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DNA Sequences Encoding Biosynthesis of Cell Polysaccharides in Bifidobacterium breve, B. longum and B. bifidum

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Abstract

Introduction

Although the useful properties of Bifidobacterial do not need to be discussed herein we have discovered the unique therapeutic properties of surface polysaccharides of certain strains of intestinal bifidobacterial helping recovery of multiple patients during the described Cholera outbreak in the Russian Federation.

The Primary Objection of This Project: *was to get the sequences of the DNA encoding the surface polysaccharides in our intestinal bifidobacterial and examine the therapeutic effect of said polysaccharides for the intestinal epithelium recovery in patients of cholera outbreak.*

Materials and Methods: *We have isolated and sequenced the genomic DNA from said strains of bifidobacterial B. bifidum, B. breve and B. longum as described before. The Author has detected that specific DNA sequences in the genomes were in charge for encoding said surface polysaccharides of the intestinal bifidobacterial. Their elimination from the genomes of said bifidobacterial led to the lack of production of said specific surface polysaccharides. Restoration of said bifidobacterial genomes to their initial state led to restoration of the production of said surface polysaccharides [90].*

Results: *The DNA sequences encoding said polysaccharides are provided. Said surface polysaccharides of B. bifidum, B. longum and B. breve had substantial therapeutic effect shortening the total recovery time of the patients infected by Cholera in the district epidemiological outbreak of Cholera in the Russian Federation.*

Conclusion: *Fresh Water shortage is anticipated in the next 10 - 25 years. To prevent it we offer the replacement of current petroleum-based economy with Carbon Negative economy and Carbon Negative fuels. During said time Humankind is anticipated the Global Starvation. We offer manufacture of abundant Carbon Negative genetically engineered foods to keep Humankind happy not starving. The set of the surface polysaccharides produced by Bifidobacterium bifidum, B. breve and B. longum naturally present in the intestine of the Author and named by him as the "Mixture" has remarkable therapeutic effect in restoration of affected by intestinal infection cholera gastrointestinal epithelium for remarkably short time of 8-10 days instead of normally occurring 21-56 days of the epithelium recovery of infected by V. cholerae patients.*

Keywords: Bifidobacterial; Bifidobacterial-Probiotics; Surface Polysaccharides of Bifidobacterium Bifidum, B. Breve and B.Longum; Therapeutic Action of Said Polysaccharides; Gastrointestinal Epithelium Recovery with Said Polysaccharides

Introduction

The Author has noticed that often his feces have glossy structure and if dried on solid lives of plants become completely transparent. The Author suggested that his feces were rich in the content of the polysaccharides and attempted the isolation of the most numerous strains of his own intestinal bacteria to isolate said proposed polysaccharides. Said numerous strains turned out to be Bifidobacterium breve, B. bifidum and B. longum with certain content of other species of intestinal bifidobacterial. Essentially, the number of bifidobacterial strains in the feces of the Author was very significant but these three species qualitatively dominated. The Author has made a suggestion that said his own intestinal bifidobacterial strains are in charge for said polysaccharides production that he has noticed as above [51].

The Author has examined his feces for the presence of the specific polysaccharides and has identified at least three of said polysaccharides. The Author has purified said polysaccharides, applied the high-performance liquid chromatography (HPLC) multi-angle laser light scattering and used the viscometer along

with the refractive index detector (RI-4035) and then performed the Fourier transformation of the infrared light (FT-IR) [60-64]. The Author has used said methodologies to discriminate his own fecal polysaccharides from other polysaccharides such as polysaccharides of nine different species of brown algae (BA1-9) as that has been done before [14,29,31,51]. The Author's results showed that his fecal polysaccharides were indeed the β-D-glucans possessing the β-1,3-1,4-glucan linkages at least [65]. The molecular weight, radius of gyration, and intrinsic viscosity of said fecal polysaccharides were ranging from 1.718 × 105 Da to 6.630 × 105 Da, had the actual size of the molecules of 30.2 nm to 51.5 nm, and were present in the Author's feces at the amounts of 360.99 mL/g to 865.52 mL/g [14,29,51]. Moreover, α values of said fecal polysaccharides were in the range of 0.635 to 0.971, which indicated a rigid rod of their chain conformation [29,31,51].

Said fecal polysaccharides possessed their own antioxidant activities of BSPs exhibited substantial radical scavenging activities against DPPH (1,1-diphenyl-2-picrylhydrazyl) and ABTS (2, 2'-azino-bis-3-ethylbenzothiazoline-6-sulfonic acid) radicals, which indicated that the use of BSPs might be the potential approach for antioxidant supplements [51].

Earlier, the Author had a trip to his native town Saratov when said town had the epidemiological outbreak of Cholera the intestinal infection of the National importance for the certain regions of the Russian Federation. Luckily, the Author was allowed to use the Mixture, the artificial preparation containing said polysaccharides in the amounts of 0.5-0.97 g/L of the liquid which the infected with Cholera Russian citizens had to consume during their antibacterial treatment to shorten the usual for this type of patients in the Russian Federation recovery period of 21-56 days [9, 51]. The specific feature of Cholera infection in people is the complete destruction of the gastrointestinal epithelium and that significantly increased the recovery periods time to typical for this type of patients 21-56 days [51]. The specific feature the Author tried to examine on said recovering from Cholera Russian citizens was the recovery stimulation of the gastrointestinal epithelium with his preparation called "Mixture" to cure said people recovering from this dangerous infection [66]. That has caused the specific Author's interest in said his own intestinal polysaccharides to be commercially included into the combinations of medicines for the treatment of this and other serious gastrointestinal disorders / infections in various people around the World after the proper testing and the positive decision of the US controlling entities to use said polysaccharides [9,67]. Basically, said polysaccharides are the product of the Author's own intestinal bifidobacterial, the microorganisms widely used as the probiotics [12, 13].

Cultivation for a prolonged time outside of the host intestine removes the capability of intestinal microorganisms to adhere to wall of the intestine [51]. However, the probiotic companies continue to make profits by manufacturing and selling at pharmacies preparations with no therapeutic effect rendered by adhesion of consumed bacteria to the intestine wall [51]. Customers are anxious to buy probiotics anticipating the therapeutic effect which does not happen anyways after said probiotics - just waste of the customer's money, sometimes in tremendous amounts [51]. In 2020, the worldwide market for probiotic supplements used for gastrointestinal health was worth 1.1 billion U.S. dollars [84].

We herein are anxious to present a tool for faster recovery of the gastrointestinal epithelium damaged by thew strong intestinal infection Cholera treatment of which is described at thew end of this article including the morphology of the recovered during "Mixture' use damaged by Cholera infection gastrointestinal epithelium.

Mentioned by us before in this original article coming in 10-25 years from now Global Environmental crysis due to the added to the air CO2 above 400 ppm measured by NASA in 2010 and charachterized by them as "Point of No Return" to healthy self-reproducible environmental conditions [85].

As we stated anticipated in the next 10-25 years from now shortness of fresh water due to its consumption by the outer Space vacuum [21] is accompanied by the shortness of crops and livestock production leading to the Global starvation. We do not discuss herein our efforts to raise the investor's money to enhance our corporate value by the manufacturing of Carbon Negative genetically engineered foods on the basis of the mushroom "Borovik" (Boletus edulis). We emphasize herein the loss of the fresh water to the outer Space [21].

The fresh water loos to the outer Space vacuum is the major reason for the coming in the next 10-25 years global environmental crysis related to shortness of fresh water as we have discussed above. Over the age of the solar system (4.5 billion years ~ 1.4×10171.4×1017 s) this loss rate gives 4.2×1019 4.2×1019 g of water [86]. The current loss figure is equivalent ~25,920 liters per day, or 9,467 m3m3 per year. And the reference of that figure seem to be the paper [87]. The current fresh water loss figure is equivalent ~25,920 liters per day, or 9,467 m3 per year [88,89]. Writing about the fresh water loss to the outer Space vacuum we have to refer to the data we have gathered while writing this original article. The current loss figure is equivalent ~25,920 liters per day, or 9,467 m3 per year [88]. And the reference of that figure seem to be the paper that used measurements from the [89]. That would correspond to the total loss over Earth's history of 42,000 km^3 of water which is equivalent to about 12 cm of sea level change [89]. Notes of the international petroleum corporations that at the altitude of 60 kilometers there is the layer of air with temperatures around -60°C and such air layer freezes all fresh water vapors into ice crystal falling then to the Ground is factually real but if someone of our the readers ever has been to Europe before the washer / dryer systems came into the households (about 40-35 years back) so such readers remember how women there has dried their laundry placing the washed linen on the ropes in the yards at winter negative (°C)temperatures and those women have collected dried laundry when the ice particles have evaporated into the air. So, the statements of the international petroleum corporations are false and useless. The layer of the air with negative (°C) temperatures does not stop

the fresh water out of its loss to the outer Space vacuum. The solution to the global environmental crysis caused by said international petroleum corporations is very simple to resolve: the elimination of said international petroleum corporations by their replacement with the Carbon Negative fuels corporations like the ones the Author owns.

Therefore, the Author feels good per this his expansion to the therapeutic area besides the major business directions he already has taken in the manufacture of the Carbon Negative fuels, Carbon negative foods for the time of disappearing of the international petroleum corporations and the manufacture of the distilled water from the sea water for the time of fresh water shortness in the next 10-25 years.

Materials and Methods

The isolation of the genomic DNA from said strains of bifidobacterial B. bifidum, B. breve and B. longum was done as described before with no modifications [13,51]. Sequencing of the isolated genomic DNA from said strains of bifidobacterial was conducted by the methods and procedures used for ther customer DNA sequencing by the business Illumina in San-Diego, CA [14,51].

The Author has detected that specific DNA sequences in the genomes were in charge of encoding said surface polysaccharides of the intestinal bifidobacterial. Their elimination at the genomes of said bifidobacterial led to the lack of production of said specific surface polysaccharides [71]. Restoration of said bifidobacterial genomes to their initial state led to restoration of the production of said surface polysaccharides [90].

We offer herein the actual DNA sequences encoding said polysaccharides.

Sequence 1. Bifidobacterium bifidum polysaccharide DNA sequence. The NCBI deposition number is 2665132.

