DOWNLOAD PDF MICROORGANISMS AND MAN

Chapter 1 : effects of microorganisms to man? | Yahoo Answers

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While the most familiar microorganisms are harmful, such as the flu and the common cold, many microorganisms are incredibly helpful. They have uses everywhere from agriculture to cutting-edge medical technology. Every year, researchers are finding new uses and benefits of microorganisms to be applied in medicine, infrastructure, cooking and other areas. From the bacteria that help humans digest food to the viruses that help plants resist heat, bacteria, viruses and fungi â€” when used properly â€” are key components in food, medicine, agriculture and other areas. In the future, they may even be core components of infrastructure and other new technologies. Environmental Benefits Bacteria and fungi are required to maintain a healthy environment. Not only do they recycle natural wastes and dead animal and plant matter, they also produce many of the nutrients that plants need to grow. Bacteria, in particular, are the only living things that can fix nitrogen for use in plants. At the same time, microorganisms work in tandem with certain plants to aid them. Some viruses have been found to provide heat resistance to grasses in arid locations, and many plants store bacteria in their roots to help absorb certain nutrients more easily. Sciencing Video Vault Microorganisms in Food In addition to their direct environmental benefits, microorganisms are important partners when it comes to the work of creating food. They can be used to increase the fertility of the soil and increase crop yields, and they are necessary when making products like bread, beer and cheese and when growing coffee. At the same time, foods with probiotic properties, such as yogurt and certain types of chocolate, deliver helpful microorganisms to our digestive systems. Bodily Benefits Microorganisms known as gut flora help us digest food and regulate the production of vitamins and nutrients essential to keeping our bodies strong and healthy. Bacteria are the first line of defense the human body has against infection. The bacteria in our bodies produce natural antibiotics to repel harmful microorganisms, and if a foreign virus does infect us, many people are host to a beneficial virus that slows the rate of viral spread in the body. Medical Benefits We regularly aid the microorganisms in our bodies by adding more. Though certain species of microorganisms can make you sick â€” strep throat, the flu and measles are nothing to laugh at â€” modern medicine would not exist if not for the careful study of microorganisms. Bacteria and viruses are the key components of the vaccines that prevent the spread of once-deadly diseases like smallpox. Today microorganisms allow us to artificially grow helpful substances such as insulin and human growth hormones, and reprogrammed viruses are frequently used as drug-delivery mechanisms. Technology and the Future Applications of microorganisms in our world are constantly being studied. Certain fungi have been theorized to have anti-cancer properties, and the CRISPR Cas9 gene found in certain types of bacteria is currently being used as a gene-editing tool. Viruses have the potential to act as the future of nanotechnology, and bacteria are currently being tested as the core component of self-repairing concrete that could revolutionize infrastructure and the way we build buildings.

Chapter 2 : Of microorganisms and man | EurekAlert! Science News

BIOL - MICROORGANISMS & MAN class wall and course overview (exams, quizzes, flashcards, and videos) at Louisiana State (LSU).

