Zeolite potentials

1. NLM CIT. ID: 99448302
TITLE: ***Pilot study on the effect of a mouthrinse containing silver zeolite plaque formation.***
AUTHORS: Morishita M; Miyagi M; Yamasaki Y; Tsuruda K, Kawahara K; Iwamoto Y
AFFILIATION: Department of Preventive Dentistry, Hiroshima University School of Dentistry, Japan. mark@ipc.hiroshima-u.ac.jp
ABSTRACT:
A double-blind cross-over study was performed to evaluate the inhibitory activity of silver zeolite (SZ) mouthrinse on plaque formation. Eleven dental students participated in this study. SZ mouthrinse was prepared by suspending SZ powder into phosphate-buffered saline (PBS) at a concentration of 3% (w/w). Type-A zeolite was used as a placebo. Before the experiment, the subjects were rendered plaque- free by professional prophylaxis. They then suspended any oral hygiene for five days, during which time they rinsed with either SZ or type-A zeolite mouthrinse twice a day. SZ significantly reduced plaque formation compared to the placebo ($p < 0.05$), suggesting that silver ions released from the SZ inhibited plaque formation.
NLM PUBMED CIT. ID: 10518857
SOURCE: J Clin Dent 1998;9(4):94-6

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2. NLM CIT. ID: 99437106
TITLE: ***Dynamic viscoelastic properties of antimicrobial tissue conditioners containing silver-zeolite.***
AUTHORS: Ueshige M; Abe Y; Sato Y; Tsuga K; Akagawa Y; Ishii M
AFFILIATION: Department of Removable Prosthodontics, Hiroshima University School of Dentistry, Japan.
OBJECTIVES:
The purpose of this study was to determine the effects of including the antimicrobial silver-zeolite (SZ) on the dynamic viscoelastic properties of various tissue conditioners. METHODS: The dynamic viscoelastic properties of five commercially available tissue conditioners: Visco-gel (VG), GC Soft-Liner (SL), FITT (FT), SR-Ivoseal (IV) and Shofu Tissue Conditioner (TC) containing SZ were evaluated after 1 and 28 days of water- and artificial saliva immersions with the use of complex modulus and loss tangent parameters. Values for these two parameters for each tissue conditioner were statistically analyzed by one- and two-way ANOVA and Bonferroni's test. RESULTS: Complex modulus and loss tangent values of TC were not significantly different among specimens containing 0, 2, 5 and 10 wt.%-SZ, respectively. In FT and TC containing 2 wt.%-SZ, these values were not significantly different between 1 and 28 days in both water- and saliva immersions. CONCLUSION: The results suggest that incorporating SZ does not affect TC's inherent dynamic viscoelastic properties, while the other tissue conditioners investigated may be found to have changed viscoelastic properties as a consequence of the inclusion of SZ.
NLM PUBMED CIT. ID:10507208
SOURCE: J Dent 1999 Sep;27(7):517-22

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4. NLM CIT. ID: 99199205
TITLE: ***La roca magica: uses of natural zeolites in agriculture and industry.***
AUTHORS: Mumpton FA
AFFILIATION:Edit Inc., P.O. Box 591, Clarkson, NY 14430, USA. fmumpton@frontiernet.net
ABSTRACT:
For nearly 200 years since their discovery in 1756, geologists considered the zeolite minerals to occur as fairly large crystals in the vugs and cavities of basalts and other traprock formations. Here, they were prized by mineral collectors, but their small abundance and polymineralic nature defied commercial exploitation. As the synthetic zeolite (molecular sieve) business began to take hold in the late 1950s, huge beds of zeolite-rich sediments, formed by the alteration of volcanic ash (glass) in lake and marine waters, were discovered in the western United States and elsewhere in the world. These beds were found to contain as much as 95% of a single zeolite; they were generally flat- lying and easily mined by surface methods. The properties of these low- cost natural materials mimicked those of many of their synthetic counterparts, and considerable effort has made since that time to develop applications for them based on their unique adsorption, cation exchange, dehydration-rehydration, and catalytic properties. Natural zeolites (i.e., those found in volcanogenic sedimentary rocks) have been and are being used as building stone, as lightweight aggregate and pozzolans in cements and concretes, as filler in paper, in the take-up of Cs and Sr from nuclear waste and fallout, as soil amendments in agronomy and horticulture, in the removal of ammonia from municipal, industrial, and agricultural waste and drinking waters, as energy exchangers in solar refrigerators, as dietary supplements in animal diets, as consumer deodorizers, in pet litters, in taking up ammonia from animal manures, and as ammonia filters in kidney-dialysis units. From their use in construction during Roman times, to their role as hydroponic (zeoponic) substrate for growing plants on space missions, to their recent success in the healing of cuts and wounds, natural zeolites are now considered to be full-fledged mineral commodities, the use of which promise to expand even more in the future.
NLM PUBMED CIT. ID:10097058
SOURCE:Proc Natl Acad Sci U S A 1999 Mar 30;96(7):3463-70

