Structure-Function Claims for Bio-pH with Scientific Documentation

Benefit	Scientific Documentation
Bio-pH granules are safe when used as directed.	Food & Drug Administration. 2006. Grant New Dietary Ingredient (NDI) status to Bio-pH®. Schindler-Horvat, J, Parman, T, Green, C.E. Acute Oral Toxicity of a Nutraceutical (Alka-Plex Granules, aka Bio-pH) in Male and Female Sprague-Dawley Rats. Stanford Research Institute study M384-05, July 2005 Schauss, A. MEM Endpoint Dilution Using L-929 Mouse Fibroblast Cells assay. American Institute for BioSocial and Medical Research (AIMBR) and AppTec Laboratory Services, May 2004 Brown, S. Case Study – A Novel Therapy for Interstitial Cystitis, Nutrition Education and Consulting Service, May, 2003. Burns RW. 2007. No serious adverse events from 10 years of use. pH Sciences anecdotal data.
Bio-pH granules raise pH levels (reduces acidity levels) of body fluids, including urine, blood, and stomach.	Cooper E. 2006. Elite bicyclist study using two levels of Alka-plex® (aka Bio-pH) supplementation. Unpublished study, pH Gural M. 2001. The effect of Tummy Tamer™ on urine pH. Unpublished study, pH Sciences. Burns RW, Lund CL. 2003. pH Control™, its effect on urine acidity and implications on blood acidity. Unpublished study, pH Sciences. Konturek JW, Beneke M, Koppermann R, Petersen-Braun M, Weingartner U. The efficacy of hydrotalcite compared with OTC famotidine in the on-demand treatment of gastroesophageal reflux disease: a non-inferiority trial. Med Sci Monit. 2007 Jan;13(1):CR44-9. Thomson AB, Kirdeikis P, Zuk L. Comparison of 200 mg cimetidine with multiple doses of antacid on extent and duration of rise in

Benefit	Scientific Documentation
	gastric pH in volunteers. Dig Dis Sci. 1999 Oct;44(10):2051-5.
Bio-pH granules help the body maintain a healthy acid-base balance.	Lindinger MI, Franklin TW, Lands LC, Pedersen PK, Welsh DG, Heigenhauser GJ. Role of skeletal muscle in plasma ion and acid-base regulation after NaHCO3 and KHCO3 loading in humans. **Am J Physiol. 1999 Jan;276(1 Pt 2):R32-43**. Goldfinch J, McNaughton L, Davies P. Induced metabolic alkalosis and its effects on 400-m racing time. **Eur J Appl Physiol Occup Physiol. 1988;57(1):45-8.** Lobo DN. Fluid, electrolytes and nutrition: physiological and clinical aspects. **Proc Nutr Soc. 2004 Aug; 63(3):453-66**. Sa pir DG, Chambers NE, Ryan JW. The role of potassium in the control of ammonium excretion during starvation. **Metabolism. 1976 Feb; 25(2):211-20**. Frassetto L, Morris RC Jr, Sebastian A. Potassium bicarbonate reduces urinary nitrogen excretion in postmenopausal women. **J Clin Endocrinol Metab. 1997 Jan;82(1):254-9**. Wiederseiner JM, Muser J, Lutz T, Hulter HN, Krapf R. Acute metabolic acidosis: characterization and diagnosis of the disorder and the plasma potassium response. **J Am Soc Nephrol. 2004 Jun;15(6):1589**. Khanna A, Kurtzman NA.Metabolic alkalosis. Respir Care. 2001 Apr;46(4):354-65..
Bio-pH granules moderate the effects of age-induced metabolic acidosis.	Frassetto L, Sebastian A. Age and systemic acid-base equilibrium: analysis of published data. J Gerontol A Biol Sci Med Sci. 1996 Jan;51(1):B91-9.. Alpern RJ, Sakhaee K. The clinical spectrum of chronic metabolic acidosis: homeostatic mechanisms produce significant morbidity. Am J Kidney Dis. 1997 Feb;29(2):291-302. Frassetto LA. Effect of age on blood acid-base composition in adult

