soft stools in 6), abdominal cramps in 30, anorexia in 18, malaise in 15, headache in 14, nausea in 13, and weakness in 7.

The group included 25 females and 10 males. The average person was 51.8, with a range from 23 to 76 years. The average weight was 153.2 lbs., with a range from 92 to 260 lbs.

A complete physical and routine urinalysis were made in every case to eliminate concomitant diseases which might affect their course of the diarrhea. Where indicated, laboratory and X-ray examinations were performed as part of the diagnostic procedure. Every effort was made to obtain a homogeneous group of patients so as to eliminate variables from the study.

The standard treatment employees was 2 tablespoonfuls of bentonite in distilled water as a vehicle 3 times daily. In cases of food allergy the dosage was increased above 6 tablespoonfuls daily.

Therapeutic Results

Acute diarrhea was relieved by bentonite in 34 of the 35 cases (97 percent) in an average period of 3.8 days, ranging from 1 to 4 days. Following treatment the number of bowel movements per diem was reduced from an average 4.0 (range 2 to 6) to an average of 1.8 (range 1 to 3).

In the 18 cases of diarrhea due to virus infection the therapeutic response was unusually prompt. Hence in this group the average duration of treatment was 2.2 days with a range of 1 to 3 days. In the 8 cases due to food allergy the diarrhea persisted longer and on many occasions returned if the same allergenic food was eaten again.

The concomitant symptoms were relieved in the following case percentages: Abdominal cramps in 24 of 30 cases (80 percent), anorexia in 14 of the 18 cases (78 percent), malaise in 12 of the 15 cases (80 percent), nausea in 11 of the 13 cases (85 percent), and weakness in all of the 7 cases (100 percent).

No side-effects attributable to the medication were observed in any case. Routine chemical and microscopic examination of the urine was negative in all 35 cases.

Summary

A preparation of bentonite with distilled water s a vehicle was found to be safe and highly effective in the treatment of acute diarrhea. The diarrhea was relieved in an average of 3.8 days in the 34 out of 35 cases (97 percent) of diverse etiology. The number of bowel movements per diem was reduced from an average of 4.0 to an average of 1.8. The concomitant symptoms were also effectively relieved in most cases, namely, abdominal cramps (80 percent), anorexia (78 percent), malaise (80 percent), headache (71 percent), nausea (85 percent), and weakness (100 percent).

Fastest results were observed in intestinal influenza, in which the diarrhea was controlled in an average of 2.2 days.

Bentonite is a native, colloidal, hydrated aluminum silicate. A survey of medical literature disclosed that hydrated aluminum silicate was used for centuries in China for summer diarrheas and cholera. Favorable results have been reported in cholera, bacillary dysentery, acute bacterial food poisonings, ulcerative colitis, and various form of enteritis.

It has been established in vitro and in vivo that hydrated aluminum silicate adsorbs toxins, bacteria and viruses. This property helps to explain its therapeutic usefulness in acute diarrhea of diverse etiology.

By virtue of its physical action bentonite serves as an adsorbent aid in detoxification of the intestinal canal.

PRIMITIVES USED CLAY

The use of volcanic ashes internally is almost older than civilization itself. Primitive tribes of various continents have used various types of clay for conditions of toxicity. Dr. Weston A. Price in his book, "Nutrition and Physical Degeneration:, pages 266-267, stated that in studying diets of certain tribes he examined their knapsacks. Among those examined in the high Andes, among those in Central Africa and among the Aborigines of Australia he reported that some contained balls of clay, a little of which was dissolved in water. Into the clay were dipped morsels of food. The explanation was that this was to prevent "sick stomach". These people were reported to use the clays for combating dysentery and food infections. In South America he found that the Quetchus Indians, believed to be descendants of the once powerful Incas, were largely vegetarians and he stated, "Immediately before eating, their potatoes are dipped into an aqueous suspension of clay, a procedure which is said to prevent 'souring in the stomach'." Yet, only comparatively recently has the white man apparently begun to use kaolin, one of the clays.