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5. NLM CIT. ID: 98313679
TITLE: ***Adsorption of desflurane from the scavenging system during high-flow and minimal-flow anaesthesia by zeolites.***
AUTHORS: Janchen J; Bruckner JB; Stach H
AFFILIATION:Pneumatik Berlin GmbH, Germany.
ABSTRACT:
Application of high-silica zeolites in a special adsorber allows complete selective adsorption of the inhalation anaesthetic desflurane from the outlet port of the scavenging system of the anaesthesia machine. In comparison with charcoal filters, zeolites allow almost complete desorption at moderate temperatures followed by condensation of the desflurane to the liquid phase. The adsorption of scavenged desflurane by zeolites was measured in 13 patients. The duration of the anaesthesia was between 70 and 130 min. A minimal-flow regime (0.5 L min-1 fresh gas inflow) was used for maintenance in seven patients and a higher-flow regime (3 L min-1 fresh gas flow) was used for maintenance in six patients. In minimal-flow anaesthesia, 62% of the delivered desflurane was adsorbed by the zeolite while 86% of the delivered desflurane was adsorbed in higher-flow anaesthesia. Preliminary results show that about 85% of the adsorbed desflurane could be recovered as liquid with high purity via desorption.
NLM PUBMED CIT. ID: 9649993
SOURCE: Eur J Anaesthesiol 1998 May;15(3):324-9

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6. NLM CIT. ID:98157739
TITLE: ***Inactivation of mercury in contaminated soils using natural zeolites.***
AUTHORS: Haidouti C

AFFILIATION:Agricultural University of Athens, Laboratory of Soils and Agricultural Chemistry, Greece.
ABSTRACT:
The application of zeoliferous rocks, from Metaxades region (Thrace, Greece) to soils contaminated with mercury significantly reduced the concentrations of mercury in the shoots and roots of alfalfa (Medicago sativa L.) and ryegrass (Lolium perenne). Use of natural zeolites at application rates of 1%, 2% and 5% by soil weight caused reductions in mercury concentrations of up to 86.0% in shoots and 58.2% in roots, compared with controls with no added zeolites. The reductions are more pronounced in above-ground plant material than in roots of the two plant species. The use of natural zeolites, as soil additives, to reduce the uptake of mercury by plants and the restriction of the entry of mercury into the food chain, is noted.
NLM PUBMED CIT. ID: 9496654
SOURCE: Sci Total Environ 1997 Dec 3;208(1-2):105-9

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7. NLM CIT. ID: 97453170
TITLE: ***A multicenter clinical trial of Gadolite Oral Suspension as a contrast agent for MRI.***
AUTHORS:Rubin DL; Falk KL; Sperling MJ; Ross M; Saini S Rothman B; Shellock F; Zerhouni E; Stark D; Outwater EK; Schmiedl U; Kirby LC; Chezmar J; Coates T; Chang M; Silverman JM; Rofsky N; Burnett K; Engel J; Young SW
AFFILIATION:Good Samaritan Hospital, San Jose, CA, USA.
ABSTRACT:
The purpose of this study was to assess the effectiveness and safety of Gadolite Oral Suspension as a gastrointestinal (GI) contrast agent for MRI in a phase II and two phase III multicenter clinical trials. Gadolite was administered to 306 patients with known or suspected abdominal and/or pelvic disease. MRI with T1- and T2-weighted sequences was performed before and after ingestion. Efficacy was evaluated by having two masked readers rate the certainty of their MR diagnosis (0 = uncertain, 1 = probable, 2 = definite) on randomly presented pre- and post-Gadolite Oral Suspension enhanced images. Principal investigators also evaluated the images and established the final diagnosis. Vital signs, clinical chemistries, and adverse events were documented. Blood and urine samples were analyzed for gadolinium content to determine whether Gadolite Oral Suspension was absorbed systemically. Certainty in MR diagnosis increased significantly ($P < .001$) for both blinded readers between pre- and post-Gadolite images (.49-1.18 for reader 1: .46-1.53 for reader 2). Sensitivity, specificity, and accuracy also increased for both masked readers. No gadolinium was detected in blood or urine samples. There were no serious adverse events and no apparent drug-related trends in mean vital signs or laboratory values. Gadolite is a highly effective, safe, and well tolerated contrast agent for clinical use with MRI.
NLM PUBMED CIT. ID: 9307913
SOURCE: J Magn Reson Imaging 1997 Sep-Oct;7(5):865-72