Antonie van Leeuwenhoek was the first to study microorganisms, using simple microscopes of his own design. Lazzaro Spallanzani showed that boiling a broth stopped it from decaying. Ancient precursors[edit] The possible existence of microorganisms was discussed for many centuries before their discovery in the 17th century. By the fifth century BC, the Jains of present-day India postulated the existence of tiny organisms called nigodas. Disease infects by spreading from one person to another. This infection occurs through seeds that are so small they cannot be seen but are alive. He was the first in to discover, observe, describe, study and conduct scientific experiments with microoorganisms, using simple single-lensed microscopes of his own design. In his book Micrographia , he made drawings of studies, and he coined the term cell. Louis Pasteur â€" exposed boiled broths to the air, in vessels that contained a filter to prevent particles from passing through to the growth medium , and also in vessels without a filter, but with air allowed in via a curved tube so dust particles would settle and not come in contact with the broth. By boiling the broth beforehand, Pasteur ensured that no microorganisms survived within the broths at the beginning of his experiment. This meant that the living organisms that grew in such broths came from outside, as spores on dust, rather than spontaneously generated within the broth. Thus, Pasteur dealt the death blow to the theory of spontaneous generation and supported the germ theory of disease. In , Robert Koch â€" established that microorganisms can cause disease. He found that the blood of cattle which were infected with anthrax always had large numbers of Bacillus anthracis. Koch found that he could transmit anthrax from one animal to another by taking a small sample of blood from the infected animal and injecting it into a healthy one, and this caused the healthy animal to become sick. He also found that he could grow the bacteria in a nutrient broth, then inject it into a healthy animal, and cause illness. It was not until the work of Martinus Beijerinck and Sergei Winogradsky late in the 19th century that the true breadth of microbiology was revealed. Winogradsky was the first to develop the concept of chemolithotrophy and to thereby reveal the essential role played by microorganisms in geochemical processes. Bacteria and archaea are almost always microscopic, while a number of eukaryotes are also microscopic, including most protists , some fungi , as well as some micro-animals and plants. Viruses are generally regarded as not living and therefore not considered as microorganisms, although a subfield of microbiology is virology , the study of viruses. All are microorganisms except some eukaryote groups. Single-celled microorganisms were the first forms of life to develop on Earth, approximately 3â€"4 billion years ago. Most microorganisms can reproduce rapidly, and bacteria are also able to freely exchange genes through conjugation , transformation and transduction , even between widely divergent species. This rapid evolution is important in medicine, as it has led to the development of multidrug resistant pathogenic bacteria , superbugs, that are resistant to antibiotics. Parakaryon myojinensis is a unique microorganism larger than a typical prokaryote, but with nuclear material enclosed in a membrane as in a eukaryote, and the presence of endosymbionts. This is seen to be the first plausible evolutionary form of microorganism, showing a stage of development from the prokaryote to the eukaryote.

Chapter 3 : Benefits of Microorganisms to Humans

Provides information to update Institute of Biology's Studies in Biology No. , "Microorganisms and Man," by W. C. Noble and Jay Naidoo (Edward Arnold,).

EM consists of mixed cultures of beneficial an naturally-occurring microorganisms that can be applied as inoculants to increase the microbial diversity of soils and plant. EM contains selected species of microorganisms including predominant populations of lactic acid bacteria and yeasts and smaller numbers of photosynthetic bacteria, actinomycetes and other types of organisms. All of these are mutually compatible with one another and can coexist in liquid culture. EM is not a substitute for other management practices. It is, however, an added dimension for optimizing our best soil and crop management practices such as crop rotations, use of organic amendments, conservation tillage, crop residue recycling, and biocontrol of pests. If used properly, EM can significantly enhance the beneficial effects of these practices Higa and Wididana, b. The uniqueness of microorganisms and their often unpredictable nature and biosynthetic capabilities, given a specific set of environmental and cultural conditions, has made them likely candidates for solving particularly difficult problems in the life sciences and other fields as well. The various ways in which microorganisms have been used over the past 50 years to advance medical technology, human and animal health, food processing, food safety and quality, genetic engineering, environmental protection, agricultural biotechnology, and more effective treatment of agricultural and municipal wastes provide a most impressive record of achievement. Many of these technological advances would not have been possible using straightforward chemical and physical engineering methods, or if they were, they would not have been practically or economically feasible. Nevertheless, while microbial technologies have been applied to various agricultural and environmental problems with considerable success in recent years, they have not been widely accepted by the scientific community because it is often difficult to consistently reproduce their beneficial effects. Microorganisms are effective only when they are presented with suitable and optimum conditions for metabolizing their substrates Including available water, oxygen depending on whether the microorganisms are obligate aerobes or facultative anaerobes , pH and temperature of their environment. Meanwhile, the various types of microbial cultures and inoculants available in the market today have rapidly increased because of these new technologies. Significant achievements are being made in systems where technical guidance is coordinated with the marketing of microbial products. Since microorganisms are useful in eliminating problems associated with the use of chemical fertilizers and pesticides, they are now widely applied in nature farming and organic agriculture Higa, ; Parr et al Environmental pollution, caused by excessive soil erosion and the associated transport of sediment, chemical fertilizers and pesticides to surface and groundwater, and improper treatment of human and animal wastes has caused serious environmental and social problems throughout the world. Often engineers have attempted to solve these problems using established chemical and physical methods. However, they have usually found that such problems cannot be solved without using microbial methods and technologies in coordination with agricultural production Reganold et al. For many years, soil microbiologists and microbial ecologists have tended to differentiate soil microorganisms as beneficial or harmful according to their functions and how they affect soil quality, plant growth and yield, and plant health. As shown in Table 1, beneficial microorganisms are those that can fix atmospheric nitrogen, decompose organic wastes and residues, detoxify pesticides, suppress plant diseases and soil-borne pathogens, enhance nutrient cycling, and produce bioactive compounds such as vitamins, hormones and enzymes that stimulate plant growth. Harmful microorganisms are those that can induce plant diseases, stimulate soil-borne pathogens, immobilize nutrients, and produce toxic and putrescent substances that adversely affect plant growth and health. A more specific classification of beneficial microorganisms has been suggested by Higa ; ; which he refer to as "Effective Microorganisms" or EM. This report presents some new perspectives on the role and application of beneficial microorganism, including EM, as microbial inoculants for shifting the soil microbiological equilibrium in ways that can improve soil quality, enhance crop production and protection, conserve natural resources, and ultimately create a more sustainable agriculture and environment The report also discusses strategies on how beneficial microorganisms, including EM.