Benefit	Scientific Documentation
	humans: role of age-related renal functional decline. Am J Physiol. 1996 Dec;271(6 Pt 2):F1114-22. Frassetto L. Diet, evolution and aging--the pathophysiologic effects of the post-agricultural inversion of the potassium-to-sodium and base-to-chloride ratios in the human diet. Eur J Nutr. 2001 Oct;40(5):200- 13.
Bio-pH granules moderate the effects of stress-induced metabolic acidosis	Sahlin K. Metabolic factors in fatigue. Sports Med. 1992 Feb;13(2):99-107. Alpern RJ, Sakhaee K. The clinical spectrum of chronic metabolic acidosis: homeostatic mechanisms produce significant morbidity. Am J Kidney Dis. 1997 Feb;29(2):291-302. Frassetto L. Diet, evolution and aging--the pathophysiologic effects of the post-agricultural inversion of the potassium-to-sodium and base-to-chloride ratios in the human diet. Eur J Nutr. 2001 Oct;40(5):200-13. Maurer MR. Neutralization of Western diet inhibits bone resorption independently of K intake and reduces cortisol secretion in humans. Am J Physiol Renal Physiol. 2003 Jan;284(1):F32-40. Sebastian A. Estimation of the net acid load of the diet of ancestral preagricultural Homo sapiens and their hominid ancestors. Am J Clin Nutr. 2002 Dec;76(6):1308-16. Peters EM, Handjiski B, Kuhlmei A, Hagen E. Neurogenic inflammation in stress-induced termination of murine hair growth is promoted by nerve growth factor. Am J Pathol. 2004 Jul;165(1):259-71.
Bio-pH granules aids the body in the removal of acidic waste from cells.	Frassetto L, Morris RC Jr, Sebastian A. Potassium bicarbonate reduces urinary nitrogen excretion in postmenopausal women. J Clin Endocrinol Metab. 1997 Jan;82(1):254-9. Lindinger MI, Franklin TW, Lands LC, Pedersen PK, Welsh DG,

Benefit	Scientific Documentation
	Heigenhauser GJ. Role of skeletal muscle in plasma ion and acid-base regulation after NaHCO3 and KHCO3 loading in humans. Am J Physiol. 1999 Jan; 276 (1 Pt 2):R32-43. Goldfinch J, Mc Naughton L, Davies P. Induced metabolic alkalosis and its effects on 400-m racing time. Eur J Appl Physiol Occup Physiol. 1988;57(1):45-8.
Bio-pH granules support healthy liver and kidney function.	Alpern RJ, Sakhaee K. The clinical spectrum of chronic metabolic acidosis: homeostatic mechanisms produce significant morbidity. Am J Kidney Dis. 1997 Feb;29(2):291-302. Frassetto L, Morris RC Jr, Sellmeyer DE, Todd K, Sebastian A. Diet, evolution and aging--the pathophysiologic effects of the post-agricultural inversion of the potassium-to-sodium and base-to-chloride ratios in the human diet. Eur J Nutr. 2001 Oct;40(5):200-13. Demigne C, Sabboh H, Remesy C, Meneton P. Protective effects of high dietary potassium: nutritional and metabolic aspects. J Nutr. 2004 Nov;134(11):2903-6. Wiederseiner JM, Muser J, Lutz T, Hulter HN, Krapf R. Acute metabolic acidosis: characterization and diagnosis of the disorder and the plasma potassium response. J Am Soc Nephrol. 2004 Jun;15(6):1589-96.
Physiological aging of the lungs pushes the acid-base balance in the body toward acid which is moderated by Bio-pH granules as a dietary supplement.	Brijker F, van den Elshout FJ, Heijdra YF, Bosch FH, Folgering HT. Effect of acute metabolic acid/base shifts on the human airway calibre. Respir Physiol. 2001 Jan;124(2):151-8. Krausz S, Sullivan SF. Cardiorespiratory effects of hypothermia and bicarbonate alkalosis. Pflugers Arch. 1980 Oct; 388(1):79-81. Frassetto L, Morris RC Jr, Sellmeyer DE, Todd K, Sebastian A. Diet, evolution and aging--the pathophysiologic effects of the post-agricultural inversion of the potassium-to-sodium and base-to-chloride ratios in the human diet. Eur J Nutr. 2001 Oct;40(5):200-13.