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8. NLM CIT. ID: 97326016
TITLE: ***Antifungal effect of zeolite-incorporated tissue conditioner against Candida albicans growth and/or acid production.***
AUTHORS: Nikawa H; Yamamoto T; Hamada T; Rahardjo MB; Murata H; Nakanoda S
AFFILIATION:Department of Prosthetic Dentistry, Hiroshima University School of Dentistry, Minami-ku, Japan.
ABSTRACT:
A new antimicrobial material, Ag-zeolite (Zeomic), was combined with a commercial tissue conditioner (GC-Soft Liner (GC); 1-5%) and, through monitoring the pH of the growth medium, examined for effects on the in vitro growth and/or acid production of Candida albicans on protein-free and saliva-coated specimens. The effect of incorporation of this agent on the physical property of the lining material was also examined according to the ISO penetration test. Comparison studies were carried out using GC, Coe Comfort (CC) or undecylenate combined GC (1-5%) specimens. Although the pH changes in the media varied depending upon the materials on which the Candida was grown, reverse sigmoidal pH curves were observed with most samples. As compared with GC, the soft lining materials showed, to some extent, an inhibitory effect on the acid production and/or the growth of C. albicans. These inhibitory effects consisted of a delay in the onset of rapid pH decline, decreases in the rate of pH change and increases in minimum pH. In most cases, the inhibitory effects of test specimens were dose-dependent, and zeolite specimens showed a significantly higher antifungal effect, followed by CC and undecylenate-combined GC; GC

showed the least antifungal effect. The inhibitory effects of these materials on fungal growth were decreased by the presence of a saliva-coat, particularly with zeolite specimens and CC. However, four of eight 5%-Zeomic specimens still exhibite perfect growth inhibition in the presence of the salivary pellicle. Furthermore, test specimens containing 2-5% Zeomic showed a significantly greater effect on the delay in rapid decline of pH, as compared with the other specimens examined. In addition, the significantly higher minimum pH was observed where the yeasts were grown on 4%- and 5%-Zeomic specimens. The physical properties of all the test specimens conformed with the ISO standard as examined by penetration test. These results taken together suggest that an antimicrobial zeolite-combined tissue conditioner would be a potential aid in denture plaque control.
NLM PUBMED CIT. ID: 9183028
SOURCE: J Oral Rehabil 1997 May;24(5):350-7

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9. NLM CIT. ID: 96107634
TITLE: ***Gadolinium zeolite as an oral contrast agent for magnetic resonance imaging.***
AUTHORS: Young SW; Qing F; Rubin D; Balkus KJ Jr; Engel JS; Lang J;
Dow WC; Mutch JD; Miller RA
AFFILIATION: Pharmacyclics, Inc., Sunnyvale, CA 94086, USA.
ABSTRACT:
The purpose of this study was to evaluate efficacy and safety of a gadolinium (Gd) zeolite suspension as an oral MRI contrast agent. Serial dilutions of GADO-LITE Oral Suspension 1,2-300 micrograms of Gd(III)/mL) were prepared. MRI (T1 and T2 weighted) of standards and dogs (precontrast and postcontrast) were performed. Toxicity and Gd absorption were also assessed. Subsequently, 30 normal male adult volunteers were divided into six groups of five subjects each. Gd zeolite po suspension was administered before and after MRI in volumes and concentrations ranging from 250 to 1500 mL; 6 to 60 micrograms of Gd+3/mL. The images were rated (efficacy score) by a blinded reader. Vital signs, blood chemistries and urinalysis were recorded. Gadolite Oral Suspension produced excellent enhancement of the dog gastrointestinal (GI) tract. No toxicity or absorption of Gd was observed in dogs receiving doses up to 4 times the anticipated human dose daily for 14 consecutive days. In clinical trials, Gd zeolite significantly improved the efficacy scores for all groups and all pulsing sequences (all P values < .05). Efficacy scores and signal intensities generally increased with concentration and volume. No Gd was detected in blood or urine specimens. No significant adverse events were reported. Gd zeolite is a promising contrast medium for enhancement of the GI tract in MRI.
NLM PUBMED CIT. ID: 8574032
SOURCE: J Magn Reson Imaging 1995 Sep-Oct;5(5):499-508