On page 418 of this work, under the chapter heading, "Application of Primitive Wisdom" Dr. Price stated:

"In Chapter 15 I presented data regarding the treatment used by several primitive races for **preventing and correcting** serious **disturbances in the digestive tract.** This consisted in the use of clay or aluminum silicate which modern science has learned has the important quality of being able to **adsorb** and thus **collect toxic substance** and other products..." (Emphasis ours.)

Dr. Price then commented upon the work of Dr. C. F. Code, reporting that he had received an award from the American Association for Advancement of Science for discoveries as to primitive and modern uses of clays and aluminum silicate especially against toxic materials produced in the alimentary tract as a putrefaction product of the proteins by the actions of certain microorganisms of the colon group. (for Bibliography see 1, 2, 3, 4, and 5 below)

Apparently primitive man was not a dumb as the modern white man has often assumed.

For one reason or another, certain conditions of toxicity can occur in the human body - which past experience and results of the experimentation reported above indicate can generally be aided by action of hydrated bentonite upon the alimentary tract.

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In the MEDICAL ANNALS of the DISTRICT OF COLUMBIA, Vol. 20, No. 6, June, 1961, under the title "The Value of Bentonite for Diarrhea" we may read the results of the clinical work performed by a team of medical doctors, using Hydrated Bentonite** in the treatment of diarrhea (34 cases). The causative factors of the diarrhea were virus infections, food allergy, spastic colitis, and food poisoning. The results of the scientific investigation indicated that liquid bentonite provides substantial relief in 97 percent of the cases. The percent of relief indicated as to concomitant symptoms was: abdominal cramps 80%; headaches 71%; nausea 85%; and weakness 100%.

The above investigation produced clinical "in vivo" (in the animal body) data as to the efficacy of **HYDRATED BENTONITE** as an aid in detoxification of the human alimentary canal (in this instance, with respect to various factors causing diarrhea and certain concomitant symptoms).

The scientific article in question concludes with the following:

"By virtue of its physical action bentonite serves as an adsorbent aid in detoxification of the intestinal canal."

As to hydrated bentonite itself, let us learn more about it, and review the results of some "in vitro" (in the laboratory) experiments which illustrate how it works, so as to better comprehend why it acts as it does.

Bentonite is one of the volcanic ashes as is kaolin, Montmorillonite and Fuller's Earth. It is not a drug or a chemical composition made in a laboratory. It is a product of Mother Earth.

Bentonite in ages past was blown into the sky by volcanic action, then sifted down to the earth to help impregnate the soil with its 25 to 35 trace minerals. But, sometimes it accumulated in layers or

veins from which it is mined. A secret process is used in producing the Hydrated Bentonite preparation (which was employed in both the in vivo and in vitro experiments herein described - commercially sold as Vit-Ra-Tox #15, Sonne's #7 and Velco #77). The natural bentonite is cleaned and the usable portion separated from the dirt and other residues. Bentonite, under a high power microscope, is seeing as extremely minute rectangular particles similar in shape to a calling card.

America's outstanding authority on bentonite claims its action is due to five characteristics. First, it has a large and varied mineral content. Second, it has a negative electrical attraction for positively charged particles. In the human bodies many of the toxic poisons are positively charged. Third, its particles, being shaped like a "calling card" with the wide surfaces negative and the edges of the card positive, have many times more negative than positive pulling power. Fourth, the very minuteness of the particles of bentonite give a large surface area in proportion to the volume used thus enabling it pick up many times its own weight in positively charged particles. Fifth, to obtain maximum effectiveness in the human body, it must be put in a liquid colloidal-gel state. This is why it cannot be made into tablet form which would save shipping costs.

There is no evidence to show it has any chemical effect on the body. Its actions seems to purely physical. In almost every common, chronic distress, there is a congestion - an un-eliminated accumulation of normal body wastes on which many germs can thrive. Both US Government Bureau of Mines Booklet #609, and a late edition of the Dispensatory of The United States of America, an official compendium, give bentonite high praise. We quote from an addition of the US Dispensatory: "In aqueous suspension, the individual particles of bentonite are negatively charged, this resulting in a strong attraction for positively charged particles and being responsible for the ability in bentonite to clarify such liquid as contains positively charged particles of suspended matter . . . In addition to the growing number of external uses for bentonite, it has been reported to be of value as an intestinal evacuant when used in the form of a gel."