1 ccaaattacg ggcggttaat agatgatcaa tgtccaagaa gcgctggcaa aaccttggtt
61 acctatcaga tattttctat atccagattc aactggtcca aattcgcaag gagaatagct
121 ggctggttcg gaattgcttg agctgacttt atacggctga tttggtcttt gcttatatac
181 gtccggatgg cgaccgtcgc ttcctagttg tggctaactt gtccaatgaa gagcaagact
241 tgacagtaga aggaaaagtc tgattgaaaa aaatctgtct cactgcggct aaagaagtac
301 ttgaaggaca ggtcttggct ccatgggatg ctttctgtgt ggaattacta tttatatttt
361 atttaaaatt ttgcagaaaa gaaatcatgt aaaaacaagg gaggactgta taaaagacag
421 aaatcctttg ttttttataa ccaaggttta taaactttca ttctcgaaat tcaattaact
481 ccactattaa ggagaaagaa gatgaacata aagaagcgtg tccttagtgc ttacaaattc
541 aggtctgact tttgcatctg ctttgcttta gctgcttgcg gccaatcagg ttcagataca
601 aaaacttact catcaacctt tagtggaaat ccaactacat ttaactatct attagactat
661 tacgctgata atacagtcaa ttgaaataag agcaggataa gggggcctcg taaaaggtat
721 tgcggcttgg taataccttt tacgaggctt tttgatatga gcccatgttt tctcggtagg
781 ggtgagtagg attgtactca gaggaagagg taaaagttta tgcccaaact cttcgcataa
841 ttccccattc tatggaatct tgcattatcc ataataataa aagttctagc ccgatggtgt
901 ggttaatgtt ggtaagaaaa acttctgaaa ccttgcttca aaaaagtcgc tcgtcatcgt
961 ttcttcgtgg gtcattggag cgattaactc accatttgtt agacctgcaa ccaaagaaat
1021 cctctgtttt cttcttccag atactttgcc tcttcttaac tgacctttta atgagcgacc
1081 atattctcga taatttttaag tatcgaatcc tgtttcatca atctaaacag gtgataggtg
1141 ctttggggcta ttaaaattct taagaaataa ggctactttt tctgggtctt gttcataatt
1201 agattgccccc tagaatagta cacttctgct tctaaaacat tgttagaaat cgatttgact
1261 atttgtcatg gtcctgatcg ttcttatttc attttactat atttttgttt cgcgggaagt
1321 ctactaagat acttaaagat gcagatagta ggggaaatgt agacattacc gtaaaaaagt
1381 gatataattg tacgatgttc aaggtatagg tgttaatcat gagtagacgt tttaggaat
1441 cacgttcaca gaaagtgaag cgaagtgtta atatcgtttt gctgactatt tatttttgt
1501 tagtttgttt tttattgttc ttggtcttta agtacaatat ccttgctttt agatatctta
1561 acctagtggt aactgcgtta gtcctactag ttgccttggt agggctactc ttgattatct
1621 ataagggagc tgaaaagttt actatttttc tgttggtgtt ctctatcctt gtcagctctg
1681 tgcagtacag cagtttgttg gactgaccaa tcgtttaaat gcgacttcta tgtcgctctt
1741 atattcaatc attactcaga agtgtcgctg ttttagcaga tagtgatatc gaaaatgtta
1801 cgcaactgac gagtgtgaca gcaccgactg ggactgataa tgaaaatatt caaaaactac
1861 tagctgatat taagtcaagt cagaataccg atttgacggt cgaccagagt tcgtcttact
1921 tggcagctta caagagtttg attgcattgg agactaaggc cattgtctta aatagtgtct
1981 ttgccaatat catcgagtca gagtatccag actacgcatc gaagataaaa aagatttata
2041 ccaagggatt cactaattaa gtagaagctc ctaagacgtc taagaatcag tctttcaata
2101 tctatgttag tggaattgac acctatggtc ctattagttc ggtgtcgcga tcagatgtca
2161 atatcctgat gactgtcaat cgagatacca agaaaatcct cttgattaca acgccacgtg
2221 atgcctatgt accaatagca gatggtggaa ataatcaaaa agataaatta acccatgcgg
2281 gcatttatgg tccattcaca ccttagaaaa tctctatgga gtggatatca agttgattcg
2341 attactatgt gcgattgaac ttgggagggg ttcacttctt tcttgaaaat gattgactta
2401 tagatgttca taatgatcaa gagttttcag ctctacatgg gaagttccat ttccagtag

2461 ggaatgtcct tctagactct gagcaggctc taggttttgt acgtgaacgc tactcactag
2521 ccgatggaga ccgtgaccgt ggtcgcaacc aacgggaggt gattgtggct atccttcaaa
2581 aattttcgtc aaccgaagca ctgaaaaatt atagtactat cattgatagc ttgcaagatt
2641 ctatccttac aaatatgcca cttgagacta tgataaattt ggtcaatact cagttagaaa
2701 gtggagggaa ttatagggta aattctcaag atttaaaagg tacaggtcgg acggatcttc
2761 cttcttatgc aatgccagac agtaacctct atgtgatgga aatagatgat agtagtttag
2821 ctgtagttaa caggatgtga tggagggtag agcagctata atgaaatgat agacatccat
2881 tcgcatatcg tttttgatgt agatgacggt cccaagtcaa gagaggggag caaggctctc
2941 ttgatagttt cctacaggca gggggtgcga accattgtct ctacctctca ccgtcgcaag
3001 ggcatgtttg aggctccgga agagaagata gcagattact ttcttcaggt tcgggaaatt
3061 gcaaaagaag tagcagatga tttagtcatt gcttatggcg cagagatata ctatactctg
3121 gatgctctag ggaagctaga aaaaaaagaa attcctaccc ttaatgatag tcgttatgcc
3181 ttgattgagt ttagcatgca tacttcctat cgtcagattc atacgggatt gagcaatatt
3241 gaatcacgcc agtaattgct catattgaac gttatgatgc tttagagaat ttgatgttgg
3301 aacgaaaaac atgttcgtga actgattgat atggggtgct atactcagat ttatagttat
3361 catgtttcaa aacctttgtt ctttggtgaa aaatataaat tcatgaaaaa gagagctcgg
3421 tatttttgggg aacgtgattt agttcatgta gttgcaagtg acatgcacaa tttagacagt
3481 atatgcaaca ggcatatgat atcattgcta agaaatattg gagccaaaaa agacctccat
3541 agcgttagaa cttttgtaga taatcccaga ttaattataa tggatcaatt aatttaggag
3601 accctatgaa ggaacaaaac actttggaaa tcgatgtatt gcaactatcc agagctttat
3661 ggaccagaaa gttagtcatt ttattagtgg caattataac ttcttcagtt gcttttgcct
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4081 tgacaacact ggaggtggca agaccggcga tatcaccgtc ttcgccaaat attaaacgca
4141 atacactggt tggtttttg gcaggggtga gtggaactag tgttatagtt tttcttcttg
4201 aatttttgaa cactcgtgtg aaacgtccgg aagatatcga aaatacactg cagatgacac
4261 ttttgggagt tgtaccttac ttgagtaagt tgaaatagga gagaggaatg ccgacattag
4321 aaaaaaactg gagttcatta aaatagcaca agaaggcaga agaatattac aatgccttgt
4381 gtacttatat acagttgagc ggagataaac taaaagtaat ttccgttact tctgttaacc
4441 ctggggaagg aaaaacaact acttccgtaa atatagcaag gtcgtttgcg cgtgcaggct
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4561 cgcgtgaagg aattacaggg ctaacagaat ttttatctgg gacagctgat ttatcttacg
4621 gtttatgtga tacaaatatt gttaatttat ttgtagttca atcgggacct gtatcaccaa
4681 accctacagc cttgttacaa agtaggaatt ttaatgatat gattgaaaca ttgcgtaaat
4741 attttgatta tatcattgtt gatacaccac ctgttggaat tgttattgat gcggtaatta
4801 tcactcaaaa gtgtgatgcg tccatcttgg taacagcaac aggtgaggcg aataaacgtg
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5581 ttgtggatga ggtgtttgtc gatcttccag gagagagcta tgatattgga gaaattatct
5641 ctaagtttga gacaatgttg atagatgtaa ctgtaaatct taatgcattt aataagaatt
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6661 ggagggtatt tggtgctaag acagtctata tagaagtatt tgatagaatt gatgctccga
6721 caatgactgg gaaacttgtt tatccagtaa ctgacaggtt tattgtacaa tgggaagaaa
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6901 tgagggattt attcaggatg atgtttttat tcccacagga tactctaatt atgttccaaa
6961 attttgtaaa tgggaggaat taatatctta tgaaaaaatg aatcaattga ttaaggaatc
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7081 tttttccaata attgttccgc ggctaaaaaa atttggtgag catgtaaatg atcaccagat
7141 gcaatttgta aaaataacga aagaaatata caatttaata gttatagatg atatttcaga
7201 cttacattta attcttcata attttaagga caaacatttt gaaacttatt tgaataacga
7261 gagatttttt gtacgtttca atgtggaaat cagtaacctt tttaaaggaa ataaaataaa
7321 tgaggattag aatagaacct cagtattttc tttataaata cctttggttt attatcctac
7381 ttccattaca gtttatgcaa ttaatattat tctttttaat tgctttaact cttttaccaa
7441 agaaaaacaa cctatataaa gtttttaaaa tagatacacc gtctttttgt atggtgctat
7501 atattctata tctataatat ttaattctct gattgatgga ttggctgttc ggactattat
7561 aagtgttgtt ttcagatttg agtatagcat ttaattggct aatagcagta ttttttata
7621 attattattt gaaaatgcca atcaatattg acaggatatt gagatatatg tattataatt
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8161 aagctattaa tggaatggaa atgttacttg gcgcgggtgt cagaattccc tctacagtag
8221 atatattatt ggggtcacat tctatgtata tttgttttat ttataggaca ggagttttag
8281 gaagtataat aataacagta atgttttatt atctgttttc tggatttta aaatgtgatt
8341 catctgagag actaagccgt attggctata ttctagcttt gtcagtattt tggctttttg
8401 aagagttaga tccacattat tggtgtttgg ttttattttt ttcaacaata agtattttca
8461 taggcaatag aaaagaggaa atagttggat gatagaagta tcaatcataa ttccaatata
8521 caatgctgaa accactatta aaaattgtgt tgatagtgcc ttaaagcaaa atttagaatc
8581 tcttgccgtg attttggtga atgatgggtc taacgattct acatcaaaaa ttcttgaaca
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8761 tatattagat gaaggtatgc tatctaaaat gtatcagttt gcaaggagta ataaaattga
8821 tcttttatct tgttggcata gggagcctag tacaacacaa tacggtggta atgataatag
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The file desposited to the NCBI is attached to this publication.

Sequence 2: Bifidobacterium Breve Mt 0033356 Polysaccharide DNA Sequence. The NCBI Deposition Number is ID 697837.

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The file desposited to the NCBI is attached to this publication.

Sequence 3: Bifidobacterium Longum Mtg 404487 Surface Polysaccharide. The NCBI Deposition Number is 404487.
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17068 ctgatgcgat

The sequence ID per the deposited to the NCBI file is 404487. The FASTA file with this sequence is attached to this file with the original publication.