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10. NLM CIT. ID: 94174534
TITLE: ***A natural rubber drainage tube with antithrombogenic lumen surface.***
AUTHORS: Klocking HP; Schunk W; Merkmann G; Giessmann C Knoll H; Borgmann S
AFFILIATION:Institute of Pharmacology and Toxicology, Medical Academy Erfurt,FRG.
ABSTRACT:
A drainage tube was made by radiation vulcanization of a high polymeric substance based on natural rubber elastomers. Pentosan polysulphate sodium bound to a carrier substance (synthetic type 4A or 13X zeolite) was incorporated in the drainage tube which was then tested for its anticoagulant properties during perfusion with Tris buffer solution, citrated plasma, and blood, resp. The amount of pentosan polysulphate sodium released from the tube walls during perfusion with human citrated plasma in an open circulatory system was sufficient to exert an anticoagulant effect on the streaming plasma. This effect was corroborated by prolonged thrombin times and by unclottability in case of recalcified plasma samples in thrombelastographic studies. The antithrombogenicity test according to Chandler in a closed circulatory system revealed thrombus formation times (TFT) of more than 24 h (control: TFT = 1-3 min in native blood).
NLM PUBMED CIT. ID:7510427
SOURCE: Thromb Res 1993 Dec 15;72(6):501-7

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11. NLM CIT. ID: 93102772
TITLE: ***Zeolite A increases proliferation, differentiation, and transforming growth factor beta***

production in normal adult human osteoblast-like cells in vitro.
AUTHORS: Keeting PE; Oursler MJ; Wiegand KE; Bonde SK Spelsberg TC; Riggs BL
AFFILIATION:Endocrine Research Unit, Mayo Clinic, Rochester, Minnesota.
ABSTRACT:
Silicon in trace amounts enhances bone formation, and the silicon containing compound zeolite A (ZA) increases eggshell thickness in hens. In the studies reported here, treatment of nearly homogeneous strains of normal human osteoblast-like cells for 48 h with ZA at 0.1- 100 micrograms/ml induced a dose-dependent increase ($r = 0.35$, $P < 0.001$) in DNA synthesis ($n = 31$) to 162 +/- 16% (mean +/- SEM) of control and in the proportion of cells in mitosis ($n = 4$) from 9.1 +/- 1.8 to 27.0 +/- 4.5% ($r = 0.69$, $P < 0.005$). ZA treatment also increased alkaline phosphatase activity ($P < 0.05$) and osteocalcin release ($P < 0.05$) but did not significantly affect collagen production per individual cell. The mitogenic action of ZA was dependent on cell seeding density over the range of 1250-40,000 cells per cm2, which is consistent with induction of an autocrine factor(s). TGF-beta is a potent mitogen for osteoblasts. ZA treatment increased the steady-state mRNA levels of transforming growth factor beta 1 (TGF-beta 1) and induced the release of the latent form of TGF-beta protein into the conditioned medium within 6 h. We conclude that ZA induces the proliferation and differentiation of cells of the osteoblast lineage.
NLM PUBMED CIT. ID:1334616
SOURCE: J Bone Miner Res 1992 Nov;7(11):1281-9

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12. NLM CIT. ID: 93034754
TITLE: ***[Anti-bacterial zeolite balloon catheter and its potential for urinary tract infection control]***
AUTHORS: Uchida T; Maru N; Furuhata M; Fujino A; Muramoto S Ishibashi A; Koshiba K; Shiba T; Kikuchi T
AFFILIATION:Department of Urology, Kitasato University School of Medicine.
ABSTRACT:
We present here a production of anti-bacterial zeolite balloon catheter and investigated its potential for controlling urinary tract infection. This anti-bacterial balloon catheter showed a bactericidal effect against Pseudomonas aeruginosa, Staphylococcus aureus and Escherichia coli in vitro studies. The antibacterial effects were correlated with the concentration of anti-bacterial zeolite and size of catheter. We tried this catheter for 11 various urological patients who needed a long-term indwelling of a balloon catheter for lower urinary tract obstruction and neurogenic bladder. All patients were already indwelled silicon balloon catheter for 3 to 6 months and suffered with complicated urinary tract infection. Nine patients who had this anti- bacterial zeolite balloon catheter indwelled for 3 to 7 months and exchanged every 2 to 4 weeks, and no patient was taking antibiotics during this trial. Two patients (22.2%) showed good results by the urinary tract infection (UTI) criteria and 5 patients (55.4%) showed good effects by doctor's judgment. This anti-bacterial zeolite balloon catheter might be useful for patients who need long-term balloon catheter indwelling.
NLM PUBMED CIT. ID:1329451
SOURCE: Hinyokika Kiyo 1992 Aug;38(8):973-8