According to Robert T. Martins, B.S., University of Minnesota; Ph.D., Cornell University and Mineralogist at Massachusetts Institute of Technology, one gram (1/28th of an ounce) of this product has a surface area of 800 sq. meters. This would be forty times that of its only competitor now being commercially used by doctors and hospitals. The greater the surface area the greater its power to pick up positively particles.

Since bentonite has such strong adsorptive powers, its consumption could render unavailable some of the necessary nutrients, as certain vitamins, by adsorbing them from the elementary canal. However, independent experiments purposely designed to find out how much this absorption would adversely affect the growth and health of experimental animals indicated no ill effects when the intake of bentonite was 25% of the total diet, but did adversely affect the health when the intake of bentonite was increased to 50% of the total diet. (From Annals of the NY Academy of Science, Vol. 57 page 678, May 10, 1954.)

Since our product is mostly water with only proportion of bentonite, to reach this state of toxicity it would mean projecting the results of this experiment to where the person would have to consume each day a supply designed for 1032 days. In other words, mathematically for the bentonite in our product to reach the toxic level of 50% of the diet it would be necessary to consume a three year supply each day over an extended period.

LABORATORY EXPERIMENTS ON HYDRATED BENTONITE - 1961

Illustrating the Mechanics of How It Acts as an Aid in Detoxification via the Alimentary Tract

Three IN VITRO (in the laboratory) experiments (reviewed below) were conducted by Dr. Howard E. Lind, M.S., BS, Ph.D. Dr. Lind is president of Lind Laboratories, Brookline, Mass. He was born in Providence, R.I., 1913; received his Bachelor of Science from the University of RI, 1934 and was assistant in Bacteriology there 1934 - 1935; Master of Public Health, Mass. Institute of Technology 1937; attended Saint Louis University 1939 - 1940; Senior Bacteriologist at Chicago Branch Laboratory, State Health Dept., Illinois 1940 - 1943; Bacteriologist at Dow Chemical Co., 1945 - 1946; Research Director at Sias Memorial Laboratory of Brooks Hospital, Brookline, Mass., 1946 to date.

EXPERIMENT I

(Reported Feb. 7, 1961)

PURPOSE:

To demonstrate in vitro sorptive (to condense and hold upon its surface) powers of an aqueous solution of bentonite.

PROCEDURE:

One hundred fifty milliliters of the Bentonite preparation were placed in a 250 ml. beaker which contained a plastic coated magnetic agitator. One ml. of a 24 hour broth culture of serratia marcescene was added to the bentonite preparation and the beaker placed on a magnetic agitator. One ml. of a 24 hour broth culture of serratia marcescene was added to the bentonite preparation and the beaker placed on a magnetic stirrer. In order to avoid the heat of the magnetic stirrer the beaker was placed approximately 1/4 inch above the base. After five minutes of stirring, 1 ml. of bentonite suspension was removed for culturing.

A brass-coated mesh cylinder containing alkaline pellets was lowered into the bentonite-bacteria mixture and allowed to remain for thirty minutes. The cylinder with its surrounding jell was removed, washed with water, filled with new pellets and again placed in the bentonite-bacteria solution. This was repeated at 30 minute intervals for 90 minutes. This experiment was repeated several times to show that the phenomenon was genuine and reproducible.

RESULTS:

The two trials below indicate the quantitative extremes of bacteria population change.

CHANGES IN BACTERIAL COUNTS OF SERRATIA MARCESCENS IN PRESENCE OF BENTONITE

	Trial 1		Trial 2	
	Bacterial count/ml.	**Reduction %***	**Bacterial count/ml.**	**Reduction %**
Initial	4,095,000		5,760,000	
30 minutes	3,675,000	10.257 %	4,260,000	26.042 %
60 minutes	2,495,000	32.109 %	2,660,000	37.559 %
90 minutes	620,000	75.150 %	27,500	98.967 %

(% reduction)	(85 %)		(99 + %)	

These two trials representing the extremes of a series of runs show a minimum reduction of 85% and a maximum reduction of 99% of the bacteria in 90 minutes. Results indicate that approximately 25% of the bentonite preparation was able to remove 85% to 99% of the organisms.