Benefit	Scientific Documentation
	Lin RY, Rehman A. Clinical characteristics of adult asthmatics requiring intubation. J Med. 1995;26(5-6):261-77.
Bio-pH granules neutralize the acids generated internally by sustained physical activity (or "exercise-induced metabolic acidosis").	Hoheisel U, Reinohl J, Unger T, Mense S. Acidic pH and capsaicin activate mechanosensitive group IV muscle receptors in the rat. Pain 110(1-2): 149-57, 2004. Robergs, RA, Ghiasvand F, and Parker D. Lingering construct of lactic acidosis. Am J Physiol Regulatory Integrative Comp Physiol 289(3): R904 - R910, 2005. Boning D, Strobel G, Beneke R, and Maassen N. Lactic acid still remains the real cause of exercise-induced metabolic acidosis. Am J Physiol Regulatory Integrative Comp Physiol 289(3): R902 - R903, 2005. Greenhaff PL, Gleeson M, Maughan RJ. Diet-induced metabolic acidosis and the performance of high intensity exercise in man. Eur J Appl Physiol Occup Physiol. 1988;57(5):583-90. Reidenberg MM, Haag BL, Channick BJ, Shuman CR, Wilson TG. The response of bone to metabolic acidosis in man. Metabolism. 1966 Mar;15(3):236-41. Portington KJ, Pascoe DD, Webster MJ, Anderson LH, Rutland RR, Gladden LB. Effect of induced alkalosis on exhaustive leg press performance. Med Sci Sports Exerc. 1998 Apr;30(4):523-8. Lindinger MI, Franklin TW, Lands LC, Pedersen PK, Welsh DG, Heigenhauser GJ. Role of skeletal muscle in plasma ion and acid-base regulation after NaHCO3 and KHCO3 loading in humans. Am J Physiol. 1999 Jan; 276 (1 Pt 2):R32-43. Ljunghall S, Joborn H, Rastad J, Akerstrom G. Plasma potassium and phosphate concentrations--influence by adrenaline infusion, beta-blockade and physical exercise. Acta Med Scand. 1987;221(1):83-93. Goldfinch J, Mc Naughton L, Davies P. Induced metabolic alkalosis and its effects on 400-m racing time. Eur J Appl Physiol Occup

Benefit	Scientific Documentation
	Physiol. 1988;57(1):45-8. Caldwell JE.Diuretic therapy and exercise performance. Sports Med. 1987 Jul-Aug;4(4):290-304.
Bio-pH granules promote faster recovery from vigorous workouts.	Robergs R, Hutchinson K, Hendee S, Madden S, Siegler J. Influence of pre-exercise acidosis and alkalosis on the kinetics of acid-base recovery following intense exercise. Int J Sport Nutr Exerc Metab. 2005 Feb;15(1):59-74. Cherry PW, Lakomy HK, Boobis LH, Nevill ME. Rapid recovery of power output in females. Acta Physiol Scand. 1998 Sep;164(1):79. Ratel S, Duche P, Hennegrave A, Van Praagh E, Bedu M. Acid-base balance during repeated cycling sprints in boys and men. J Appl Physiol. 2002 Feb;92(2):479-85. Portington KJ, Pascoe DD, Webster MJ, Anderson LH, Rutland RR, Gladden LB. Effect of induced alkalosis on exhaustive leg press performance. Med Sci Sports Exerc. 1998 Apr;30(4):523-8. Greenhaff PL, Gleeson M, Maughan RJ. Diet-induced metabolic acidosis and the performance of high intensity exercise in man. Eur J Appl Physiol Occup Physiol. 1988;57(5):583-90. Sharp RL, Costill DL, Fink WJ, King DS. Effects of eight weeks of bicycle ergometer sprint training on human muscle buffer capacity. Int J Sports Med. 1986 Feb;7(1):13. Costill DL, Verstappen F, Kuipers H, Janssen E, Fink W. Acid-base balance during repeated bouts of exercise: influence of HCO3. Int J Sports Med, 5(5) 228-231, 1984. Jones NL, Sutton JR, Taylor R, Toews CL. Effect of pH on cardiorespiratory and metabolic responses to exercise. J Appl Physiol, 43 (6) 959-964, 1977. Lindinger MI, Franklin TW, Lands LC, Pedersen PK, Welsh DG, Heigenhauser GJ. Role of skeletal muscle in plasma ion and acid-base regulation after NaHCO3 and KHCO3 loading in humans. Am J Physiol. 1999 Jan; 276 (1 Pt 2):R32-43.

Benefit	Scientific Documentation
	Sutton JR, Jones NL, Toews CJ. Effect of PH on muscle glycolysis during exercise. Clin Sci (Lond). 1981 Sep;61(3):331-8. Cooper E. 2006. Elite bicyclist study using two levels of Alka-plex® (aka:Bio-ph) supplementation. Unpublished study, pH Sciences.
Bio-pH granules improves performance during workouts.	Matson LG, Tran ZV. Effects of sodium bicarbonate ingestion on anaerobic performance: a meta analytic review. Int J Sport Nutr. 1993 Mar;3(1):2-28. Harmer AR, McKenna MJ, Sutton JR, Snow RJ. Skeletal muscle metabolic and ionic adaptations during intense exercise following sprint training in humans. J Appl Physiol. 2000 Nov;89(5):1793. Portington KJ, Pascoe DD, Webster MJ, Anderson LH, Rutland RR, Gladden LB. Effect of induced alkalosis on exhaustive leg press performance. Med Sci Sports Exerc. 1998 Apr;30(4):523-8. Caldwell JE. Diuretic therapy and exercise performance. Sports Med. 1987 Jul-Aug;4(4):290-304. Wilkes D, Gledhill N, Smyth R. Effect of acute induced metabolic alkalosis on 800-m racing time. Med Sci Sports Exerc, 15(4) 277-280, 1988. McNaughton LR, Dalton, B, Palmer G. Sodium bicarbonate can be used as an ergogenic aid in high-intensity, competitive cycle ergometry of 1 h duration. Eur J Appl Physiol, 80(1) 64-69, 1999. Webster M.J. 2002. Sodium bicarbonate. In: Bahrke M and Yesalis C, Eds. Performance-enhancing substances in sport and exercise. Champaign, IL: Human Kinetics. p 197-207. Greenhaff PL, Gleeson M, Maughan RJ. Diet-induced metabolic acidosis and the performance of high intensity exercise in man. Eur J Appl Physiol Occup Physiol. 1988;57(5):583-90. Reidenberg MM, Haag BL, Channick BJ, Shuman CR, Wilson TG. The response of bone to metabolic acidosis in man. Metabolism. 1966 Mar;15(3):236-41. Jacobs I, Schele R, Sjodin B. Blood lactate vs. exhaustive exercise