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13. NLM CIT. ID: 91307851
TITLE: ***The potential of a microencapsulated urease-zeolite oral sorbent for the removal of urea in uremia.***
AUTHORS: Cattaneo MV; Chang TM
AFFILIATION:Artificial Cells and Organs Research Centre, McGill University, Montreal, Quebec, Canada.
ABSTRACT:
Although successful in reducing urea levels, the use of oral microcapsules containing a urease-silica adduct and a zirconium phosphate ion exchanger result in a number of problems, including a negative calcium balance. In this study, it is demonstrated that the use of microcapsules containing a urease-zeolite preparation may be a potential route to urea removal. The use of zeolite ion exchangers, and zeolite W in particular, can alleviate the problems encountered with zirconium phosphate. Unlike zirconium phosphate, zeolite W is nonselective toward calcium ions and is stable at the high pH found in the intestinal tract. Zeolite W, when present in the sodium form, has a high ammonium capacity of 3.6 mEq NH_4^+/g zeolite under simulated intestinal conditions; its reactivity to ammonium is also higher. The application of enzyme envelopes to zeolite particles is a novel immobilization procedure that does not involve the use of colloidal silica and can reduce the amount of ingested material by as much as 25%.

The current in vitro study shows that cellulose acetate butyrate microcapsules, containing a urease-zeolite preparation, remove up to 80% of urea in less than 1 hour. These microcapsules can be dried and retain activity when sealed in a jar at 4 degrees C.
NLM PUBMED CIT. ID:1649615
SOURCE: ASAIO Trans 1991 Apr-Jun;37(2):80-7

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14. NLM CIT. ID: 89251640
TITLE: ***A reflection filter for isoflurane and other anaesthetic vapours.***
AUTHORS: Thomasson R; Luttropp HH; Werner O
AFFILIATION:Department of Inorganic Chemistry 2, University of Lund, Sweden.
ABSTRACT:
A new way of saving anaesthetic vapours is described. The method is analogous to the heat-moisture exchanger principle: the vapour is trapped in a filter during expiration and is returned to the patient during the subsequent inspiration. Fresh vapour is supplied on the patient side of the filter. A small container with 60 ml of a hydrophobic zeolite (an inorganic material) was used as filter. In model lung tests, this reduced the isoflurane consumption by 51% at a tidal volume of 300 ml, by 57% at 600 ml and by 51% at 930 ml. Neither isoflurane nor halothane yielded any degradation products when brought in contact with the zeolite.
NLM PUBMED CIT. ID:2721507
SOURCE: Eur J Anaesthesiol 1989 Mar;6(2):89-94

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15. NLM CIT. ID: 90020984
TITLE: ***[The effect of natural zeolite on the excretion and distribution of radiocesium in rats]***
AUTHORS: Mizik P; Hrusovsky J; Tokosova M
ABSTRACT:
Observation was made of the influence of natural zeolite(clinoptilolite) supplement in food on 134Cs excretion and distribution after oral internal contamination of laboratory brown rats. After diet administration with 2.5, 5, and 10% zeolite supplement the 134Cs elimination in droppings increased and the radionuclide deposition in liver, kidneys and femoral musculature decreased. The zeolite decontamination effects were observed with preventive administration, as well as with sorbent administration from the 24th hour after a single internal contamination.
NLM PUBMED CIT. ID:2552638
SOURCE: Vet Med (Praha) 1989 Aug;34(8):467-74

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16. NLM CIT. ID: 90050897
TITLE: ***[Sorption characteristics of natural zeolite (clinoptilolite) in biological material in vitro]***
AUTHORS: Vrzgula L; Seidel H
ABSTRACT:
The zeolite (clinoptilolite) sorption of arsenic, cadmium, and lead ions from rumen fluid and abomasum juice was investigated in laboratory conditions. Zeolite was found to sorb 91% of lead and 45% of cadmium from rumen fluid in 24 hours. The sorption effectiveness was even higher from abomasum juice where zeolite sorbed 98% lead in 24 hours.
NLM PUBMED CIT. ID:2554555
SOURCE: Vet Med (Praha) 1989 Sep;34(9):537-44