Chapter 4 : Microorganisms And Man by Jay Naidoo

Man and Microbes As with many things in life, humans need more than nature provides, not only to battle hazards in nature but also to battle things we have created ourselves.

Some microbes are free-living organisms and others are parasites. This topic looks at the interactions between microorganisms and the human body. Microorganisms can be harmless, beneficial or pathogenic, which means harmful. This chapter looks at the beneficial types of microorganisms. What are beneficial microorganisms? Apparently, harmless and beneficial bacteria far outnumber the harmful varieties. Some microbes also lead a symbiotic type of lifestyle in most multicellular organisms. The community of beneficial microoraganims living in human intestines is called microflora. Nitrogen cycle Nitrogen is a very important chemical element of all living matter. It is an essential part of amino acids - the building blocks of proteins. It must be converted by nitrifying nitrosomonas bacteria, so that it can enter food chains as a part of the nitrogen cycle. The nitrogen cycle is the cyclic movement of nitrogen in different chemical forms from the environment to organisms and then back to the environment. The nitrogen cycle consists of several different processes: The nitrogen cycle is also used in agricultural practices for soil enrichment. The decomposition or stabilisation of organic matter by biological action is as old as life itself. The controlled microbial decomposition of organic matter is called composting. The final product of composting is called compost. There are two types of composting: Anaerobic - without oxygen. In these processes, bacteria, fungi, moulds, protozoa and other saprophytic organisms feed upon decaying organic materials initially. In the later stages of decomposition, mites, millipedes, centipedes, springtails, beetles and earthworms further break down and enrich these composting materials. Biotechnology The industrial application of living organisms is called biotechnology. Humans have been using microorganisms for centuries. Today, biotechnology is a fast-developing industry. Bioremediation Bioremediation is the use of living organisms for cleaning up oil spills and soil and water pollutants. Sewage treatment techniques are based on biofiltration of some toxic organic material by converting it into something that can be safely discharged into the environment. Bacteria that break down environmental pollutants are sometimes called biofilters. Pharmaceuticals Some microbes are used for medicinal production. One of the most important groups of medicines, antibiotics, is produced by fungi and bacteria. It is appropriate, because they attack bacteria and other unicellular organisms that are pathogenic for humans. Most antibiotics used today were found originally in fungi. Fungi are saprophytes, meaning that they get their nourishment from dead animals or plant matter. Microflora Billions of bacteria live in the human digestive system. They form over a kilogram of our body weight. These bacteria are referred to as microflora, or gut flora. These bacteria break down food remains that have not been digested earlier in the digestive system. They stop harmful bacteria and fungus from invading the body. Human microfolora consists of different species of bacteria. Some of these are beneficial and others are potentially harmful. A balance between the two is vital for human health and wellbeing. One way of maintaining a balance between the beneficial and harmful bacteria in our intestines is to eat the types of food that contain beneficial bacteria. Beneficial bacteria that can be introduced into the digestive system through food are called probiotics. Most commercially-promoted fermented milk products with probiotic properties contain Lactobacillus bacteria or Bifidobacteria. Natural yogurts and Yakult, a fermented milk product, are examples of foods which contain probiotics. Food industry Fermentation is the process that produces alcoholic beverages or acidic dairy products. On a cellular level, fermentation is a way of obtaining energy without using oxygen. Fermentation involves the breaking down of complex organic substances into simpler ones. Food like cheese, pickles, olives, sausages, chocolate, bread, wine, beer and soy sauce are all made with the help of different types of bacteria and yeast. In most of these food products, bacteria play a major role because they produce lactic acid. Science As bacteria can multiply and mutate easily, some of them are commonly used for scientific research in genetics and molecular biology.