Benefit	Scientific Documentation
	to evaluate aerobic fitness. Eur J Appl Physiol Occup Physiol. 1985;54(2):151. McCartney N, Heigenhauser GJ, Jones NL. Effects of pH on maximal power output and fatigue during short-term dynamic exercise. J Appl Physiol. 1983 Jul;55(1 Pt 1):225-9. Busse MW, Maassen N. Effect of consecutive exercise bouts on plasma potassium concentration during exercise and recovery. Med Sci Sports Exerc. 1989 Oct;21(5):489. Cooper E. 2006. Elite bicyclist study using two levels of Alka-plex® supplementation. Unpublished study, pH Sciences.
Bio-pH granules decrease the amount of muscle damage and soreness created by vigorous exercise due to the build-up of acids in the muscle.	Haller RG, Lewis SF, Estabrook RW, DiMauro S, Servidei S, Foster DW. Exercise intolerance, lactic acidosis, and abnormal cardiopulmonary regulation in exercise associated with adult skeletal muscle cytochrome c oxidase deficiency. J Clin Invest. 1989 Jul;84(1):155-61. Busse MW, Maassen N. Effect of consecutive exercise bouts on plasma potassium concentration during exercise and recovery. Med Sci Sports Exerc. 1989 Oct;21(5):489. Brien DM, McKenzie DC. The effect of induced alkalosis and acidosis on plasma lactate and work output in elite oarsmen. Eur J Appl Physiol Occup Physiol. 1989;58(8):797-802. Sahlin K. Metabolic factors in fatigue. Sports Med. 1992 Feb;13(2):99-107. Kleger GR, Turgay M, Imoberdorf R, McNurlan MA, Garlick PJ, Ballmer PE. Acute metabolic acidosis decreases muscle protein synthesis but not albumin synthesis in humans. Am J Kidney Dis. 2001 Dec;38(6):1199-207. Vormann J, Worlitschek M, Goedecke T, Silver B. Supplementation with alkaline minerals reduces symptoms in patients with chronic low back pain. J Trace Elem Med Biol. 2001;15(2-3):179-83. Verbitsky O, Mizrahi J, Levin M, Isakov E. Effect of ingested sodium

Benefit	Scientific Documentation
	bicarbonate on muscle force, fatigue, and recovery. J Appl Physiol. 1997 Aug;83(2):333-7.
Bio-pH granules induce greater muscle alkalinity and supports muscle and athletic endurance (or “time to fatigue”).	Lambert CP, Flynn MG. Fatigue during high-intensity intermittent exercise: application to bodybuilding. Sports Med. 2002;32(8):511-22. Raymer GH, Marsh GD, Kowalchuk JM, Thompson RT. Metabolic effects of induced alkalosis during progressive forearm exercise to fatigue. J Appl Physiol. 2004 Jun;96(6):2050-6. Verbitsky O, Mizrahi J, Levin M, Isakov E. Effect of ingested sodium bicarbonate on muscle force, fatigue, and recovery. J Appl Physiol. 1997 Aug;83(2):333. Sahlin K. Metabolic factors in fatigue. Sports Med. 1992 Feb;13(2):99-107. Cowan RA, Hartnell GG, Lowdell CP, Baird IM, Leak AM. Metabolic acidosis induced by carbonic anhydrase inhibitors and salicylates in patients with normal renal function. Br Med J (Clin Res Ed). 1984 Aug 11; 289 (6441): 347-8. Bushinsky DA. Acid-base imbalance and the skeleton. Eur J Nutr. 2001 Oct;40(5):238-44. Robergs RA, Ghiasvand F, Parker D. Biochemistry of exercise-induced metabolic acidosis. Am J Physiol Regul Integr Comp Physiol. 2004 Sep;287(3):R502-16. Swenson ER. Metabolic acidosis. Respir Care. 2001 Apr;46(4):342-53. Coyle EF. Physiological determinants of endurance exercise performance. J Sci Med Sport. 1999 Oct;2(3):181- 9. Bishop D, Edge J, Davis C, Goodman C. Induced metabolic alkalosis affects muscle metabolism and repeatedsprint ability. Med Sci Sports Exerc. 2004 May;36(5):807-13. Denning H, Talbot JH, Edwards HT, Dill DB. Effect of acidosis and alkalosis upon capacity for work. J Clin Invest, 9, 601-613, 1931.