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17. NLM CIT. ID: 83247478
TITLE: ***Protection by clinoptilolite or zeolite NaA against cadmium-induced anemia in growing swine.***
AUTHORS: Pond WG; Yen JT
ABSTRACT:
Weanling Landrace X Yorkshire swine were fed a basal diet or a diet containing 3% clinoptilolite (a natural zeolite) with or without 150ppm CdCl2 or 3% zeolite NaA (a synthetic zeolite) with or without 150 ppm CdCl2 for 31 days. Hematocrit and hemoglobin were depressed significantly in animals fed Cd in the absence of zeolites, but not in their presence. Liver Cd concentration was increased dramatically by

added dietary Cd but was significantly lower in animals fed clinoptilolite with Cd than in those fed Cd alone (11.4 vs 16.5 ppm). Liver Fe and Zn were decreased by dietary Cd; liver Fe was not affected significantly by clinoptilolite or zeolite NaA, but liver Zn was increased by zeolite NaA. Kidney dry matter, Zn, and Cd concentrations were increased by dietary Cd; neither clinoptilolite nor zeolite NaA affected kidney Cd concentration. Zeolite NaA increased kidney dry matter both in the presence and in the absence of dietary Cd. Plasma urea-N, K, Na, and Mg were unaffected by Cd or by either zeolite. The data illustrate the different effects of dietary clinoptilolite compared with zeolite NaA on blood plasma, liver, and kidney concentrations of minerals and provide evidence that both zeolites offer some protection against Cd-induced Fe-deficiency anemia; the magnitude of this protection and the effects of each zeolite on tissue concentrations of Cd and other materials need further quantification.
NLM PUBMED CIT. ID: 6306673
SOURCE: Proc Soc Exp Biol Med 1983 Jul;173(3):332-7

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18. NLM CIT. ID: 85130639
TITLE: ***Effects of zeolite a or clinoptilolite in diets of growing swine.***
AUTHORS: Shurson GC; Ku PK; Miller ER; Yokoyama MT
ABSTRACT:
Growth, nutrient balance, plasma ammonia levels and urinary p-cresol excretion were evaluated in growing pigs fed diets containing various levels of zeolite A or clinoptilolite. In one growth trial, crossbred pigs averaging 25 kg initial body weight were assigned to diets containing no zeolite, .3% zeolite A or .5% clinoptilolite for a 6-wk growing phase trial. Average daily gain (ADG), average daily feed intake (ADF) and feed/gain (F/G) were unaffected by supplementation of either zeolite in the diet, but metabolizable energy (ME) utilization was improved by feeding diets containing either zeolite. A second growth trial utilized the same crossbred pigs, which averaged 65 kg initial body weight, and were assigned to diets containing no zeolite, 1% zeolite A or 5% clinoptilolite for an 8-wk finishing phase trial. Average daily gain, ADF, and ME utilization were unaffected by feeding either zeolite diet, while F/G was increased in pigs fed the diet containing 5% clinoptilolite. In two nutrient balance trials, 16 crossbred pigs averaging 7.5 kg in initial body weight were fed diets containing 0, 1, 2 or 3% zeolite A in one trial and 16 crossbred pigs averaging 7.0 kg initial body weight were fed diets containing 0, 2.5, 5.0 or 7.5% clinoptilolite in a second trial. In both trials, digestible energy, ME, N-corrected ME and ME corrected for N balance and zeolite levels were linearly reduced as increasing amounts of either zeolite were fed. Daily fecal N increased and apparent digestibility of N was linearly reduced by feeding increasing amounts of zeolite A or clinoptilolite. Biological value of protein was improved linearly as higher levels of zeolite A were fed, indicating that there may be some ammonia binding to zeolite A in the gastrointestinal tract. Net protein utilization was reduced by feeding increasing levels of clinoptilolite in the diet. Calcium, P, Mg, Na, K and Fe retentions were linearly reduced by feeding increasing amounts of zeolite A in the diet, while increasing levels of clinoptilolite caused only P retention to be linearly reduced. Both free and conjugated forms of urinary p-cresol we linearly reduced by feeding increasing levels of clinoptilolite. Plasma ammonia levels were reduced at subsequent bleedings after a meal and by increasing levels of clinoptilolite.
NLM PUBMED CIT. ID:6098574
SOURCE: J Anim Sci 1984 Dec;59(6):1536-45

