PHARMACEUTICAL SIGNIFICANCE OF MICRO ORGANISMS : PHARMACEUTICAL SIGNIFICANCE OF MICRO ORGANISMS

INTRODUCTION : INTRODUCTION Microbes are small Single- celled Organisms. Either free living or in colonies. They can belonging to any of the three Domains.

TYPES OF MICRO ORGANISMS. : TYPES OF MICRO ORGANISMS.

CLASSIFICATION : CLASSIFICATION

BACTERIA : BACTERIA A bacterium is an organism belonging to the domain bacteria traditionally classified as 5 kingdoms ,bacteria are microscopic single celled ,and there cell structure is relatively simple.Bacteria population can double as quickly as possible for every 9.8min.Reproduction is by asexually..

BACTERIAL INFECTIONS : BACTERIAL INFECTIONS THEY ARE

USEFUL ACTIVITIES : USEFUL ACTIVITIES DECOMPOSERS SOIL FERTILITY SINGLE CELL PROTIENS PRODUCTION OF INDUSTRIAL CHEMICALS PRODUCTION OF MILK PRODUCTS PRODUCTION OF ANTIBIOTICS MODELS FOR BIOLOGICAL RESEARCH

PRODUCTION OF INDUSTRIAL CHEMICALS : PRODUCTION OF INDUSTRIAL CHEMICALS ACETIC ACID GLUCONIC ACID LACTIC ACID PROPIONIC ACID CITRIC ACID LYSIN GLUTAMIC ACID PROTEASES AMYLASES ACETONE BUTANOL GLYCEROL ETHANOL Acetobacteraceti Acetobacter Lactobacillusdelbrueckii Propionibacterium Bacilluslicheniformis Brevibacteriumflavum Corynebacteriumglutamicum Bacilluslicheniformis Bacillusdiastictus,bacillusubtilis Clostridiumacetobutylicum Clostridiumsaccharoacetobutylicum Bacillus subtilis

PRODUCTION OF ANTIBIOTICS : PRODUCTION OF ANTIBIOTICS STREPTOMYCIN CHLOROMYCITIN KANAMYCIN VANCOMYCIN NEOMYCIN NOVOBIOCIN CHLORTETRACYCLIN BACITRACIN POLYMIXIN B AMPHOTERICIN B Streptomyces griseus Streptomyces venezualae Streptomyces kanomyceticus Streptomyces orientalis Streptomyces fradiae Streptomyces niveus,S.spheroids Streptomyces aureofacians Bacillus licheniformis,B.subtilis Bacillus polymixa Streptomyces nodosus

ACTINOMYCETES : ACTINOMYCETES Actinomycetes are bacteria with a fungal morphology They are Gram+ve,nonmotile,non capsulated filaments that break into bacillary and coccoid elements They are rich source of secondary metabolites with diverse biological activity.

IMPORTANCE OF ACTINOMYCETES : IMPORTANCE OF ACTINOMYCETES PRODUCTION OF ENZYMES PRODUCTION OF ANTIBIOTICS PRODUCTION OF BIOSURFACTANTS TRANSFORMATION OF XENOBIOTICS PRODUCTION OF ENZYME INHIBITORS GENERATION OF IMMUNOMODIFIERS

MARINE ACTINOMYCETES : MARINE ACTINOMYCETES NEOMYCIN(B&C) APLASMOMYCIN TETRAZOMIN MADURALIDE HALICOMYCINS BIOXALOMYCINS ANTHRANILAMIDES BUTANOLIDE

PROTOZOA : PROTOZOA It is an unicellular non fungal eukaryote ,and heterotropic protist belonging to protista family.

PROTOZOAL INFECTIONS : PROTOZOAL INFECTIONS MALARIA AMOEBIASIS GIARDIASIS TOXOPLASMOSIS CRYPTOSPORIDISIS TRICHOMONIASIS LEISHMANIASIS SLEEPING SICKNESS DYSENTRY

USES OF PROTOZOA : USES OF PROTOZOA IN WASTE WATER TREATMENT IN INDUSTRIES AQUATIC ECOLOGICAL BALANCE SEWAGE AND INDUSTRIAL WASTE TREATMENT CERTAIN PROTOZOAN USED AS REASERCH TOOLS

FUNGI : FUNGI Fungi are eukaryotic,non chlorophyllus filamentus and heterophic micro organisms,reproduce by spores

CLASSIFICATION : CLASSIFICATION

Fungi reproduction : Fungi reproduction

USES OF FUNGI : USES OF FUNGI PRODUCTION OF ORGANIC ACIDS PRODUCTION OF ANTIBIOTICS PRODUCTION OF ENZYMES PRODUCTION OF VITAMINS PRODUCTION OF ALCOHOLS PRODUCTION OF ALKALOIDS PRODUCTION OF ENZYMES PRODUCTION OF VITAMINS PRODUCTION OF ALCOHOLS

ORGANIC ACIDS PRODUCED FROM FUNGUS : ORGANIC ACIDS PRODUCED FROM FUNGUS GALLIC ACID CITRIC ACID GLUCONIC ACID OXALIC ACID FUMARIC ACID LACTIC ACID Pencilliumglaucum Aspergillusniger Aspergillusniger,Pencilliumperfurogenum Aspergillusniger,scleroteniumsp Mucor sps,Rhizopus sps Rhizopus oryzae