Benefit	Scientific Documentation
	Wijnen S, Verstappen F, Kuipers H. The influence of intravenous NaHCO3 administration in interval exercise: acid-base balance and endurance. Int J Sports Med, 5, 130-132, 1984. Swank A, Robertson RJ. Effect of induced alkalosis on perception of exertion during intermittent exercise. J Appl Physiol, 67(5) 1862-1867, 1989. Burns RW, Lund CL. 2003. pH Control™, its effect on urine acidity and implications on blood acidity. Unpublished study, pH Sciences.
Exercise-induced metabolic acidosis causes fatigue which is mediated by Bio-pH based dietary supplements.	Sahlin K. Metabolic factors in fatigue. Sports Med. 1992 Feb;13(2):99-107. Alpern RJ, Sakhaee K. The clinical spectrum of chronic metabolic acidosis: homeostatic mechanisms produce significant morbidity. Am J Kidney Dis. 1997 Feb;29(2):291-302. Frassetto L, Sebastian A. Age and systemic acid-base equilibrium: analysis of published data. J Gerontol A Biol Sci Med Sci. 1996 Jan;51(1):B91-9. Wiederseiner JM, Muser J, Lutz T, Hulter HN, Krapf R. Acute metabolic acidosis: characterization and diagnosis of the disorder and the plasma potassium response. J Am Soc Nephrol. 2004 Jun;15(6):1589.
Bio-pH granules alkalize the acids generated internally by high-protein diet (or “diet-induced metabolic acidosis”).	Frassetto LA, Todd KM, Morris RC Jr, Sebastian A. Estimation of net endogenous noncarbonic acid production in humans from diet potassium and protein contents. Am J Clin Nutr. 1998 Sep;68(3):576-83. Marliss EB. Protein diets for obesity: metabolic and clinical aspects. Can Med Assoc J. 1978 Dec 23; 119 (12): 1413-21. Worthington BS, Taylor LE. Balanced low-calorie vs. low-protein-low-carbohydrate reducing diets. II. Biochemical changes. J Am Diet Assoc. 1974 Jan;64(1):52-5.

Benefit	Scientific Documentation
	Alpern RJ, Sakhaee K. The clinical spectrum of chronic metabolic acidosis: homeostatic mechanisms produce significant morbidity. Am J Kidney Dis. 1997 Feb; 29 (2):291-302. Frassetto L, Morris RC Jr, Sellmeyer DE, Todd K, Sebastian A. Diet, evolution and aging--the pathophysiologic effects of the post-agricultural inversion of the potassium-to-sodium and base-to-chloride ratios in the human diet. Eur J Nutr. 2001 Oct;40(5):200-13
Bio-pH granules aid the body in the removal of acidic waste from cells.	Frassetto L, Morris RC Jr, Sebastian A. Potassium bicarbonate reduces urinary nitrogen excretion in postmenopausal women. J Clin Endocrinol Metab. 1997 Jan;82(1):254-9. Lindinger MI, Franklin TW, Lands LC, Pedersen PK, Welsh DG, Heigenhauser GJ. Role of skeletal muscle in plasma ion and acid-base regulation after NaHCO3 and KHCO3 loading in humans. Am J Physiol. 1999 Jan;276(1 Pt 2):R32-43. Goldfinch J, McNaughton L, Davies P. Induced metabolic alkalosis and its effects on 400-m racing time. Eur J Appl Physiol Occup Physiol. 1988;57(1):45-8.
Bio-pH granules help the body maintain a healthy acid-base balance.	Lindinger MI, Franklin TW, Lands LC, Pedersen PK, Welsh DG, Heigenhauser GJ. Role of skeletal muscle in plasma ion and acid-base regulation after NaHCO3 and KHCO3 loading in humans. Am J Physiol. 1999 Jan;276(1 Pt 2):R32-43. Goldfinch J, Mc Naughton L, Davies P. Induced metabolic alkalosis and its effects on 400-m racing time. Eur J Appl Physiol Occup Physiol. 1988;57(1):45-8. Lobo DN. Fluid, electrolytes and nutrition: physiological and clinical aspects. Proc Nutr Soc. 2004 Aug;63(3):453-66. Sa pir DG, Chambers NE, Ryan JW. The role of potassium in the control of ammonium excretion during starvation. Metabolism. 1976 Feb;25(2):211-20.