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19. NLM CIT. ID: 20010591
TITLE: ***[Effects of natural zeolite-clinoptilollite on processes of removal of Cs-137 from the rat body]***
AUTHORS:Krasnoperova AP; Lonin AIu
AUTHOR
AFFILIATION:Kharkov State University, Ukraine.
ABSTRACT:
The selectivity of natural and synthetic zeolites to 137Cs in experiments in vitro has been investigated. The influence of natural zeolite-clinoptilolite on the dynamics of withdrawal of 137Cs from rats' organism was estimated.
NLM PUBMED CIT. ID:10542878
SOURCE:Radiats Biol Radioecol 1999 Jul-Aug;39(4):471-4

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20. NLM CIT. ID: 93199492
TITLE: ***Efficacy of zeolitic ore compounds on the toxicity of aflatoxin togrowing broiler chickens.***
AUTHORS: Harvey RB; Kubena LF; Elissalde MH; Phillips TD
AUTHOR AFFILIATION: Food Animal Protection Research Laboratory, U.S. Department of Agriculture, College Station, Texas 77845.
ABSTRACT:
Commercially available zeolitic ore compounds, when incorporated into the diets at 0.5%, were evaluated for their ability to reduce the deleterious effects of 3.5 mg aflatoxin/kg feed on growing broiler chickens from 1 day to 3 weeks of age. In a series of four experiments, the compounds used included the following: mordenite (particle size of - 20 mesh; Zeomite); clinoptilolite (particle size of -20 mesh; Zeobrite); SC Zeolite (particle size of -20 mesh); and clinoptilolite (particle size of -35 mesh; Clino 1) or clinoptilolite (particle sizes of -20 plus +35 mesh; Clino 2). Results demonstrated that 0.5% Zeobrite, Clino 1, or Clino 2 added toaflatoxin-contaminated diets did not significantly ($P < 0.05$) diminish the toxicity of high concentrations of aflatoxin to growing broiler chicks. Zeomite mordenite ore reduced the toxicity of aflatoxin to growing chicks by 41%, as indicated by weight gains, liver weight, and serum biochemical measurements, which compares favorably with its in vitro binding capacity to aflatoxin. SC Zeolite reduced weight-gain toxicity of aflatoxin by approximately 29%.
NLM PUBMED CIT. ID: 8383962
SOURCE: Avian Dis 1993 Jan-Mar;37(1):67-73

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21. NLM CIT. ID: 89186861
TITLE: ***Can zeolites decrease the uptake and accelerate the excretion of radio- caesium in ruminants?***
AUTHORS: Forberg S; Jones B; Westermark T
AUTHOR AFFILIATION:Department of Nuclear Chemistry, Royal Institute of Technology, Stockholm, Sweden.
ABSTRACT:
The zeolite group of minerals has been suggested as a means of decreasing the uptake of radio-caesium by humans and domestic animals, and also to accelerate the excretion of radio-caesium which has already been absorbed. Artificial mordenite, one of the zeolites being considered for this purpose, was dispersed in liquid paraffin and administered to goats and lambs fed radio-caesium-contaminated hay. Faeces and urine were collected separately and analyzed by gamma spectrometry on each day of the experimental period. At a dose of 10 g day-1 of mordenite, the amount of radio-caesium excreted was more than double the amount ingested with the fodder, due to extraction of the radio-caesium stored in the body. Initially, the effect/dose ratio was even higher. It is shown conclusively that mordenite can reduce the uptake of radio-caesium by goats and lambs, and also, without changing the fodder, reduce their body burden. A similar, preliminary experiment on man was less successful. In another experiment, boiling reindeer meat with mordenite reduced its radio-caesium content to 8%.
NLM PUBMED CIT. ID:2538920
SOURCE: Sci Total Environ 1989 Feb;79(1):37-41

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22. NLM CIT. ID: 84197843
TITLE: ***[The effect of zeolite (clinoptilolite) on the post-feeding dynamics of N metabolism in the portal vein, jugular vein and the rumen fluid of bulls]***
AUTHORS: Jacobi U; Vrzgula L; Blazovsky J; Havassy ILedecky V; Bartko P
ABSTRACT:
If easily digestible saccharides are deficient in the feed ration of bulls with the live weight of 300 kg and at simultaneous single application of urea at a rate of 0.2 g per 1 kg live weight, zeolite (with 50.6% clinoptilolite content) administered at a rate of 2.5% per 1 kg dry matter influenced significantly (P less than 0.05) the ammonia concentration in rumen, v. portae and v. jugularis. The rumen contents and blood were sampled at the intervals of 0, 15, 30, 60, 90, 120, 180 and 360 minutes after feeding. Basal feed ration consisted of 1 kg feed mixture and 3 kg meadow hay. After urea administration, zeolite reduced the ammonia concentration in rumen by 20-40% in comparison with the control group and in v. portae by 60-70%. In v. jugularis in the 90th minute after feeding significant hyperammonemia was observed in bulls with no zeolite supplement. Zeolite administration did not influence urea concentration in plasma.
NLM PUBMED CIT. ID:6326373