ANTIBIOTICS PRODUCED FROM FUNGI : ANTIBIOTICS PRODUCED FROM FUNGI PENCILLIN GRISEOFULVIN CEPHALOSPORIUM FUSCHIDIC ACID Pencilliumchrysogenum Pencilliumgriseofulvum Achrimoniumsps Fuschidiumcoccinium,Mucorramanneanus

ALGAE : ALGAE Algae are a group of photosynthetic eukaryotic organisms which contain chlorophyll.They occur in unicellular,colonial,filamentous forms,some are ENDOPHYTIC

CLASSIFICATION OF ALGAE : CLASSIFICATION OF ALGAE EUGLENOPHYTA(euglenoids) PYRROPHYTA(dinoflagellates) PHAEOPHYTA(brownalgae) RHODOPHYTA(redalgae) CHLOROPHYTA(greenalgae) CHRYSOPHYTA(diatoms)

BLUE GREEN ALGAE : BLUE GREEN ALGAE Also called as Cyanobacteria are prokaryotic but not regarded as true bacteria .they inhabit freshwater as well as marine environments and occur as unicellular or filamentous organisms.

IMPORTANCE OF ALGAE : IMPORTANCE OF ALGAE AGAR ALGINIC ACID CARRAGEENAN DIATOMACEOUS EARTH USED IN GOITER TREATMENT

VIRUSES : VIRUSES Viruses are noncellular,neither eukaryotes nor prokaryotes,they neither grow nor display any nutrition patterns .Replication is the only observable activity of viruses that too is accomplished only with in living cells .Viruses consists of an ultramicroscopic fragment of nucleic acid,either DNA or RNA,surrounded by a sheath of protein.They are responsible for many human dieseases including influenza,hepatitis,polio&chicken pox

IMPORTANCE OF VIRUSES : IMPORTANCE OF VIRUSES TO STUDY MOLECULAR&CELLBIOLOGY TO STUDY OF GENITICS PHAGE THERAPY PRODUCTION VARIOUS VACCINE Antigen&Antibodies NANOTECHNOLOGY

OTHER PRODUCTS FROM MICROBES : OTHER PRODUCTS FROM MICROBES

Slide 33: Bioconversion Utilization of microbes to modify a compound Useful when multi-step chemical synthesis is expensive or inefficient Often microbial conversion is combined with traditional chemistry to reduce the steps necessary The most common use of bioconversion is in the synthesis of steroids such as hormones & corticosteroids

Steroids biotransformation : Steroids biotransformation Microbes acts as biocatalyst in steroidal biotransformation in a step or in otherwise in a chemical synthesis

Slide 35: FERMENTATION

Ethanol ProductionProduced via anaerobic fermentation by yeastCorn starch is hydrolyzed to glucose monomers : Ethanol ProductionProduced via anaerobic fermentation by yeastCorn starch is hydrolyzed to glucose monomers

VENIGAR PRODUCTION : VENIGAR PRODUCTION

VITAMINS &AMINO ACIDS : VITAMINS &AMINO ACIDS VITAMINS PRODUCED FROM MICROBIAL SOURCE ARE VITAMIN B12 AND RIBOFLAVIN

MICROBES IN COSMETICS : MICROBES IN COSMETICS In preparation of Antiageing creams In Hair Growth In Whitening of skin

Recombinant DrugsBesides antibiotics which are derived from antibiotics Protein medicines are produced by inserting human genes into microbes : Recombinant DrugsBesides antibiotics which are derived from antibiotics Protein medicines are produced by inserting human genes into microbes

Slide 44: 1982, FDA approves the first recombinant protein drug, human insulin produced by E. coli developed by Genentech Today there are >75 recombinant protein drugs approved by the FDA with 100s more being studied Currently the global market for recombinant protein drugs is $47.4 billion1

Slide 45: Product Microbe Purpose Insulin E. coli Diabetes treatment Interleukin-2 E. coli Cancer/immune system stimulant EGF E. coli wound healing Interferons E. coli / yeast Cancer/virus treatments Prourokinase E.coli / yeast Anticoagulant/heart attacks CSF E. coli / yeast Immune stimulant Taxol E. coli ovarian cancer

PLASTICS : PLASTICS Polyhydroxyalkanoate(PHA)is a polymer made by some microbes as a way of storing carbon. Upto 80% of the microbes biomass is plastic PHA is sold to make shampoo bottles in Germany,and disposable Razors in Japan. The microbes Pseudomonas putidda converts styrene to PHA.

Slide 48: Enzyme Name Organism Use (examples) -acetolactate bacteria Removes bitter substances decarboxylase from beer  -amylase bacteria Converts starch to simple sugar Catalase fungi Reduces food deterioration Chymosin bacteria or fungi Clots casein to make cheese -glucanase bacteria Improves beer filtration Glucose isomerase bacteria Converts glucose to fructose Glucose oxidase fungi Reduces food deterioration Lipase fungi Oil and fat modification Maltogenic amylase bacteria Slows staling of breads Pectinesterase fungi Improves fruit juice clarity Protease bacteria Improves bread dough structure xylanase (hemicellulase) bacteria or fungi Enhances rising of bread dough

CONCLUSION : CONCLUSION The conclusion herein is “Humans can’t survive without a biodiversity of microbes functioning in a manner that makes our life form possible”. Regardless of human actions, microbes will survive some geological time after mankind no longer inhabits the Earth.

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