Benefit	Scientific Documentation
	Frassetto L, Morris RC Jr, Sebastian A. Potassium bicarbonate reduces urinary nitrogen excretion in postmenopausal women. J Clin Endocrinol Metab. 1997 Jan;82(1):254-9. Wiederseiner JM, Muser J, Lutz T, Hulter HN, Krapf R. Acute metabolic acidosis: characterization and diagnosis of the disorder and the plasma potassium response. J Am Soc Nephrol. 2004 Jun;15(6):1589. Khanna A, Kurtzman NA. Metabolic alkalosis. Respir Care. 2001 Apr;46(4):354-65.
The body is better able to utilize electrolytes in an alkali state induced by Bio-pH based dietary supplement.	Allison S. Fluid, electrolytes and nutrition. Clin Med. 2004 Nov-Dec;4(6):573-8. Rehrer NJ. Fluid and electrolyte balance in ultra-endurance sport. Sports Med. 2001;31(10):701-15. Demigne C. Protective effects of high dietary potassium: nutritional and metabolic aspects. J Nutr. 2004 Nov; 134 (11):2903-6. Frassetto, L. Diet, evolution and aging--the pathophysiologic effects of the post-agricultural inversion of the potassium-to-sodium and base-to-chloride ratios in the human diet. Eur J Nutr. 2001 Oct;40(5):200-13. Frassetto LA. Estimation of net endogenous noncarbonic acid production in humans from diet potassium and protein contents. Am J Clin Nutr. 1998 Sep;68(3):576-83.
Certain prescription drugs and trauma push the body's acid-base balance toward drug induced acidosis which can be mediated by Bio-pH based dietary supplements.	Neale R, Reynolds TM, Saweirs W. Statin precipitated lactic acidosis? J Clin Pathol. 2004 Sep;57(9):989-90. Jin H, Meyer JM, Jeste DV. Atypical antipsychotics and glucose dysregulation: a systematic review. Schizophr Res. 2004 Dec 1;71(2-3):195-212. Sandhu GK, Heyneman CA. Nephrotoxic potential of selective cyclooxygenase-2 inhibitors. Ann Pharmacother. 2004

Benefit	Scientific Documentation
	Apr;38(4):700-4. Inamasu J, Nakamura Y, Saito R, Kuroshima Y, Mayanagi K, Ohba S, Ichikizaki K. Normokalemia and hyperglycemia in subarachnoid hemorrhage patients resuscitated from prehospital cardiopulmonary arrest. Resuscitation. 2002 Sep; 54(3):255. Hameed SM, Cohn SM. Gastric tonometry: the role of mucosal pH measurement in the management of trauma. Chest. 2003 May;123(5 Suppl):475S. Price G. Metformin lactic acidosis, acute renal failure and rofecoxib. Br J Anaesth. 2003 Dec;91(6):909-10. Boelsterli UA, Zimmerman HJ, Kretz-Rommel A. Idiosyncratic liver toxicity of nonsteroidal antiinflammatory drugs: molecular mechanisms and pathology. Crit Rev Toxicol. 1995; 25(3): 207-35.
Bio-pH based dietary supplements reduce acid concentrations in tissue and body fluids with the result that intra-cellular nutrient transportation may be improved.	Abdoun K, Wolf K, Arndt G, Martens H. Effect of ammonia on Na+ transport across isolated rumen epithelium of sheep is diet dependent. Br J Nutr. 2003 Oct;90(4):751-8. Mene P. Transient receptor potential channels in the kidney: calcium signaling, transport and beyond. J Nephrol. 2006 Jan-Feb;19(1):21-9. Wakabayashi I, Poteser M, Groschner K. Intracellular pH as a determinant of vascular smooth muscle function. J Vasc Res. 2006;43(3):238-50. Hayashi H, Szaszi K, Grinstein S. Multiple modes of regulation of Na+/H+ exchangers. Ann N Y Acad Sci. 2002 Nov;976:248-58. Powell JJ, Jugdaohsingh R, Thompson RP. The regulation of mineral absorption in the gastrointestinal tract. Proc Nutr Soc. 1999 Feb;58(1):147-53. Burton RF. The roles of intracellular buffers and bone mineral in the regulation of acid-base balance in mammals. Comp Biochem Physiol Comp Physiol. 1992 Jul;102(3):425-32.