Results

As we have promised in these are the exact DNA sequences determined to encode the biosynthesis of surface polysaccharides to be produced in vivo by intestinal bifidobacterial strains isolated from the intestine of the Author's. Said polysaccarides have been purified by the Author who investigated certain properties of said polysaccharides [10].

Said polysaccharides have been tested to decrease substantially the recovery times in the Russian citizens subjected to Cholera infectious outbreak recently. Now this is the task of our other Senior executive team member to run the investigation or to join the investigation of said therapeutic preparation for the treatment of the serious gastrointestinal infections in the established clinical trials. Said feature is beyond of the Author's expertise. But he trusts that such testing is essential to implement the therapeutic preparation "Mixture" he has used successfully to substantially shorten the recovery times for the patients infected with the Cholera infection in the Russian Federation recently [10]. Basically, the recovery time has been shortened to 8-10 days vs. 21-56 days if no therapeutic preparation "mixture" has been used [10]. As the Author has planned and reasonably anticipated, the overall result of testing of the proprietary therapeutic "Mixture" showed exceptionally positive results of said proprietary mixture application in all infected with Cholera adults and in all infected children [10]. The infection, which has been confirmed to be the Cholera infection by the State Epidemiologists and Microbiologists who immediately attended the clinics of the Saratov State Medical University during said epidemiological outbreak, noted in the recently published article [10].

The results of the treatment with Ampicillin and the application of the proprietary therapeutic preparation Mixture showed very fast and definite recovery of all infected patients. The treated disease (we were not informed about cases of untreated infection in said geographical area) stopped on the eight day in all infected patients. On the ninth day, we were allowed to get certain images of the patient's intestinal status from the specialists of Saratov State Medical University [10].

Therefore, the Author feels good per this his businesses expansion to the therapeutic area besides the major business directions he already has taken in the manufacture of the carbon negative fuels and the manufacture of the distilled water from the sea water.

Discussion

As our corporate web site stated there will be the shortage of the fresh water anticipated in the next 10-25 years [16]. The Author is not the medium to predict the timing of that exactly, there might be certain timing deviation in both sides: to make the waiting time shorter or wise versa - LONGER.

The Earth fresh water reserves of Earth are indicated in the picture below (Fig.1). The evaporated fresh water is not shown in the picture below, but the destiny of that fresh water vapors is very disturbing since in 2010 NASA has called the air CO2 levels of 400 ppm as "the point of NO return" [16].

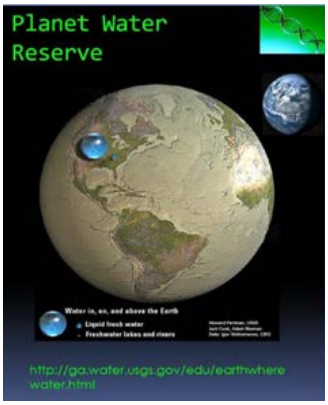

Figure 1: Earth Fresh Water Reserves as Indicated At http://ga.water.usds.gov./edu/earthwherewater.html [1,3,16].

The shown below picture (Fig. 2) provides the details of our ecological concerns with the availability of the fresh water in the future for the livestock manufacture and the crop manufacture, predicting certain time of Global food starvation on Earth as that was described in detail at [16].

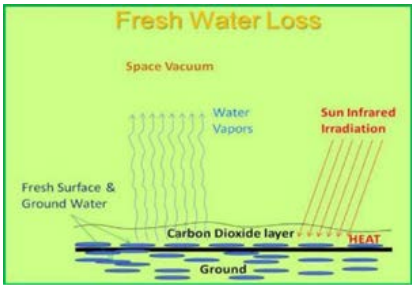

Figure 2: The Mechanism of The Fresh Water Vapors Loss to The Space Vacuum [16].

Basically, as the Author detailed at [16] the air CO_2 at the levels above 400 ppm significantly changes the amount of the fresh water on our planet. As that has been known before that the CO_2 selectively absorbs Solar infra-red energy, which at the point of absorption is converted into the heat energy. The air CO_2 as the heaviest gas in the air blend (1m3 of CO_2 is 1.997 g at the average air gases mix density of 1.2 g/m^3) forms the layer just above the ground known as the fresh water refuge. Therefore, the trapped in the Ground water gets evaporated there and adds to the air fresh water vapors. That added amount is these days very high as we might notice the change of the climate everywhere with the prevalence of cloudy and rainy days and unusually high probability of tornadoes and other weather anomalies.

A fresh water evaporation happens easily in the Equator Sea areas and therefore might not be anyhow controlled.

For instance, Mexican Gulf has been the place for the fresh water evaporation always but recently the fresh water evaporation happens more intensively. These days almost never rainy weather in Houston in 1998 is always rainy. What is that? Yes, indeed, the climate change makes changes of the weather, but so abundantly as in Houston? Might be our predictions of the fresh water shortage on Earth will take much shorter time compared to our recent predictions? We do not know the exact thermal conditions on the surface of the Mexican Gulf, specifically does the surface sea water boil and at what temperature or not, but we could see the evaporated water in Houston TEXAS by the increased number of the rainy days especially this year while keeping in mind that the Author came to Houston for his work in 1998 when almost all the days of the year were with the blue TEXAS sky and with no any precipitation. Twenty years was long enough to accumulate so much air CO_2 that it causes fresh water evaporation that much from the Mexican Gulf salty sea water and going into the air one side of which is the outer Space vacuum.

The current loss figure is equivalent ~25,920 liters per day, or 9,467 m3 per year. And the reference of that figure seems to be the paper [58], that used measurements from the [59]. That would correspond to a total loss over Earth's history of 42,000 km3 of water, equivalent to about 12 cm of sea level change [58].

The consequence of the fresh water vapors loss to the outer Space is known as the shortage of livestock and crops. Here we are on that immediately: we are ready to supply the Humankind with the genetically engineered food for the time of the Global starvation anticipated in the next 10-25 years The starvation time is anticipated as about 70 years from the beginning of that [1].

And the Author promises to make the carbon negative food available for everyone as it is written in this article.Therefore the Author is essential for our planet Earth viability and will ask the investors' money to fill the anticipated gap in the supply of the crops and livestock with the carbon negative food supply [16]. The Humankind savior role of the investors is obvious. There has to be the smart guy who might wisely invest the investors moneys to reach the goal of the Humankind savior. Here it is - the Author, who was born form the originally virgin mother and does not look like his father by law - the new "Jesus Christ" who came to save the Earth from what people has been done to the nature starting from the intensive petroleum conversion and burning of the resulting from petroleum fuels.

The progress in the R & D which the Author has reached with the Acetogens-biocatalysts is because the Author was able to use his unique electro transformation / electrofusion generator copy built in 1995 as described before [6]. The history of this generator copy appearing in the US is below. This story is the direct evidence of the Author's active entrepreneurial spirit waking him up daily.

After getting the Russian Patent 2-005776 [6] the Author started looking for the potential consumers for his electro transformation technology. In 1995 he got the communication with the BTX, Inc. / Getronics, Inc. per said electro transformation Generator. The BTX, Inc. / Getronics, Inc. was very interested in getting a copy and ordered one. The intent of said company was to try this Generator for the therapy of the Head and Neck Cancers with the toxic anti-tumor antibiotics and other anti-tu-

mor preparations supposedly easily entering the tumor cells after treatment of said tumor cells in vivo with series of similar to electro transformation high voltage pulses (cell electrotrotransformation with anti-tumor drugs). So, that company has ordered the copy of said Generator. There was a certain delay in the communication related to the total pricing. The Author has made friends with the Third Secretary of the US Embassy at that time in Moscow, the Russian Federation, Mr. James Winkelman, and promptly characterized to him his problem. Mr. Winkelman was very kind and offered help to the Author and the Author got the funds from the company essential for the UPS transportation of the copy of said Generator (100 lbs) from Moscow, the Russian Federation, to San-Diego, CA. In 1999 the Author has requested the CEO of BTX. Inc. / Genetronics, Inc. if the Author might purchase said copy of his Generator for the spare parts. In response he has received the fax from Ms. Joany Kerr, the International Sales Director, that now the Generator becomes the property of the Author (present of the company). Therefore, the Author was able to do his Acetogens strains biocatalysts development using his electrotransformation Generator [6]. The original generator sold to the BTX, Inc. / Genetronics, Inc. in 1995 is shown in Fig. 3 showing the Moscow, the Russian Federation, the apartment Dr. MV Tyurin had in 1995.

Figure 3: Generator [6] copy sold to BTX, Inc./ Genetronics, Inc. in 1995.

Spending a year at Rice University, Dr. Tyurin started missing his electrotarnsformation adventures he had in Moscow, the Russian Federation. He sent a letter to BTX, Inc. / Genetronics, Inc. CEO, Executive Chairman, President Dr. Gunter A. Hoffman, asking if said purchased in 1995 from Moscow, the Russian Federation, Generator could be sold back to Dr. MV Tyurin as the source of spare parts. In response Dr. MV Tyurin got the fax from Ms. Joan (Joany for the friends) Kerr, the BTX, Inc. / Genetronics, Inc. International Sales Director, as shown in Fig. 4.

Figure 4: Dr Mv Tyurin Has Gotten His Access to His Electrotransformation / Electrofusion Generator [6,11].

The essential need for said Generator was determined by the Author's observations, that Acetogen cells possess extremely high internal cell electric capacitance. For example, the standard 50 microliters cell sample of the Acetogen cell suspension had the electric capacitance of about 8 micro-Farads vs. standard E. coli 50 microliter cell sample having the electric capacitance of 50 nano Farads. The design of the electric circuit of the Author's electro transformation Generator allowed the electric treatment of the cell samples with very high internal capacitance, like in the case of Acetogens [1,2,11,16]. Fig. 7 shows the distortion of the shape of the high voltage exponential or square pulses, created by the widely used in the laboratories world-wide Bio-Rad, Inc. or BTX, Inc. electroporation generators.

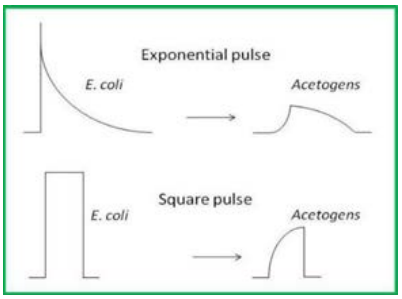

Figure 5: Distortion of the Original Square of Exponential High-Voltage Electric Pulse in the Widely used Electroporation Generators Made by Bio-Rad, Inc. or BTX, Inc.

Fig. 6 shows the basics of the electronics design of the output cascades of the Bio-Rad, Inc. or BTX, Inc. widely used in the laboratories around the World electroporation generators.