SOURCE:Vet Med (Praha) 1984 Apr;29(4):207-16

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23. NLM CIT. ID: 84148311
TITLE: ***[The effect of zeolite on experimentally induced acidosis in sheep]***
ABSTRACT:
The effect of zeolite (clinoptilolite) on experimentally induced metabolic acidosis was studied in sheep under experimental conditions. Sucrose was administered at the doses of 10 and 15 g per kg l. w. either alone or, in other groups, together with 0.45 g zeolite per kg l. w. The content of volatile fatty acids in rumen contents and the indices of acid-base homeostasis of blood were monitored in the subsequent 24 and/or 48 hours. The examinations showed that simultaneous administration of zeolite with sucrose failed to prevent the rise of metabolic acidosis but the drop in the indices of acid-base homeostasis was less severe, or was delayed by three to six hours. The dose of 0.45 g zeolite per kg l. w. was found to be insufficient for the prevention of a medium-severe or severe course of metabolic acidosis.
NLM PUBMED CIT. ID: 6322406
SOURCE:Vet Med (Praha) 1983 Nov;28(11):679-86

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24. NLM CIT. ID:78056296
TITLE: ***[Effect of zeolite mineral clinoptilolith on nitogen concentration in bird droppings]***
AUTHORS:Danchev IK
ABSTRACT:
The addition of certain amounts of the zeolite mineral klinoptilolith to freshly obtained bird feces led to the retention of nitrogen—up to 14 per cent and more--as compared with feces without zeolite in storage. The addition of the mineral produced also a deodorizing effect in neutralizing the offensive smelling accompanying the putrefaction process.
NLM PUBMED CIT. ID:929967
SOURCE: Vet Med Nauki 1977;14(4):93-6

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25. *TITLE:* ***Enterex: Anti-diarrheic drug based on purified natural clinoptilolite***
AUTHORS: G. Rodriguez-Fuentes, M.A. Barios, B. Cedre
ABSTRACT:
A new anti-diarrheic drug for humans has been developed based on the physical and chemical properties of the purified natural clinoptilolite (NZ). A series of physical, chemical, technological, pharmacological, microbiological and clinical studies were successfully conducted to meet the requirements of the Cuban Drug Quality Agency. The most important results concerning the properties and biological mechanism of NZ are:
a) Clinical study in diabetes patients with vascular impairments neuropathic diarrhea- This was a comparative study with diphenoxilate of atropine, an antimotility drug. The results didi not show significant difference between the two drugs, which is remarkable because neuropathic diarrhea is a syndrome that affects patients with vascular impairments produced by diabetes mellitus. Thus the recovery of the patients must be achieved in the first 24 h, and this was made possible by application of Enterex therapy. It was demonstrated that a second dosage of our drug had no adverse side effects, contrary to diphenoxilate of atropine, which does not allow for a second dosage without adverse side effects.
b) Clinical study in patients with acute diarrhea resulting from food intoxication. The main cause of acute diarrhea in adults is food intoxication, therefore, the fourth clinical study was conducted in a large population of volunteers (434) affected by this diarrhea. The result of the study shows that 75,6% of the patients recovered from diarrhea in the first 24 h and 24,4% in 36 h. These figures confirm the results obtained in previous studies such as a significant reduction in time for the physiological evolution of an acute diarrhea – 72 h – without verse side effects.
SOURCE: Zeolites 19; 441-448, 1997

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26. *TITLE:* ***Development and featuring of the zeolitic active principle FZ: A glucose adsorbent***
AUTHORS: B. Conception-Rosabal, G. Rodriguez-Fuents, R. Simon-Carballo
ABSTRACT:
The development of a zeolitic active principle called FZ that shows a high selectivity for glucose

adsorption is described. FZ has been obtained by hidrothermal transformation of natural purified clinoptilolite. This principle has been physically and chemically characterized by using X-ray diffraction, infrared spectroscopy, and chemical analysis techniques. The comparative studies prove for the important role played by the Fe2+ incorporated into natural zeolite regarding the glucose capture performed by zeolitic active principle.
SOURCE: Zeolites 19; 47-50, 1997