Benefit	Scientific Documentation
Bio-pH granules improve enzyme activity which is very sensitive to tissue acidity conditions.	Eiam-ong S, Laski ME, Kurtzman NA, Sabatini S. Effect of respiratory acidosis and respiratory alkalosis on renal transport enzymes. Am J Physiol. 267(3 Pt 2):F390-9, 1994. Nolan PJ, Knepper MA, Packer RK. Inhibition of IMCD 11 beta-hydroxysteroid dehydrogenase type 2 by low pH and acute acid loading. J Am Soc Nephrol. 8(4):530-4, 1997. Price SR, Wang X, Bailey JL. Tissue-specific responses of branched-chain alpha-ketoacid dehydrogenase activity in metabolic acidosis. J Am Soc Nephrol. 9(10):1892-8, 1998.
Bio-pH based dietary supplements reduce the formation of crystals and stones in the urinary tract.	Torres VE, Cowley BD Jr, Branden MG, Yoshida I, Gattone VH. Long-term ammonium chloride or sodium bicarbonate treatment in two models of polycystic kidney disease. Exp Nephrol. 2001;9(3):171-80. Torres VE, Mujwid DK, Wilson DM, Holley KH. Renal cystic disease and ammoniagenesis in Han:SPRD rats. J Am Soc Nephrol. 1994 Nov;5(5):1193-200. Rodman JS. Prophylaxis of uric acid stones with alternate day doses of alkaline potassium salts. J Urol 145(1):97- 9, 1991. Kessler T, Hesse A. Cross-over study of the influence of bicarbonate-rich mineral water on urinary composition in comparison with sodium potassium citrate in healthy male subjects. Br J Nutr 84(6):865-71, 2000.
Bio-pH granules release alkalizing minerals slowly so they are available for transport across tissue without overwhelming the transport mechanism.	Johnson EA, Tanford C, Reynolds JA. Variable stoichiometry in active ion transport: theoretical analysis of physiological consequences. Proc Natl Acad Sci U S A. 1985 Aug;82(16):5352-6. Mafe S, Pellicer J, Cervera J. Kinetic modeling of ion conduction in KcsA potassium channel. J Chem Phys. 2005 May 22;122(20):204712. Berteloot A. Kinetic mechanism of Na+ -glucose cotransport through

Benefit	Scientific Documentation
	the rabbit intestinal SGLT1 protein. J Membr Biol. 2003 Mar 15;192(2):89-100.
Bio-pH granules stay in the system longer for longer-lasting absorption than sodium bicarbonate.	Lindinger MI, Franklin TW, Lands LC, Pedersen PK, Welsh DG, Heigenhauser GJ. Role of skeletal muscle in plasma ion and acid-base regulation after NaHCO3 and KHCO3 loading in humans. Am J Physiol. 1999 Jan; 276 (1 Pt 2):R32-43. Wiederseiner JM, Muser J, Lutz T, Hulter HN, Krapf R. Acute metabolic acidosis: characterization and diagnosis of the disorder and the plasma potassium response. J Am Soc Nephrol. 2004 Jun;15(6):1589-96. Burns, R., Ph.D. Comparing Composition™ with Bicarbonate Alternatives. Unpublished paper, 2004.
Bio-pH granules help the body maintain optimal acid-base balance longer than and without the negative side effects of sodium bicarbonate.	Lindinger MI, Franklin TW, Lands LC, Pedersen PK, Welsh DG, Heigenhauser GJ. Role of skeletal muscle in plasma ion and acid-base regulation after NaHCO3 and KHCO3 loading in humans. Am J Physiol. 1999 Jan;276(1 Pt 2):R32-43. Wiederseiner JM, Muser J, Lutz T, Hulter HN, Krapf R. Acute metabolic acidosis: characterization and diagnosis of the disorder and the plasma potassium response. J Am Soc Nephrol. 2004 Jun;15(6):1589-96. Burns, R., Ph.D. Comparing Composition™ with Bicarbonate Alternatives. Unpublished paper, Tamer Laboratories, 2004.
Bio-pH granules are significantly more effective than sodium bicarbonate in alkalization.	Lindinger MI, Franklin TW, Lands LC, Pedersen PK, Welsh DG, Heigenhauser GJ. Role of skeletal muscle in plasma ion and acid-base regulation after NaHCO3 and KHCO3 loading in humans. Am J Physiol. 1999 Jan;276(1 Pt 2):R32-43. Wiederseiner JM, Muser J, Lutz T, Hulter HN, Krapf R. Acute metabolic acidosis: characterization and diagnosis of the disorder