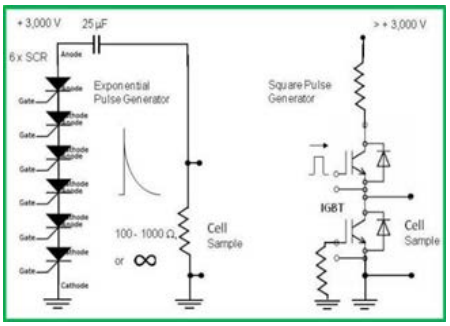

Figure 6: Electronics Details of The Power Output Cascades of The Standard Laboratory Generators for Cell Electroporation: Square pulse output (BTX, Inc. generator) or exponential decay pulse output (Bio-Rad, Inc. generator).

The Author never had said pulse distortion problems by the high electric capacitance of the target cell samples like Acetogens due to the principally different electronics design of his electro transformation / electrofusion Generators as Fig. 7 shows [6,11,16].

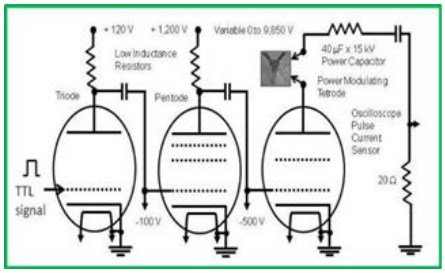

Figure 7: Electro transformation / Electrofusion Generator Invented by The Author [6,11].

It is extremely important, that the design of the electronic scheme shown in Fig. 10 allowed the generation of the secondary oscillations by the to be electro transformed cells of Acetogens during the standard high voltage electro transformation at the high voltage electric pulse generation by said Generator as clearly shown in Fig. 8 [2-7,11].

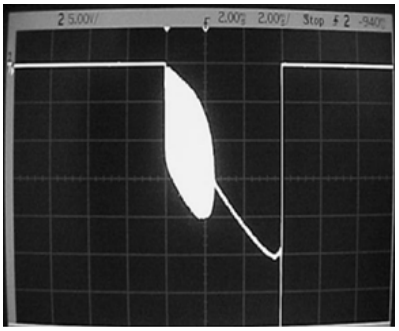

Figure 8: Secondary Oscillations Inside the Standard Square Electric Pulse (6 Ms) Generated by The Cells of Acetogens Electro transformed Using the Author's Generator [1,10,11,16].

Due to the use of said electro transformation / electrofusion Generator [6,11,16], we were able to create the commercial biocatalysts capable of production of fuel acetone (predecessor of fuel Diacetyl alcohol) or fuel 2,3-Butanediol from air CO_2 via the set of biochemical reactions [1-6,8,11]. The standard biocatalysts look is shown in Fig. 9.

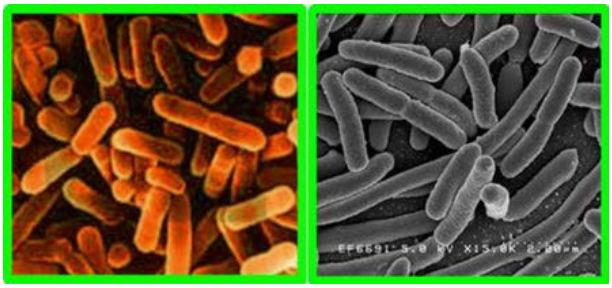

Figure 9: The Look of The Acetogen Biocatalyst Producing Acetone from Air CO2 [6,7,8,11,16].

The carbon flux distribution in said Acetogen biocatalyst is shown in Fig. 10.

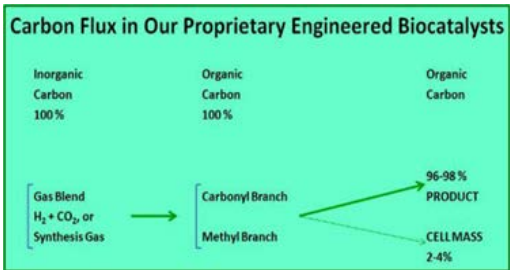

Figure 10: The Carbon Flux in the Acetogen Biocatalyst Converting Air Co_2 into Acetone [1-1,11,16].

Therefore, now the life of the Author has changed significantly. From achieving his purely scientific and business progress goals now he has to worry much about personal safety and security of himself and of his businesses. Now the Author cannot go out and have a dinner in a restaurant unless he is accompanied by the group of the Security Officers. The business location has to be secured as much as possible by not only the Security officers, but also by the electromagnetic means of protection from ANY unauthorized invasion of the property by the means of the microwave radar protection.

It is costly, but said cost in not compared to the cost of intrusion and damages created by said intrusion. Therefore, the business camp has to be located somewhere where there are no any other businesses operating. Such location invades intruders, unlawful the US border crossers and the respective US military personnel. Therefore, the site electronic protection has to include the means for the control of the potential intruders by the electronic means, as the Author does not know the kind of the intruders. If they are the FBI or something like that, any mechanical or the company Safety Officers checking will cause the length of the lawsuits which the Author would not be able to win, etc.

Now the Author has to be concerned about the quality and safety of the food he consumes to avoid food poisoning. That generates a lot of safety procedures and expenses related to that. For example, now the Author cannot go shopping as he did before. He has to arrange the food and other merchandise delivery on the corporate site, to check the vehicles delivering that, and then to organize the brought produce checking and consumption at the corporate site. That is not easy, that is time consuming and money consuming. But the overall gaol is still very simple - to save the Planet and to make moneys on that saving of the Planet. A lot of things therefore depend on the kind of people who will work for the Author on his business site. They have to be honest to ensure the proper testing and the delivery efforts as above.

The medical care. There is always the option to get hired the people with the exceptional health. However, the quality of such people as the R & D staff will be limited, etc. Therefore, there is the need to organize express communication between the corporate site and Houston or San-Antinio, if it is in TEXAS, or similar means for the transportation elsewhere. That means that from the short distance of several hundred miles the Author has to get the separate helicopter for the immediate use (the cost of maintenance, inspection, the pilot, insurance, etc.). If this is at above a thousand miles, there has to be the Learjet. The cost of

one helicopter now is above $1 million. Similar cost is for the Learjet, and all of this is just to have someone from the company delivered to the Doctor fast. And also, both the Learjet and the helicopter require pilots, who's salary is in addition to the cost of the air vehicles.Therefore, now the Author has a lot of problems and said problems appeared right after the said attempted murder the author successfully survived. The Author is not mentioning how many times the KGB in the former Soviet Union tried to kill him, there is not space for that herein.

So, the Author has to be prepared to be in the constant war with the international petroleum corporations now after his attempted murder in Houston TEXAS, USA. For instance, there is the problem of disposal some liquid staff form the fermentors. Imagine, that there might be the Checking City Drain Waste team, which will not be the City Drain Checking team, but a team of the competitors masked as the City Waste Checking Team. Therefore, the Author has to be sure that NO BIOLOGICAL MATERIAL goes to the drain. That means there is the need for the extra expenses on doing that kind of the R & D and the team to do so. There is also the need to control such team on how they will handle the classified very private materials they will get, and to be sure that they will not get immediately to the competitors. Therefore, now the life of the Author has changed substantially after his attempted murder by SHELL.

The next step in the fuel Diacetyl alcohol use for the Diesel engines fueling will be the offering of the fuel Diacetyl alcohol for the fueling of the commercial air jets. These are the plans yet. We at our corporations will have to develop the substantial corporate security after that mentioned above corporate car totaling /attempted Author's murder accident with the Author's sincere intent to commercialize his Gasoline replacement fuel Isobutanol manufacturing technology [3,4,11,16]. The goal of the Author is to replace all the petroleum-based fuel manufacture on the planet Earth with his carbon negative technologies as that was published in the peer-reviewed journals since the Author did not have enough funds for the US patenting process.

Now after the attempted murder the Author has to take special care of his security. The only car to drive around will be the car with the security driver, which will be also used as the eventual witness of any undesirable interactions with any third party will show up during the car on business. Now, to go on a date with anyone, the author has to use only his corporate car with a security driver - no any privacy, but safe.

Special care has to be taken about the food to consume by the Author and his Senior Executives along with some other personnel associated with access to the secure information on the carbon negative technologies. That creates a lot of problems which have to be addressed immediately. First, the living of said people has to be on the corporate site protected by the special microwave tools of search and disablement of any third party. This might be the expensive set of radars used for the commercial ships. Radar is based on the intensive microwave irradiation towards the object to be examined for the safety purposes. Using radar microwaves, it is possible to find the metal weapons in the clothing of the third parties. That might be possible to disable the electronic systems of any vehicle which harasses said business settlement.

Intensive microwave irradiation eventually causes psychearticic deviations in anyone subjected to that. Said electrically induced hallucinations affect the "damaging" the Author and his businesses capability of any third party not desirable anywhere near said business settlement. Now imagine that the subordinate of the Author decides to share the confidential information on the topics they work during business hours at the corporate sight protected by said radar microwave Security System. Said microwave might be directed at the particular person of interest generated by his previous actions of suspicious behavior to watch said person all the time across the walls made of any construction material. Said walls become completely transparent and allow to watch that person 24/7/365 before said person will be officially fired and removed from the business operations protected site.

So, the food for the corporate consumption will be safe. You might remember that certain poisoning could be added to the food. The properly stored at the grocery store food will have the packages which will be checked by the Security personnel after their delivery. There are the grocery stores around. That might be possible to make the arrangements at the top State Security level on that. That might be possible to arrange the delivery of the consumer goods from said grocery stores directly to the protected business site. The delivery will be conducted by the store car which will be checked for any interference by the third party. He food will be distributed among the corporate employees during their time they are free from their work. That will eventually safe a lot of driving time for said workers of the Author and the Author himself. The business site will be cleaned by the Mexicans living nearby after their thorough checking at the entrance.

Classified work will be performed by the foreigners the Author plans to hire. Their mobile phones and other communications tolls will be all recorded during the off-work time. The work time will not allow said foreigners to use any personal communications tolls as that will be in the work contract agreements.

Security during the personnel vacations. Said personnel hired by the Author under the work contracts will be advised on the impossibility for them to contact any third party during their vacations. Most likely said vacations have to be performed on the special resorts with the enhanced security unless the Author will desire to occupy himself with the resort sort of industry above his carbon negative and water distilling projects he has to be done over his corporate work for the World and for the US, specifically.

Again, the Author's idea is the raising the venture capital to set up the network of the gas stations in the area nearby with the subsequent distribution of said carbon negative gas stations Nationwide. This is the gift the Author plans to present to the United States which allowed him to run his carbon negative projects

and his water distillation projects as planned. Said carbon negative gas stations will additionally serve foods for the customers unlike the current gas stations do.