SUMMARY:

The research results indicated that by the in vitro method it has been possible to demonstrate that the bentonite preparation Vit-Ra-Tox #16 (et al.) is able to remove bacteria by sorption. It was definitely established that the bacteria were not inactivated but were removed by sorption.

EXPERIMENT II

(Reported March 10, 1961)

PROBLEM:

To demonstrate in vivo sorption powers of a bentonite preparation against two organisms, Escherichia coli (a gram-negative organism) and Staphylococcus Aureus (a gram-positive organism).

PROCEDURE:

Essentially the same as in Experiment I, reported above, but modified by using a four-hour culture instead of the 24-hour culture of Experiment I. This was to avoid excessive clumping of the organisms.

RESULTS:

CHANGES IN BACTERIA COUNTS OF ESCHERICHIA COLI IN THE PRESENCE OF BENTONITE

	Trial 1		Trial 2	
	Bacterial count/ml.	Reduction %*	Bacterial count/ml.	Reduction %*
Initial	1,170,000		10,500,000	
30 minutes	410,000	64.940%	6,100,000	41.905%
60 minutes	0	100.00%	5,200,000	14.755%
90 minutes	0	-	900,000	82.693%
(% reduction)	(100 %)		(91 %)	

The above two trials show that the E. coli were reduced 100% and 91% respectively after 60 to 90 minutes using only about 20% of the bentonite preparation. This compares favorably with the removal of the serratia marcescents in Experiment I above.

CHANGES IN BACTERIAL COUNTS OF STAPHYLOCOCCUS AUREUS IN THE PRESENCE OF BENTONITE

	Trial 1		Trial 2		Trial 3
	Bacterial count/ml.	**Reduction %***	**Bacterial count/ml.**	**Reduction %***	**Bacterial count/ml. Reduction %***
Initial	780,000		230,000		490,000
30 minutes	740,000	5.129%	160,000	30.435%	290,000 40.816%
60 minutes	810,000	-8.642%	100,000	37.500%	290,000 -0-
90 minutes	620,000	23.547%	140,000	-28.572%	300,000 -3.333%
(% reduction)	(21%)		(39%)		(40%)

With S. Aureus (a gram-positive organism), in Trials 1, 2, 3, it was shown that the numbers of S. Aureus were reduced 21%, 39%, and 40% respectively, or an average of 33%. Results of these trials indicate that 20-30% of the bentonite was able to remove 33% of the organisms.

SUMMARY:

The research indicated that by the technique employed, it has been possible to confirm the previous conclusion that the bentonite preparation can remove significant numbers of certain gram-negative bacteria, while it appears to be only one-third as effective as to a gram-positive organism, S. Aureus.

EXPERIMENT III

(Reported May 8, 1961)

PURPOSE:

To demonstrate in vitro sorptive powers of a bentonite preparation against A. Proteus mirabilis, a gram-negative organism which can cause diarrhea, and B. its selective sorptive value in a mixture of 3 organisms, namely Proteus mirabilis (gram-negative), Escherichia coli (gram-negative) and Staphylococcus aureus

(gram-positive).

PROCEDURE:

Essentially the same as that used in Experiment I and II above, using the 4-hour culture used in Experiment II instead of the 24-hour one of Experiment I, and lowering the concentration of each organism.

RESULTS:

A. CHANGES IN BACTERIAL COUNTS OF PROTEUS MIRABILIS IN THE PRESENCE OF BENTONITE

	Trial 1		Trial 2	
	Bacterial count/ml.	**Reduction %***	**Bacterial count/ml.**	**Reduction %***
Initial	155,000		240,000	
30 minutes	45,000	70.968%	70,000	70.834%
60 minutes	15,000	66.667%	20,000	71.429%
90 minutes	1,000	93.333%	-0-	-
120 minutes	-0-	-	-0-	-
(% reduction)	(100%)		(100%)	

In trials #1 and #2, it was shown that the numbers of Proteus mirabilis were reduced 100% after 90 to 120 minutes in the concentration of organisms employed by 15% of the volume of bentonite.