Benefit	Scientific Documentation
	and the plasma potassium response. J Am Soc Nephrol. 2004 Jun;15(6):1589-96. Burns, R., Ph.D. Comparing Composition™ with Bicarbonate Alternatives. Unpublished paper, 2004.
The absorbed alkaline materials of Bio-pH mediate the acid-producing phase of the localized inflammatory response to injury.	Mamet J, Baron A, Lazdunski M, Voilley N. Proinflammatory mediators, stimulators of sensory neuron excitablity via the expression of acid-sensing ion channels. J Neuroscience; 2002 Dec 15; 22(24): 10662-70. Mamet J, Lazdunski M, Voilley N. How nerve growth factor drives physiological and inflammatory expressions of acid-sensing ion channel 3 in sensory neurons. J Biol Chem 278 (49):48907-13, 2003. Dean RT, Fu S, Stocker R, Davies MJ. Biochemistry and pathology of radical-mediated protein oxidation. Biochem J 324:1-18, 1997.
The absorbed alkaline materials of Bio-pH granules can moderate the cycle of chronic inflammation induced by over acidity of tissue.	Losso JN, Bawadi HA. Hypoxia inducible factor pathways as targets for functional foods. J Agric Food Chem 53 (10): 3751-68, 2005. formate intoxication- role of the Fenton reaction. Proc Natl Acad Sci U S A 98(24): 13549-13553, 2001. Komarova SV, Pereverzev A, Shum JW, Sims SM, Dixon SJ. Convergent signaling by acidosis and receptor activator of NF-kappaB ligand (RANKL) on the calcium/calcineurin/NFAT pathway in osteoclasts. Proc Natl Acad Sci U S A 102(7):2643-8, 2005. Serrano CV Jr, Fraticelli A, Panniccia R, Teti A, Noble B. pH

Benefit	Scientific Documentation
	dependence of neutrophil-endothelial cell adhesion and adhesion molecule expression. Am J Physiol 271(3 Pt 1):C962-70, 1996. Yamaura K, Akiyoshi K, Irita K, Taniyama T, Takahashi S. Effects of olprinone, a new phosphodiesterase inhibitor, on gastric intramucosal acidosis and systemic inflammatory responses following hypothermic cardiopulmonary bypass. Acta Anaesthesiol Scand 45(4):427. Zambon JJ, Mather ML, Gonzales Y. A microbiological and clinical study of the safety and efficacy of baking-soda dentifrices. Compend Contin Educ Dent Suppl 18(21):S39-44, 1997. Keay SK, Szekely Z, Conrads TP, Veenstra TD, Barchi JJ Jr. An antiproliferative factor from interstitial cystitis patients is a frizzled 8 protein-related sialoglycopeptide. Proc Natl Acad Sci U S A 101(32):11803-8, 2004. Parsons CL. Successful downregulation of bladder sensory nerves with combination of heparin and alkalinized lidocaine in patients with interstitial cystitis. Urology 65(1):45-8, 2005. Dell JR, Parsons CL. Multimodal therapy for interstitial cystitis. J Reprod Med 49(3 Suppl):243-52, 2004. Gillespie L. Metabolic appraisal of the effects of dietary modification on hypersensitive bladder symptoms. Br J Urol. 1993 Sep;72(3):293-7. Nickel JC. Interstitial cystitis. Etiology, diagnosis, and treatment. Can Fam Physician. 2000 Dec;46(12):2430-4, 2437-40. Chung MK. Interstitial cystitis in persistent posthysterectomy chronic

Benefit	Scientific Documentation
	pelvic pain. JSLS. 2004 Oct- Dec;8(4):329-33 . Dallosso HM, McGrother CW, Matthews RJ, Donaldson MM. The association of diet and other lifestyle factors with overactive bladder and stress incontinence: a longitudinal study in women. BJU Int 92(1):69-77, 2003.
Bio-pH granules attenuate the activation of sensory neurons associated with the acid-producing phase of the inflammatory response.	Steen KH, Steen AE, Reeh PW. A dominant role of acid pH in inflammatory excitation and sensitization of nociceptors in rat skin, in vitro. J Neurosci 15(5 pt 2):3982-9, 1995. Yiangou Y, Facer P, Smith JA, Sangameswaran L, Eglen R. Increased acid-sensing ion channel ASIC-3 in inflamed human intestine. Eur J Gastroenterol Hepatol 13(8):885-8, 2001. Mamet J, Baron A, Lazdunski M, Voilley N. ProInflammatory mediators, stimulators of sensory neuron excitablity via the expression of acid-sensing ion channels. J Neuroscience 22(24): 10662-70, 2002. Davies RJ. Buffering the pain of local anaesthetics: A systematic review. Emerg Med (Fremantle) 15(1):81-8, 2003. Vossinakis IC, Stavroulaki P, Paleochorlidis I, Badras LS. Reducing the pain associated with local anaesthetic infiltration for open carpal tunnel decompression. J Hand Surg [Br] 29(4):399-401, 2004. Vormann J, Worlitschek M, Goedecke T, Silver B. Supplementation with alkaline minerals reduces symptoms in patients with chronic low back pain. J Trace Elem Med Biol 15(2-3):179-83, 2001.