The food to be served has to be served by the additional personnel as the personnel of the grocery stores. This is all directed to protect the customers time during their attempts to fill the gas tanks of their cars. Then customers will not need to drive to the grocery stores, they could get the food they need right at the carbon negative gas stations. That means said carbon negative gas stations have to have enough space for said grocery operations unlike the current gas stations do.

Thew Carbon Negative Gas Station Plan Is Below

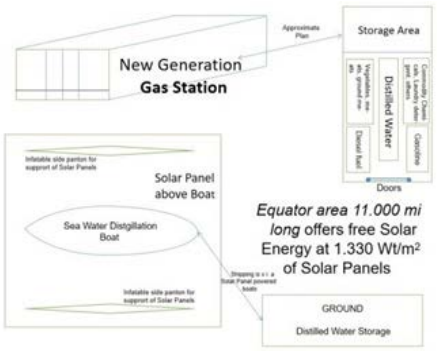

Figure 11: The Plan of The Consumer Time Saving Carbon Negative Gas Station

Therefore, we have made a substantial proposal to any party interested in our discoveries of the coming to Earth shortage of the fresh water and associated with that shortage of production of crops and livestock, eventually the shortage of the meat-based food for the Humankind.

Tremendous therapeutic effect of the surface polysacchardes produced by the isolated from the intestine of the Author intestinal bifidobacteria B. bifidum, B. breve and B. longum. Said therapeutic effect shortened the recovery time for the damaged by the Cholera infection gastrointestinal epithelium of young and adult patients suffering from the gastreointestinal infection caused by Vibrio cholerae to about 8-10 days instead of normally occurring 21-56 days.

The Author has isolated from his own intestine strains of bifidobacteria B. bifidum, B. breve and B. longum. For the isolation he used the invented by the Author prior to that selective medium for the isolation of bifidobacteria from feces [52]. of the following composition, g/l:

Caseine Tryptone	10.0
Yeast Extract	5.0
Avocado/soybean extract	5.0
Meat extract	10.0
Tween 80	1.0 ml
K_2HPO_4	2.0
Ammonium 2-hydroxypropane-1,2,3-tricarboxylate (ammonium citrate tribasic)	2.0
$MgSO_4$ x 7 H_2O	0.2
$MnSO_4$ x 4 H_2O	0.05
Agar-agar powder [53]	
pH prior to autoclaving for 35 min at 0.5 Atm	

Prior poring to Petri dishes [54] the medium after its autoclaving was cooled down to about 42-43 °C and the powder of Norfloxacin [55] was added to the medium aseptically in the laminar cabinet [56] to its final concentration of 200 microgram/ml of the Selective medium for bifidobacteria isolation.

Said bifidobacteria had extracellular polysaccharides produced abundantly in the liquid medium similar by its composition to the selective medium but the agar-powder and Norfloxacin were omitted. Said polyscacharides were isolated in the amount of 20 g each. Said polycassharides were mixed and taken for the approbation of their intestinal use for the recovery of the patients which suffered sudden Cholera intestinal infection outbreak in the native city where the Author was born, in Saratov, the Russian Federation. Said epidemiological outbreak was totally controlled by the infectio specialists of Saratov State Medical University. Said infectionists have made multiple images of the intestinal epithelium of the recovering patients, both children and adults. The polyscacchardes Mixture (we will call it ":Mixture" further) was used to make the solution with the final concentration of each of the three polysaccharides of 0.1 g/l. Said mixture was given by about 5 ml to each recovering adult and child patient (40 and 40 people were treated) along with the antibacterial therapy which was the ampicillin trihydrate tablets of 0.5 grams each tablet two tablets per taking every four hours (6 grams per day per patient). That antibacterial therapy was mandatory for all affected with the cholera infection: 40 adults from 18 to 72 yo and 40 children from 3 to 16 years old were given the "Mixture" to shorten the recovery after the Cholera infection as to investigate the "Mixture" for its possible clinical trials in the US.

Said "Mixture" had tremendous therapeutic effect in shortening the the recovery time of the affected by Cholera epidemiological outbreak in the Saratov region of the Russian Federation. The shortening was to 7-9 days vs regular for Cholera 21-56 days. The images the infection specialist from Saratov State Medical University presented to the Author for no money he had to pay to them fro that. Said images are shown below.

Figure 12: Epithelium of Duodenum of the 3 yo patient, the 7th day of "Mixture" use and antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

Figure 13: Ileum epithelium of the 36 yo patient, 8th day of recovery using "mixture" and antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

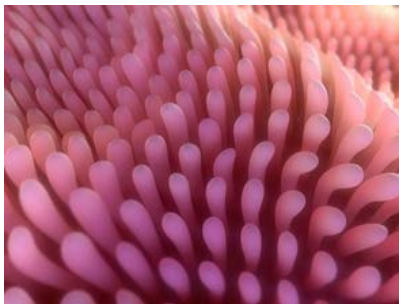

Figure 14: Lower section of the small intestine of the 56 yo patient. 9th day of taking "Mixture" solution along with the antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

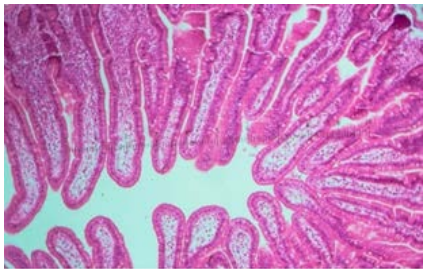

Figure 15: Stomach of the 13 you patients on the 7th day of taking "Mixture" and the antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

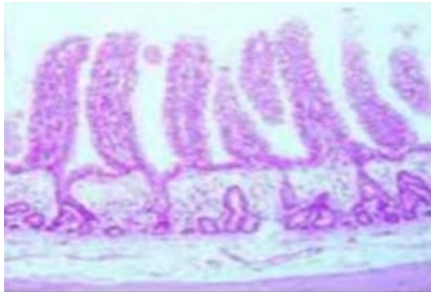

Figure 16: Stomach of the 26 yo patient on the 8th day of taking "Mixture" along with the antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

Figure 17: Duodenum of the 15 yo patient of the 9th day of taking "Mixture" along with the antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

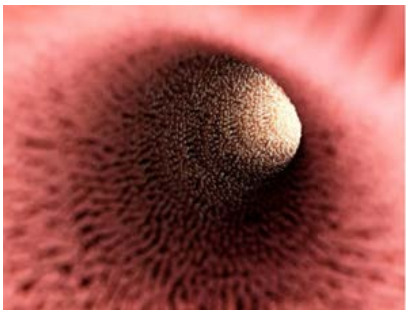

Figure 18: Jejunum of the 39 yo patient on the 9th day of taking the "Mixture" along with the antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

Figure 19: Doudeno-jejunal junction of the 12 yo patient on the 7th day of taking "Mixture" and the antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

Figure 20: Ilium of the 69 yo patient on the 8th day of taking "mixture" and the antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

Figure 21: Lower stomach of the 75 yo patient on the 9th day after taking "Mixture" and the antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

Figure 22: Duodenum of the 6 yo patient on the 7th day of taking "Mixture" along with the antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

Figure 23: Ilium of the 46 yo patient on the 8th day of taking "Mixture" along with the antibacterial therapy. This Image was presented to the Author by the infection specialists of Saratov State Medical University.

Presented images display pretty normal state of the intestinal epithelium suggesting that "Mixture" has tremendous therapeutic effect in the gastrointestinal epithelium recovery after it was totally damaged by the Cholera infection in the patients of the noted adult and young groups in this epidemiological outbreak in Saratov region of the Russian Federation. Therefore, the presented herein data suggest that we might subject of proprietary "Mixture" to the clinical trials in the US and after their approval said "Mixture" might be recommended for the wide National use in all the patients in which the gastrointestinal disorders have become prominent and who cannot find any food at the grocery stores to have their intestines work as in normal people.

We have made our promise to provide the Humankind with the plenty of the genetically engineered food during the times of shortage of the crops and the livestock production. That will strongly depend on our capability to raise essential funds form the investors.

We have made herein our promise made to organize the system of the Carbon Negative Gas Stations (Fig. 11) around the United States. The purpose of said Carbon Negative Gas Stations will be to ensure the customers get enough carbon negative Gasoline and the Diesel fuel.

To save precious time of our customers we offered to the public the Carbon Negative Gas Stations combined with the kind of the grocery stores offering to buy the foods from the regular grocery stores. During the anticipated time of shortage of the crops and the livestock production due to the shortage of the fresh water water we have offered to compensate said shortage of the crops and the livestock production by our own production of the genetically engineered foods based on the carbon dioxide consuming genetically engineered fungi for the eventual sales at said Carbon Negative Gas Stations. Basically, this is our own step in the wear with the International Petroleum Corporations started by SHELL via the attempt to kill the Author. The Author has discovered the absence of any civil and criminal laws in the State of Texas where the Governor is Mr. Gregg Abbott who will eventually suffer from the expansion of the Author's intent to find the [proper federal laws in the US Supreme Court where he is eventually going to bring this case of the attempted killing of the Author by the based in Texas International Petroleum Corporation SHELL as stated in the respective Police Report of the Houston Police Department. Genetically engineered foods [48].

Genetically engineered foods have had their DNA changed using genes from other plants or animals. Scientists take the gene for a desired trait in one plant or animal, and they insert that gene into a cell of another plant or animal.

Genetic engineering can be done with plants, animals, or bacteria and other very small organisms. Genetic engineering allows scientists to move desired genes from one plant or animal into another. Genes can also be moved from an animal to a plant or vice versa. Another name for this is genetically modified organisms, or GMOs.

The process to create GE foods is different from the selective breeding. This involves selecting plants or animals with desired traits and breeding them. Over time, this results in offspring with those desired traits.

One of the problems with selective breeding is that it can also result in traits that are not desired. Genetic engineering allows scientists to select one specific gene to implant. This avoids introducing other genes with undesirable traits. Genetic engineering also helps speed up the process of creating new foods with desired traits.

The Possible Benefits of Genetic Engineering Include

- More nutritious food
- Tastier food
- Disease- and drought-resistant plants that require fewer environmental resources (such as water and fertilizer)
- Less use of pesticides
- Increased supply of food with reduced cost and longer shelf life

- Faster growing plants and animals
- Food with more desirable traits, such as potatoes that produce less of a cancer-causing substance when fried
- Medicinal foods that could be used as vaccines or other medicines
- Some people have expressed concerns about GE foods, such as:
- Creation of foods that can cause an allergic or toxic reaction
- Unexpected or harmful genetic changes
- Inadvertent transfer of genes from one GM plant or animal to another plant or animal not intended for genetic modification
- Foods that are less nutritious

These concerns have thus far been unfounded. None of the GE foods used today have caused any of these problems. The US Food and Drug Administration (FDA) assesses all GE foods to make sure they are safe before allowing them to be sold. In addition to the FDA, the US Environmental Protection Agency (EPA) and the US Department of Agriculture (USDA) regulate bioengineered plants and animals. They assess the safety of GE foods to humans, animals, plants, and the environment [49].