Chapter 5 : blog.quintoapp.com: Microorganisms: Man and Microbes

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Until now, the theory that makes ladybugs, oak trees, champagne yeast and humans distant relatives has remained beyond the scope of a formal test. This week, a Brandeis biochemist reports in Nature the results of the first large scale, quantitative test of the famous theory that underpins modern evolutionary biology. The results of the study confirm that Darwin had it right all along. In his book, On the Origin of Species, the British naturalist proposed that, "all the organic beings which have ever lived on this earth have descended from some one primordial form. Still, rumblings among some evolutionary biologists have recently emerged questioning whether the evolutionary relationships among living organisms are best described by a single "family tree" or rather by multiple, interconnected trees--a "web of life. In that case, some scientists argue, early evolutionary relationships were web-like, making it possible that life sprang up independently from many ancestors. Alternatively, separate populations could have merged, by exchanging enough genes over time to become a single species that eventually was ancestral to us all. Either way, all of life would still be genetically related. Theobald said UCA is millions of times more probable than any theory of multiple independent ancestries. The three domains include diverse life forms such as the Eukarya organisms, including humans, yeast, and plants, whose cells have a DNA-containing nucleus as well as Bacteria and Archaea two distinct groups of unicellular microorganisms whose DNA floats around in the cell instead of in a nucleus. Theobald studied a set of 23 universally conserved, essential proteins found in all known organisms. He chose to study four representative organisms from each of the three domains of life. First, he assumed that genetic copies of a protein can be multiplied during reproduction, such as when one parent gives a copy of one of their genes to several of their children. Second, he assumed that a process of replication and mutation over the eons may modify these proteins from their ancestral versions. These two factors, then, should have created the differences in the modern versions of these proteins we see throughout life today. What Theobald did not assume, however, was how far back these processes go in linking organisms genealogically. It is clear, say, that these processes are able to link the shared proteins found in all humans to each other genetically. But do the processes in these assumptions link humans to other animals? Do these processes link animals to other eukaryotes? Do these processes link eukaryotes to the other domains of life, bacteria and archaea? The answer to each of these questions turns out to be a resounding yes. Just what did this universal common ancestor look like and where did it live? Nevertheless, he speculated, "to us, it would most likely look like some sort of froth, perhaps living at the edge of the ocean, or deep in the ocean on a geothermal vent.

Chapter 6 : Microorganism - Wikipedia

Microorganisms And Man has 1 rating and 1 review. James said: Details are wrong. Authors are W.C Noble and Jay Naidoo - both from the Institute of Dermat.

Benefits of Microorganisms to Humans By: Microorganisms are very useful for human beings. They are also responsible for cleaning the environment and recycle the wastes to produce energy sources like nitrogen and carbon Microorganisms are the small unicellular structures. Bacteria, viruses and fungi come under this category. They have he ability to reproduce themselves with the help of simple cell division. The single cell of the microorganisms contains the complete genetic material and this genetic material is transferred to the next generation of cells. They can increase in numbers but they cannot increase in size. They have great impact on human lives and are used for various purposes in biotechnology. For example foods like bread, beer and cheese are produced with the help of yeast. Similarly bacteria are involved in the production of butter, yogurt, many kinds of chocolates, coffee and other foods of daily life. It means their body consists of various types pf cells and they are all differentiated into different tissues and organs. Microorganisms have made it possible to make such medicines which when enter the body, target the defected genes and make healthy changes in them and they become functional again. There is a common example of human insulin. Insulin is an antibiotic which is prescribed for the diabetic patients. Now it is possible to synthesize the insulin in microorganisms like bacteria and yeast. These microorganisms are inserted in the body in the form of vectors and cure the defected genes. Due to the availability of microorganisms in the environment, scientists have made use of them for making many medicines and drugs and also used them for drug delivery. These microorganisms are useful for the body and perform various useful functions, for example E. If microorganisms help in performing different body functions then they also take something from the body that is they take nutrients from the body. One purpose of bacteria in the body is to fight against those harmful bacteria which can cause diseases. For example there is also a bacterium in the gut which helps in synthesizing the vitamins like biotin, vitamin K and folic acid. By using the techniques of biotechnology, scientists have succeeded in developing human insulin, growth hormones and other useful components of the body. Biotechnological processes use microorganisms for the drug delivery in the form of vectors and plasmids. Microorganisms have provided many beneficial things to agriculture as they are responsible for increasing the fertility of the soil. Due to this, the production of the plants increases and economy becomes strong. Plants use carbon dioxide during the process of photosynthesis. More the consumption of carbon dioxide will lead to more production of food. Some bacteria also help in cleaning the environment by digesting the pollutants and as a result they release nutrients which are environment friendly. Sc in Agriculture Biotechnology.