B. CHANGES IN BACTERIAL COUNTS OF A MIXTURE OF P. MIRABILIS, E. COLI, AND S. AUREUS

	Trial 3		Trial 4	
	Bacterial count/ml.	**Reduction % ***	**Bacterial count/ml.**	**Reduction %***
Proteus mirabilis				
Initial	34,000		90,000	
30 minutes	18,000	47.059%	20,000	77.778%
60 minutes	2,000	88.889%	10,000	50.000%
90 minutes	1,000	50.000%	0	-
Escherichia coli				
Initial	18,000		10,000	
30 minutes	14,000	22.223%	10,000	-0-
60 minutes	8,000	42.857%	1,000	90.000%
90 minutes	3,000	62.500%	0	-
Staphylococcus aureus				
Initial	2,000		3,000	
30 minutes	2,000	-0-	2,000	33.334%
60 minutes	3,000	-33.334%	3,000	-33.334%
90 minutes	0	-	0	-

In trials #3 and #4 it was indicated that approximately 15% of the bentonite preparation removed from 95-100% of Proteus mirabilis organism, 83-100% of the E. coli organisms and 100% of the S. aureus organism in the concentrations employed. In other words there appeared to be selective sorption when the quantity of organism concentration was much less than the high concentration used in previous tests.

COMMENTS:

With lower concentrations of mixed organisms there appears to be selective sorption. However, when the population of mixed organisms is over 100,000 and the concentration of bentonite remains the same as when individual organisms were used, there was apparently little or no selective sorption by the technique employed. Thus it may be that selectivity of mixed organisms above 100,000 will require the use of a much larger quantity of bentonite than that used for sorption of single organisms or for sorption of mixed organisms under 100,000 population.

While the bentonite is working to remove the undesirable bacteria it could also remove an equal number of desirable bacteria, but when one realizes the large difference in the relative population of the this may not present a problem. In a normal healthy individual the population of desirable bacteria can run from 100,000 to 100,000,000 per cubic centimeter while the undesirable will generally run only 1/10 of one percent to 1%

(.001 to .01) of that number. However, when the population of undesirable bacteria gets up to 2% or 3%, the individual may be in real trouble and may perhaps have as, cramps, or serious diarrhea. To illustrate, assume a desirable population of 50,000 organisms with 1% undesirable or 500,000, assuming that the undesirable population increases to 2% or 1,000,000 and by increasing the quantity of bentonite suppose we removed 500,000 of each within 2 hours, we then would get:

Desirable 50,000,000 But, Undesirable 1,000,000

Removed 500,000 Removed 500,000

Balance 49,500,000 We now have 500,000

or a reduction of only 1% which should be rapidly replaced with or a reduction of 50% in this category, bringing the population back to a more normal state, where it should stay if conditions of normal good health prevail.

Note: In this summary Dr. Lind stated, "It also appears that if one wishes to accurately determine that a specific organism will be removed or sorpted from the gut by bentonite, one must set up "in vivo" experiments in animals. This would involve oral administration of the specific organism in question and following its path through the gut in the presence of a bentonite preparation." The clinical work done by Dr. Damrau's group mentioned in the first paragraph of this article, seems to have already demonstrated this "in vivo" (in the body) within the scope of the matters under investigation. In that research results in the treatment of diarrhea in humans were indicated as 97% satisfactory and had the dosage been raised as per Dr. Lind's procedures, the results might have been more impressive.

Note: Throughout the above report on hydrated bentonite various conditions (such as diarrhea, virus infections, and the like) are referred to in reporting certain results of scientific experimentation. Such references are made in the interest of providing a full report concerning such experimentation and not for the purpose of offering hydrated bentonite (either as such or under a specific product name) for such specific conditions. Such hydrated bentonite is offered solely as an aid in detoxification via the alimentary canal, and is not offered for any other use except as the same may be prescribed only

by a qualified and competent medical person. Certain so-called authorities may disagree with one or more of the conclusions expressed above. Nevertheless, we believe such conclusions to be based upon reputable and substantial scientific authority.

Prices:

Reprints of this circular or reprints from the Medical Annals of the District of Columbia entitled THE VALUE OF BENTONITE FOR DIARRHEA are obtainable from V.E. Irons, Inc. at .03 cents each, or (10) for .25 cents, or more (25) or more .02 cents each.

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