Article Summary

1. Fresh Water Shortage is anticipated in the next 10 - 25 years.
2. The Solution is the replacement of current petroleum-based economy with Carbon Negative economy and Carbon Negative fuels use only might take about 70 years.
3. During said time Humankind is anticipated the Global Starvation. To cope with it we offer manufacture of plenty Carbon Negative genetically engineered foods to keep Humankind happy.
4. Gastrointestinal Tract of humans is the way to deliver recombinant proteins synthetized by the genetically engineered components of the normal intestinal microflora.
5. Anticipated Global Starvation on Earth might be resolved via massive manufacture of genetically engineered Carbon Negative foods along with the use of fuels which are only the Carbon Negative fuels for the cars, trucks, cargo ships, Airjets, helicopters, airplanes with the the internal combustion engines.
6. Set of surface polysaccharides produced by Bifidobacterium bifidum, B. breve and B. longum naturally present in the intestine of the Author, named "Mixture" has remarkable therapeutic effect in restoration of affected by intestinal infection cholera gastrointestinal epithelium for remarkably short time of 8-10 days instead of normally occurring 21-56 days of the epithelium recovery.

Declaration of Interests Statement

Ethics Approval and Consent to Participate

The Author has received all the proper documents granting the Ethical Approval and the Consent to Participate from the State of Texas officials. The Author has made sure that the ethical approval and his consent to participate in preparation and submission for publication of this article were properly approved by the respective authorities of the State of Texas.

Consent for Publication

The Author has expressed his complete consent to participate in work with this article and its publication in this Journal.

Availability of Data and Materials

The Author makes all his data and materials herein available for any third party. The data and materials might be obtained from the Author at PO Box 300230, Houston, TX, 77340. If any third party needs any materials used to publish this article, please, do contact the Author.

Competing Interests

This article is another the Author's move in the war which has started by SHELL International Petroleum Corporation some time back by attempted murder of the Author. The people hired by SHELL has totaled the Author's corporate car and did some other illegal things to the Author which have concluded the Author that the war with the international petroleum corporations has started already. No Houston FBI or Houston Police investigation of said attempted murder has happened and this is behind the responsibility of the Texas Governor with all the legal remedies the Author might use in his fight to sue the State and its Governor Gregory Abbott. The attempted murder has the statute of limitations 20 years, and there are jurisdictions above the level of the State of TEXAS. The Author had certain legal problems with the at that time Attorney General of the State of Texas in 2013, now Texas Governor, Greg Abbott and the Author is going to resolve all the legal problems with the Texas Governor, regardless would he be dismissed or not. The corporate Author's website http://syngasbiofuelsenergy.com was destroyed by the person, the Attorney of Hirsch and Westheimer Law Firm, PC by the last name Levy. She belongs to the same family which owned or owns the grocery stores chain named "Fiesta" in Houston Texas. The Author was unable to find a lawyer in Texas to file the respective federal law suit and recover his corporate website, but the Author has the US Constitutional right to recite this website in the references herein. Therefore, the Author has multiple legal problems with the State of Texas and the Author is going to resolve said legal problems at the respective Court level in the US. The Author was already involved into the war which has been started by the International Petroleum Corporation SHELL.

The Author has approached SHELL offering them for the commercialization the proprietary technology of Gasoline or Diesel fuel manufacture from the air CO2, not from petroleum which SHELL and other international petroleum corporation's use. SHELL representative met the Author, got his draft of the at that time in publication article on creation Gasoline from the air CO2 [1,21-24,41,42]. SHELL hired two Mexicans to kill the Author in the car accident, paying the possibly around $6,000 for this dirty job, which has been done in Houston TEXAS at the US59 down South (9494 Southwest Fwy). The Houston FBI and the Houston Police were contacted by the Author multiple times over his mobile phone however there was no any detailed and thorough Police or the FBI investigation of said attempted murder of the Author since as the Author trusts, both Houston FBI and Houston Police are totally corrupted by the internation-

al petroleum corporations. Therefore, any law is not used in the State of Texas to hurt said corporations. Therefore, the Author has to look for the law enforcement outside of the State of Texas, at the National level and he will do that to affect the Texas Governor Abbott for his actions of 2013 and have him resign from his position. Therefore, the Author has conflict of interests with the State of Texas, TEXAS Governor Gregg Abbott, Texas FBI and Texas Police.

Since that time more scientific publications by the Author on the Gasoline and Diesel fuel production from the air CO2 came out [15-49]. The US patents are extremely expensive; therefore, the Author uses instead of patents scientific publications. Publications are as good as the US patents; each the US patent has to claim something better than the Author already did in his scientific publications. The Author working on the Acetogens-biocatalysts has no any competition in the world because of his prior invention, the electroporation / electrofusion Generator, already sold as a sample (with no right for reproduction) to the US corporation BTX, Inc. / Genetronics, Inc. (San-Diego, CA). Said Generator and the invented by the Author genome tailoring technology make him with no any competition in the whole World [15 - 49].

Genome tailoring powered production of isobutanol in continuous CO_2 / H2 blend fermentation using engineered acetogen biocatalyst. J Ind Microbiol Biotechnol. has no practical authorship of said publications meaning since said individuals got paid by the Author significant amounts of cash for doing research for the Author per the topics, he ordered them to investigate and provide the detailed reports to him. However, their names are included in said specific publications since they have worked on said topics. Name of Vel G. Berzin is also included and has no scientific meaning since Mr. Berzin was a friend of the Author some time back, Mr. Berzin paid his own $300 for starting the corporation Syngas Biofuels Energy, Inc. for which he did not provide any scientific input including the corporate website http://syngasbiofuelsenergy.com. Mr. Berzin has retired from the public life when he became 65 and he keeps his current location at the nursing home very confidential from the Author.

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Authors' Contributions

The Author has conducted all the experiments himself. The Author has planned, wrote this original article and edited the written text, including proper placement of the illustrations mentioned which the Author owns. The Author read, edited and approved the final manuscript. The Author is the only owner of all materials disclosed in this original article. The Author has plans to distribute his proprietary products after their approval as needed. The Author might be contacted for the data and materials at PO Box 300230, Houston, TX, 77230.

The Author contributed to the study conception and design. Material preparation, data collection and analysis were performed by the Author. The first draft of the manuscript was written by the Author. The Author read and approved the final manuscript.

The Author has designed the ideology of this article by himself. He collected the information on the absence of rapid tools for the recovery of infectious patients in his town of origin Saratov, the Russian Federation. Often patients suffering Cholera infection have their gastrointestinal epithelium severely damaged by this infection and that normally takes them up top 21-56 days for the recovery after said infection severely damaging the gastrointestinal epithelium. Therefore, the Author has invented the "Mixture" of the surface polysaccharides normally produced by his intestinal isolates of bifidobacteria namely Bifidobacterium bifidum, B. breve and B. longum when isolated using his invented before selective medium for isolation of bifidobacteria from feces and grown after the isolation and thorough purufication on the regular growth medium for bifidobactera. Said polysaccharides were collected, purified and dissolved in the distilled water to form the solution to treat the recovering from Cholera patients along with the proper antibacterial treatment. The effect of adding said "Mixture" water solution to the regular antibacterial treatment was really tremendous: the recovery time for said patients has shortened significantly from 24-36 days to just 8-10 days, offering great saving effect to the doctors and the recovery clinics. The Grateful doctors of Saratov State Medical University have presented to the Author the images of the intestinal epithelium of the recovering patients he has placed into this article. The Author intends to develop the pe4cial structure in his Carbon Negative corporations to be in charge for the establishing and running clinical trials of his inventions he plans to commercialize additionally to his major business of manufacture of Carbon Negative fuels and Carbon Negative genetically engineered foods for the Nationwide distribution.

The Author has conducted all the experiments himself. The Author has planned, wrote this original article and edited the written text, including proper placement of the illustrations mentioned which the Author owns. The Author read, edited and approved the final manuscript. The Author is the only owner of all materials disclosed in this original article. The Author has plans to distribute his proprietary products after their approval as needed. The Author might be contacted for the data and materials at PO Box 300230, Houston, TX, 77230. The Author contributed to the study conception and design. Material preparation, data collection and analysis were performed by the Author. The first draft of the manuscript was written by the Author. The Author read and approved the final manuscript.

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He collected the information on the absence of rapid tools for the recovery of infectious patients in his town of origin Saratov, the Russian Federation. Often patients suffering Cholera infection have their gastro-intestinal epithelium severely damaged by this infection and that normally takes them up top 28-36 days for the recovery after said infection severely damaging the gastro-intestinal epithelium.

Therefore, the Author has invented the "Mixture" of the surface polysaccharides normally produced by his intestinal isolates of bifidobacteria namely Bifidobacterium bifidum, B. breve and B. longum when isolated using his invented before selective medium for isolation of bifidobacteria from feces and grown after the isolation and thorough purification on the regular growth medium for bifidobactera. Said polysaccharides were collected, purified and dissolved in the distilled water to form the solution to treat the recovering from Cholera patients along with the proper antibacterial treatment. The effect of adding said "Mixture" water solution to the regular antibacterial treatment was really tremendous: the recovery time for said patients has shortened significantly from 24-36 days to just 8-10 days, offering great saving effect to the doctors and the recovery clinics. The Grateful doctors of Saratov State Medical University have presented to the Author the images of the intestinal epithelium of the recovering patients he has placed into this article. The Author intends to develop the pe4cial structure in his Carbon Negative corporations to be in charge for the establishing and running clinical trials of his inventions he plans to commercialize additionally to his major business of manufacture of Carbon Negative fuels and Carbon Negative genetically engineered foods for the Nationwide distribution.

The Author conceived of the presented idea. The Author developed the theory and performed the computations. The Author verified the analytical methods. The Author investigated therapeutic effects of "Mixture" and supervised the findings of this work. The Author discussed the results and contributed to the final manuscript. The Author carried out the experiment. The Author wrote the manuscript. The Author supervised the project. The Author conceived the original idea. The Author supervised the project. The Author developed the theoretical formalism, performed the analytic calculations and performed the numerical simulations. The Author contributed to the final version of the manuscript. The Author supervised the project. The Author conceived and planned the experiments. The Author carried out the experiments. The Author planned and carried out the simulations. The Author contributed to sample preparation. The Author contributed to the interpretation of the results. The Author took the lead in writing the manuscript. The Author provided critical feedback and helped shape the research, analysis and manuscript. The Author designed the model and the computational framework and analyzed the data. The Author carried out the implementation. The Author performed the calculations. The Author wrote the manuscript. The Author conceived the study and were in charge of overall direction and planning. The Author designed and performed the experiments, derived the models and analyzed the data. The Author wrote the manuscript in consultation with other corporate employees, devised the project, the main conceptual ideas and proof outline. The Author worked out almost all of the technical details, and performed the numerical calculations for the suggested experiment.