Chapter 7 : List of microorganisms used in food and beverage preparation - Wikipedia

Microorganisms And Man Microorganism wikipedia, a microorganism, or microbe, is a microscopic organism, which may exist in its single celled form or in a colony of cells the possible existence.

Fungi Lichen Good Microbes Bad Microbes Humans Man and Microbes As with many things in life, humans need more than nature provides, not only to battle hazards in nature but also to battle things we have created ourselves. Scientists all over the world are experimenting with viruses, bacteria, and fungi for hundreds of reasons. Why mess around with these little creatures? They are the simplest of all organisms. They can also be the most deadly. That is reason enough to study them. Microbes to Make Medicine Scientists are working with microbes and the compounds they create to make new medicines to save our lives. You might be vaccinated for pox or the flu. Scientists have studied those viruses to see how they act. Then they came up with a way to teach your immune system to do battle. If you get sick at all, you will be able to fight off the infection. Labs are also developing drugs that help you fight infections after you get the disease. We already spoke about antibiotics. Labs are creating new and stronger antibiotics every day. Microbes in War Although nobody likes to talk about it, humans have a history of using disease and compounds created by microbes in warfare. Labs were built to create chemical compounds that would kill people. They also isolate diseases viruses that could be released to infect entire populations of people. Most of the world has chosen not to develop diseases for use in war. They realized how dangerous and uncontrollable these diseases are. Once they are out, they might not be able to be stopped. Scientists are also working with microbes to help the environment. Good examples are the bacteria that have developed to break down oil in the water. If a tanker leaked and oil began to get into the water, these bacteria could be released to break down the oil. The resulting compounds would not hurt the environment. Scientists are also working with bacteria and fungi to help breakdown garbage.

Chapter 8 : BIOL (CBIO) - Microorganisms and Man - Acalog ACMSâ„¢

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A mighty creature is the germ, Though smaller than the pachyderm, His strange delight he often pleases, By giving people strange diseases. We spend millions of dollars each year on anti-bacterial soaps and antibiotics to fend off germs, but, in fact, microorganisms play an essential role in human health and in the functioning of all ecosystems. Microorganisms include viruses, bacteria, fungi, protozoa, algae, and nematodes, in roughly decreasing order of size. They are the oldest form of life on Earth and are found virtually everywhere, from boiling hot springs deep in the Earth to the depths of the oceans to the Arctic. Microorganisms play a critical role in the various biogeochemical cycles, as well as being a particularly important component of plant and soil ecosystems. They break down dead plant and animal tissues and make their nutrients, including carbon and nitrogen, available to support plant growth. There are generally between one and ten million microorganisms in each gram of soil; similar numbers occur on plants and animals. Microorganisms play a similarly critical part within both animal and human bodies. Bacteria, for example, play an important role in digestion, helping to synthesize vitamin K and absorb certain nutrients; they also help convert bile and acids in the intestines. Some also help to prevent other, more harmful bacteria from invading the intestines or other areas of the body. Although Anton van Leeuwenhoek first observed bacteria in the late s, it was not until late in the 19th century that the germ theory of disease became generally accepted. The research of French scientist Luis Pasteur provided persuasive evidence that certain microorganisms were responsible for human illness. Among his other findings, he discovered three bacteria, Staphylococcus, Streptococcus and Pneumococcus, that can become pathogenic. However, pathogenicity among microorganisms is an exception, not the rule. Considering the huge population of microorganisms in our environment and in our own bodies, it is a relatively rare occurrence that the symbiotic relationships become harmful. After all, microorganisms are neutral or have little to gain, in an evolutionary sense, from killing their host. As physician and microbiologist Lewis Thomas reminded us,? The man who catches a meningococcus is in considerably less danger for his life, even without chemotherapy, than meningococci with the bad luck to catch a man.? It is not completely understood why some immunological reactions occur. Although modern science and medicine has made vast improvements in human, animal, and plant health, it is remarkable how much remains to be learned and understood. New infectious viruses appear from time to time, posing a threat to human health. The origin of some of these is unknown, and no one knows within an order of magnitude how many microorganisms actually exist.