The Author worked out the bound for quantum mechanics. The Author analyzed the data. The Author wrote the paper. The Author designed and directed the project; the Author performed the experiments; the Author analyzed spectra; the Author. made the simulations; the Author developed the theoretical framework; the Author wrote the article. The Author performed the measurements. The Author. was involved in planning and supervised the work, the Author processed the experimental data, performed the analysis, drafted the manuscript and designed the figures.

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Originality-Significance Statement

The Author has written this original article based on his originality of the business approach and the existing resistance of the International Petroleum corporation to the technology of manufacturing carbon negative fuels to replace their production of fuels originating from petroleum. The reduction of the air CO_2 levels towards the pre-petroleum era of the year 1900 is paramount,since our planet loses fresh water to the outer Space vacuum. NASA has confirmed that in 2010 sating that the Earth has reached the "Point of No Return" to the healthy environmental conditions suitable for life on our planet. The new family of the gas stations selling not only Carbon Negative fuels but also foods for cooking at home and commodity chemicals for the households will save a lot of time for the customers of said new gas stations [60-89,91,92].

References

1. Tyurin MV, Padda RS (2019) Nitrogen gas reducing commercial acetogen biocatalyst suitable for direct and selective reduction of CO2 inorganic carbon to organic carbon and atmospheric nitrogen to fuel isobutanol during continuous fermentation of CO2 + H2 + N2 gas blend. International Research Journal of Applied Sciences, Engineering and Technology Vol 3: 1 - 2.
2. Gak E, Tyurin MV, Kiriukhin M (2014) Genome tailoring powered production of isobutanol in continuous CO2/H2 blend fermentation using engineered acetogen biocatalyst. J Ind Microbiol Biotechnol. 41: 763-781. http://www.ncbi.nlm.nih.gov/pubmed/24659176.
3. Tyurin MV (2021) Expression in Situ of the Recombinant Human Erythropoetin and Recombinant Insulin. J Diabetes Metab 12: 900-907.
4. Tyurin MV (2021) Successful Treatment of Diabetes II in adult patient and New Prospects of Recombinant Vaccine and Recombinant Proteins Engineering in situ. J Diabetes Metab 12: 871-875.
5. Tyurin MV (2021) Gasoline Replacement Fuel Diacetyl Alcohol. International Journal of Automotive Technology. Volume 23: 23-46.
6. Tyurin MV (2021) Air CO2 for the Manufacture of the Commodity Fuels. Atmospheric Pollution Research 13: 77-94.
7. Tyurin MV (2021) Diacetone Alcohol as the Diesel. Energy Efficiency. Energy Efficiency. Ed.: Dr. Muhammad Wakil Shahzad. IntechOpen. Rijeka: Janeza Trdine 9, 51000 Rijeka, Croatia. London: 5 Princess Gate Court, London, SW7 2QJ, UK. ISBN 978: 83969-828-
8. Tyurin MV (2022) Vaccines against potential pathogens. Journal of Community Medicine and Public Health Reports (IF:0.01). 295. V 3: 847-854.
9. Chen S, Sathuvan M, Zhang X, Zhang W, Tang S, et al. (2021) Characterization of polysaccharides from different species of brown seaweed using saccharide mapping and chromatographic analysis. BMC Chem 15: 1-11.
10. Tyurin MV (2023) Mixture for Treatment of Serious Gastro-Intestinal Disorders. Annals of Case Reports 7: 1076-1084.
11. Tyurin MV (1992) Russian Patent RU 2-005776. Generator for electrotransformation and electrofusion / electrodistruction of various cells: microbial, animal, plant and the process of its manufacture, and the set of plate-parallel polished electrodes and the process of their manufacture from the titanium-based metal alloy VK 2.
12. Picard C, Fioramonti J, Francois A, Robinson T, Neant F, et al. (2005) Review article: bifidobacteria as probiotic agents -- physiological effects and clinical benefits. Aliment Pharmacol Ther 22: 495-512.
13. Chen J, Chen X, Loong Ho C-L (2021) Recent Development of Probiotic Bifidobacteria for Treating Human Diseases. Front Bioeng Biotechnol 9: 770248. Doi: 10.3389/fbioe.2021.770248.
14. Tyurin MV (1990) Total DNA isolation from a variety of microaerophilic and strictly anaerobic organisms including Bifidobacteria. Antibiot Khimiother 35: 39- 45.
15. https://www.illumina.com/content/dam/illumina-marketing/documents/products/research_reviews/dna-sequencing-methods-review-web.pdf .
16. http://syngasbiofuelsenergy.com.
17. Tyurin (1992) Russian Patent RU 2-005776. Generator for electrotransformation and electrofusion/electrodistruction of various cells: microbial, animal, plant and the process of its manufacture, and the set of plate-parallel polished electrodes and the process of their manufacture from the titanium-based metal alloy VK 2.
18. https://www.illumina.com/techniques/sequencing/dna-sequencing.html.
19. Cheong K L, Meng L Z, Chen X Q, Wang LY, Wu D T, et al. (2016) Structural elucidation, chain conformation and immuno-modulatory activity of glucogalactomannan from cultured Cordyceps sinensis fungus UM01. J. Funct. Foods 25: 174-185.
20. Tyurin MV (2022) Future of our planet. International Journal of Advanced Multidisciplinary Research 23: 225-228.
21. Tyurin MV (2022) The use of Human Intestine to Deliver Recombinant Proteins Which Macroorganism Needs. J Clinical Case Studies V 497: 1-2.
22. Tyurin MV (2022) Human intestine to deliver recombinant proteins. Clinical Medicine Insights. Vol 3: 227-229.
23. Tyurin MV (2022) New Gasoline or Diesel fuel Replacement.Adv. J. Sci. Eng. Tech. V 7: 126-140. ISSN: 2330 – 1744.
24. Tyurin MV (2022) Diesel fuel or gasoline raplacement diacetyl alcohol. Gasoline replacement fuel isobutanol or diacetyl alcohol. Air CO2 for the Manufacture of the Fuels. Oil and Gas Research V 3: 234-248.
25. Tyurin MV (2022) Diesel fuel or gasoline raplacement diacetyl alcohol. Gasoline replacement fuel isobutanol or diacetyl alcohol. Air CO2 for the Manufacture of the Fuels. Oil and Gas Research V 3: 234-248.
26. Tyurin MV (2022) Vaccines against potential pathogens. Journal of Community Medicine and Public Health Reports (IF:0.01) 295. V 3: 847-854.
27. Tyurin MV (2022) Vaccines against microorganism causing Plug.Innovative Journal of Medical and Health Sciences 95: 234-251. ISSN: 2277-4939.
28. Tyurin MV (2022) Air CO2 for the Manufacture of the Commodity Fuels; Diesel Fuel Replacement and Gasoline Replacement Carbon Negatie Diacetyl Alcohol - Brealdown of Gasoline and Diesel Fuel Prices at the Gas Stations. Fuel 82: 388-392.
29. Tyurin MV (2022) Expression in situ of the recombinant human erythropoetin and recombinant insulin. Abstr. of Technologies in Diabetes—the Thirteenth ATTD Yearbook. Eds.:Moshe Phillip and Tadej Battelino. Published Online: S 2-250 doi.org/10.1089/dia.2022.2500.
30. Tyurin MV (2022) Body Fat Removal. Abstr. Webinar on Managing Chronic Conditions in Diabetic and Obese Patients with Remote Patient Monitoring. Colorado, Denver.
31. Tyurin MV (2022) Expression in situ of the recombinant human erythropoetin and recombinant insulin. Abstrt Webinar on Managing Chronic Conditions in Diabetic and Obese Patients with Remote Patient Monitoring. Colorado, Denver.
32. Tyurin MV (2022) Expression in situ of the recombinant human erythropoetin and recombinant insulin. Abstrt of the