Chapter 9 : Of Bacteria and Men:

Perhaps it is because of the superb opportunities for direct mucosal spread during sexual intercourse that only an occasional microorganism, such as cytomegalovirus in man, has made use of semen as a vehicle for transmission. Milk, in contrast, is a fairly common vehicle for transmission.

Self-organization of bacterial populations Fluorescent bacteria in glass microchannels In many environments, hundreds, sometimes thousands of different microbial species coexist as mixtures of cells of various sizes and shapes. For example, each human being teems with their very own and unique microbial mixture trillions of cells , as the human microbiome project unveiled a few years ago. Microbial diversity in soil is equally â€" possibly even more â€" astounding, with a gram of rich soil capable to host thousands to millions of distinct bacterial and archaeal species, as well as hundreds of fungal and protistan species. Yet, despite this wealth of diversity, microbial communities are not simply soups of species â€" there is order hiding behind this curtain of complexity. Actually, the more we look, the more we find patterns of microbial organization in the natural world. Some patterns are obvious and have been known for a long time, such as the distinct layers of microorganisms visible with the naked eye in sections of microbial mats. The vast majority of patterns, however, reveal themselves only at the scale of individual microbes, that is, at the microscopic scale. Microbial populations are thus often spatially organized at small scale, and in a very defined and refined way. But how does it work? Part of the answer seems to reside in so-called self-organization processes. With such processes, patterns emerge from the individual behavior of cells that can only sense the conditions in their local environment and react accordingly. This in appearance simple process at the individual level can lead to seemingly complex patterns of organization at larger scale. Think of bird murmuration , or of how ants can form bridges with their own bodies! I also discussed spatial patterns of bacterial organization triggered by metabolic cooperation in a previous post. In a recent paper whose lead author is my colleague Benedict Borer , we examined some of the basic processes that can lead to bacterial spatial self-organization. In that study we were specifically interested in pore networks that mimic the spatial structure of soil aggregates, but the processes that matter here are valid in other kinds of environments as well. The idea is as follows. In a given habitat, bacterial populations with distinct metabolic capabilities and food preferences would spontaneously arrange in space in order to optimize their use of the available resources. We thought there must be two necessary conditions for that. First, that the bacterial cells have some level of motility which could be flagellar motility, such as swimming, or simply movement provide by growth and cell division. Second, that gradients of carbon and nutrients are present in the habitat i. We chose to work with two bacterial species that differ on their ability to respire: Both species are motile thanks to flagella that they can use to swim within liquid films. To facilitate observation, the two species were each tagged with a distinct fluorescent protein green or red. Although initially well-mixed in the center of the network, after a week of incubation the two bacterial species segregated in the network to form two distinct and coexisting populations see figure below. One grew preferentially where the oxygen was more abundant the obligate aerobe , while the other could occupy the anoxic niche at the center of the network, which also contained more carbon. The two bacterial populations, initially well-mixed, grow and segregate in the pore network as function of their respiration metabolism. From Borer et al. Another intriguing result was that the coexistence of the two species, as seen in the figure, could not been achieved in well-mixed liquid environments vials or flasks , because one of the species would always win over and dominate the community see below. This illustrates how the habitat spatial structure can help limit competition and maintain species coexistence. Experimental and modeling results show competitive exclusion in homogeneous cultures a and coexistence in structured pore networks b. Admittedly, our system is artificial and our community only composed of two species Bacteria have a remarkable faculty of optimizing their distribution and activity in complex habitats, which we could demonstrate with our simple mathematical and experimental models.