Regional Forum of Experts in Diabetes and Obesity 2:00pm Dubai, 1:00pm Jerusalem, 12:00pm Paris, 6am NYC.
33. Tyurin MV (2022) Expression in situ of the recombinant human erythropoetin and recombinant insulin. Abstrt of the 2nd Global Meeting on Diabetes and Endocrinology. November 21-23, 2022, Paris, France.
34. Tyurin MV (2022) Synergistic combination of two antibioitcs carbennicillin and lincomycin effective against Presudomonas aeruginos and anaerobes common for human teef. Archives of Pharmacy Practice (APP) 13: 536-542.
35. Tyurin MV (2022) Recovery from the mixed Pseudomonas arerugonosa-anaerobic infection followed the car trauma in the worker with unstable Angina Pectoris and Diabetes II. Journal of Cardiology Reports. Review and Research 876: 832-836.
36. Tyurin MV (2022) Overporulated Earth calls for new Extra Space arrangements. Abstr. of 3rd World Congress on Diabetes & Endocrinology. May 09-10, 2022 | Dubai, UAE. https://diabetes.inovineconferences.com/3rd-world-diabetes-conference-information/
37. Tyurin MV (2022) Expression in situ of the recombinant human erythropoetin and recombinant insulin. International Journal of Endocrinology and Diabetes. J Diabetes Metab, Vol 12: 1-5.
38. Tyurin MV (2022) Cure of Intestinal Disorders. Journal of Clinical Review and Case reports 612: 784-790.
39. Tyurin MV (2022) Cure of Gastrointestinal Discomfort at Home. Annals of Gastroenterology and the Digestive System 5: 1058-1062.
40. Tyurin MV (2022) Recombinant Human Pepsin Expression in Intestinal Lactobacilli. Biotechnology Letters. Submitted https://meddocsonline.org/annals-of-gastroenterology-and-the-digestive-system/cure-of-gastrointestinal-discomfort-at-home.pdf
41. Tyurin MV (2021) Cure of the Intestinal Disorders (recombinant pancreatic lipase expression in intestinal bifidobacteria). Medical & Clinical Research 6 788-794.
42. Tyurin MV (2021) Gasoline Replacement Fuel Diacetyl Alcohol. International Journal of Automotive Technology. Volume 23: 23-46.
43. Tyurin MV (2021) Air CO2 for the Manufacture of the Commodity Fuels. Atmospheric Pollution Research 13: 77-94.
44. Tyurin MV (2021) Diacetone Alcohol as the Diesel. Energy Efficiency. Energy Efficiency. Ed.: Dr. Muhammad Wakil Shahzad. IntechOpen. Rijeka: Janeza Trdine 9, 51000 Rijeka, Croatia. London: 5 Princess Gate Court, London, SW7 2QJ, UK. ISBN 978-1-83969-828-6.
45. Tyurin MV (2021) Natural Competence for Foreign Plasmid DNA Uptake. 2021. Journal of Molecular Biology 11: 665-672.
46. Tyurin MV (2021) Expression in Situ of the Recombinant Human Erythropoetin and Recombinant Insulin. J Diabetes Metab 12: 900-907.
47. Tyurin MV (2021) Successful Treatment of Diabetes II in adult patient and New Prospects of Recombinant Vaccine and Recombinant Proteins Engineering in situ. J Diabetes Metab 12: 871-875.
48. Tyurin MV (2022) Vaccines against potential pathogens. Innovative Journal of Medical and Health Sciences. ISSN (ONLINE) 2482-2489.
49. Tyurin MV (2022) Body Fat Removal. A Case Report. Biodiversity International Journal. V 6: 15-20.
50. https://medlineplus.gov/ency/article/002432.htm.
51. Tyurin MV (1990) Thesis Abstract: Ph.D. in Microbiology, Molecular Pharmacology and Molecular Biology (Antibiotics & Chemotherapy: Microbiology / Molecular / Cell Biology, and Molecular Pharmacology): The USSR Research Institute for Antibiotics, Moscow, USSR, 1990: "Antibiotic Resistance and Antagonistic Activity of Lactobacilli": Lactobacilli and Bifidobacteria are the component of normal oral, intestinal and vaginal microflora in humans and animals. Lactobacilli and Bifidobacteria are the component of natural colonization resistance rendered in situ due to production of organic acids, esters of organic acids, small amounts of hydrogen peroxide and antimicrobial peptides / polypeptides with high antimicrobial activity at pH below 6.
52. Tyurin MV (2019) Russian Patent 39536642. Selercxtive medium for isolation of Bifidobacteria from feces of humans and animals.
53. https://www.amazon.com/Agar-Powder-Ounces-Excellent-Strength/dp/B007PJAOG4/ref=asc_df_B007PJAOG4?tag=bingshoppinga-20&linkCode=df0&hvadid=79852084166622&hvnetw=o&hvqmt=e&hvbmt=be&hvdev=c&hvlocint=&hvlocphy=&hvtargid=pla-458345166327143 3&psc=1.
54. https://www.amazon.com/BIPEE-Polystyrene-Sterile-Square-PetriDish10x10/dp/B01DBBBZO4/ref=asc_df_B01DBBBZO4?tag=bingshoppinga20&linkCode=df0&hvadid=80058242182172&hvnetw=o&hvqmt=e&hvbmt=be&hvdev=c&hvlocint=&hvlocphy=&hvtargid=pla4583657821653016&psc=1.
55. https://www.sigmaaldrich.com/US/en/tech-docs/paper/454822.
56. https://www.escolifesciences.com/products/laminar-flow-cabinet/airstream-gen-3-horizontal-laminar-flow-cabinet-with-simple-switch.
57. https://earthscience.stackexchange.com/questions/9488/how-much-water-is-the-atmosphere-losing-to-space.
58. https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2010GL045075.
59. https://nssdc.gsfc.nasa.gov/nmc/spacecraft/display.action?id=2006-047B#:~:text=The%20SolarTerrestrial%20Relations%20Observatory%20%28STEREO%29%20mission%20includes%20two,and%20radio%20observations%20of%20coronal%20mass%20ejections%20%28CMEs%29.
60. https://microbenotes.com/high-performance-liquid-chromatography-hplc/ Microbe Notes. Sagar Aryal: HPLC: Principle, Parts, Types, Uses, Diagram. High-performance liquid chromatography or commonly known as HPLC, is an analytical technique used to separate, identify or quantify each component in a mixture.
61. https://www.colorado.edu/lab/biochem-instruments/multi-angle-light-scattering.
62. https://www.amazon.com/Rotational-Viscosity-Viscometer-visometer-220V-1-100/dp/B072BL2C47/ref=asc_df_B072BL2C47?tag=bingshoppinga-20&linkCode=df0&hvadid=80126962060882&hvnetw=o&h-

vqmt=e&hvbmt=be&hvdev=c&hvlocint=&hvlocphy=&hvtargid=pla-458372654109645&psc=1
63. https://jascoinc.com/products/chromatography/hplc/modules/detectors/
64. refractive-index/.
65. https://andarupm.co.id/fungsi-ftir-fourier-transformed-infrared/.
66. Lante A Canazza E (2023) Insight on Extraction and Preservation of Biological Activity of Cereal β-D-Glucans. Appl. Sci 13: 11080.
67. https://www.verywellhealth.com/cholera-overview-1958786.
68. Lovegrove A, Edwards CH, De Noni I, Patel H, El SN, et al. (2017) Role of polysaccharides in food, digestion, and health. Crit Rev Food Sci Nutr 57: 237–253. doi: 10.1080/10408398.2014.939263.
69. Yazawa K, Imai K, Tamura Z (1978) Oligosaccharides and polysaccharides specifically utilizable by bifidobacteria. Chem Pharm Bull (Tokyo) 26: 3306-3311. doi: 10.1248/cpb.26.3306.
70. Tyurin MV (2013) Gene replacement and elimination using λRed- and FLP based tool to re-direct carbon flux in acetogen biocatalyst during continuous CO2 / H2 blend fermentation. Journal of Industrial Microbiology & Biotechnology 40: 749- 758. doi: 10.1007/s10295-013-1279-1.
71. Tyurin M, Kiriukhin M (2013) Expression of amplified synthetic ethanol pathway integrated using Tn7-tool and powered at the expense of eliminated pta, ack, spo0A and spo0J during continuous syngas or CO2 /H2 blend fermentation. J Appl Microbiol 114:1033-1045. https://ami-journals.onlinelibrary.wiley.com/doi/abs/10.1111/jam.12123.
72. Berzin V, Kiriukhin M, Tyurin M (2013) Cre-lox66/lox71-based elimination of phosphotransacetylase or acetaldehyde dehydrogenase shifted carbon flux in acetogen rendering selective overproduction of ethanol or acetate. Appl Biochem Biotechnol. 195: 181-188. https://link.springer.com/article/10.1007/s12010-012-9864-8.
73. Tyurin MV (2013) (Invited) Reversal of global warming using $3 trillion market force: chemicals and fuels produced directly and selectively in continuous fermentations of gas blends comprising CO and CO2. In: Environmental Aspects of Global warming. Nova Science Publications Press. – New Developments in Global Warming Research. Eds: Carter B. Keyes and Olivia C. Lucero.
74. https://www.novapublishers.com/catalog/product_info.php?products_id=46 570.
75. Tyurin MV (2016) (invited) Direct and selective syngas biocatalysis for manufacture of fuels and commodity chemicals. In: Syngas: Production, Emerging Technologies and Ecological Impacts. R. Myers, Ed. Nova Publishers, NY https://www.novapublishers.com/catalog/product_info.php?products_id=5771.74. Tyurin MV (2022) Vaccines against potential pathogens. Innovative Journal of Medical and Health Sciences 2482-2489.
76. Tyurin MV (2021) Successful Treatment of Diabetes II in adult patient and New Prospects of Recombinant Vaccine and Recombinant Proteins Engineering in situ. J Diabetes Metab 12: 871-875.
77. Tyurin MV (2021) Expression in Situ of the Recombinant Human Erythropoetin and Recombinant Insulin. J Diabetes Metab 12: 900-907. doi: 10.35248/2252- 5211.21.12.900.
78. Tyurin MV (2021) Diacetone Alcohol as the Diesel. Alternative Energies Efficiency Evaluation. Ed.: Dr. Muhammad Wakil Shahzad. IntechOpen. Rijeka: Janeza Trdine 9, 51000 Rijeka, Croatia. London: 5 Princess Gate Court, London, SW7 2QJ, UK https://www.intechopen.com/books/10687.
79. Tyurin MV (2021) Gasoline and Diesel Fuel Replacement Fuel Diacetyl Alcohol. International Journal of Automotive Technology. Volume 23: 23-46.
80. Tyurin MV (2021) Air CO2 for the Manufacture of the Commodity Fuels. Atmospheric Pollution Research 13: 77-94.
81. Tyurin MV (2022) Carbon Negative Gasoline replacement. Advance Journal of Science, Engineering and Technology V 7: 1-7.
82. Tyurin MV (2022) Environmental Problem Solution. Clinical Medicine Insights 02, 26: 15-21.
83. Tyurin MV (2022) New Gasoline or Diesel fuel Replacement. Adv. J. Sci. Eng. Tech. V 7: 126-140. ISSN: 2330 – 1744.
84. Tyurin MV (2023) Carbon Negative Replacements of Gasoline and Diesel Fuel. Journal of Infrastructure Preservation and Resilience. Submitted for publication https://assets.researchsquare.com/files/rs-2978038/v1/0d57ebe1-edbf-4053-ad1f-f3452dd707e6.pdf?c=1697509353.
85. https://www.statista.com/statistics/1198131/forecast-of-the-gloabal-probiotics-supplements.market/.
86. https://climate.nasa.gov/400ppmquotes/.
87. https://earthscience.stackexchange.com/questions/9488/how-much-water-is-the-atmosphere-losing-to-space.
88. Kistler LM, Galvin AB, Popecki MA, Simunac DC, Farrugia C, et al. (2010) Escape of O+ through the distant tail plasma sheet.Geophysical Research letters. Escape of O+ through the distant tail plasma sheet. Geophysical Research Letters, V37 (L21101) doi:10.1029/2010GL045075.
89. https://earthscience.stackexchange.com/questions/9488/how-much-water-is-the-atmosphere-losing-to-space.
90. https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2010GL045075.
91. Tyurin MV, Kiriukhin M (2013) Selective methanol or formate production during continuous CO2 fermentation by the acetogen biocatalysts engineered via integration of synthetic pathways using Tn7-tool. World Journal of Microbiology and Biotechnology 29: 1611-1623. https://www.semanticscholar.org/paper/Selective-methanol-or-formate-production-during-CO2-Tyurin-Kiriukhin/84f55f6505b1757dcab27f93a532001f035eb53b. Cited by https://www.frontiersin.org/articles/10.3389/fmicb.2022.865168/full;
92. T Shubert (2020) Production routes of advanced renewable C1 to C4 alcohols as biofuel components – a review. Biofules, Bioproducts & Biorefining 14:845-878. doi: 10.1002/bbb.2109.

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