Saarthak the theory and practice of assessing

Business, Management

SAARTHAKBANSAL AIP A1 BPHARM A4513317019 INDEX – 1) Acknowledgement2) Environmental Health3) Toxicology Brief4) History5) Testing Methods6) Types of Toxicology7) Toxicity Levels8) Reference Acknowledgement – I would like to express my special thanksof gratitude to my teacher .... who gave me the golden opportunityto do this wonderful project on the topic .....

....., which also helped mein doing a lot of Research and i came to know about so many new things I amreally thankful to them. Secondly i would also like to thank my parentsand friends who helped me a lot in finalizing this project within the limitedtime frame. ENVIRONMENTALHEALTH – Environmentalhealth is the branch of public health that is concerned withall aspects of the natural and built environment that may affect humanhealth. Health is the science, practice, and study of a human's well-being andtheir health and preventing illnesses and human injuries. Other terms referringto or concerning environmental health are environmental public health, and public health protection / environmental health protection.

Environmental health and Environmental protection are very much interrelated . Environmental health isfocused on the natural and built environments for the benefit of human health, whereas environmental protection is concerned with protecting the naturalenvironment for the benefit of human health and the ecosystem. Research in theenvironmental health field tries to limit the harmful exposures through naturalthings such as soil, water, air food, etc.

Environmental health has been defined in a 1999 documentby the World Health Organization (WHO) as:” Those aspects of the humanhealth and disease that aredetermined by factors in the environment.” It also refers to the theory and practice ofassessing and controlling factors in the environment that can potentiallyaffect health. Environmental health asused by the WHO Regional Office for Europe, includes both the directpathological effects of chemicals, radiation and some biological agents, andthe effects (often indirect) on health and well being of the broad physical, psychological, social and cultural environment, which includes housing, urbandevelopment, land use and transport. There are five basic disciplinesgenerally contribute to the field of environmental health: environmentalepidemiology, toxicology, exposure science, environmental engineering, andenvironmental law. Here in this article , TOXICOLOGY has been explained taking environmental healthsciences in context … Whatis toxicology? Toxicologyis a field of science that helps us understand the harmful effects that chemicals, substances, or situations, can have on people, animals, and the environment. Some refer to toxicology as the “ Science of Safety” because as a field it hasevolved from a science focused on studying poisons and adverse effects ofchemical exposures, to a science devoted to studying safety. Toxicologyuses the power of science to predict what, and how chemicals may cause harm andthen shares that information in the interest of public health to protect them. Toxicology is a discipline, which goes hand in hand with biology, chemistry, pharmacology, and medicine, that involves the study ofthe adverse effects of chemical

substances on living organisms and the practice
of diagnosing and treating exposures to toxins and toxicants.

The relationship between doseand its effects on the exposed organism isof high significance in toxicology. Factors that influence
chemical toxicity include the dosage(and whether it is acute or chronic), route of exposure, species, age, sex, andenvironment Who are Toxicologists? Toxicologists study the safety andbiological effects of drugs, chemicals, agents, and other substances on livingorganisms. They develop methods to determine harmful effects, the dosages thatcause those effects, and safe exposure limits.

They mayalso investigate the relationship between dose and effect, which can beinfluenced by factors such as the dosing regimen (single large exposure vs. continuous smaller exposures), route of exposure (oral, dermal, nasal), age, gender, and environment. Toxicology brings together a wide variety of fields, including chemistry, biology, pharmacology, human and animal medicine, andenvironmental science, to help inform policies and regulations to protect bothhuman health and the environment. Toxicologistsare the people who spend their time planning and conducting experiments, dosinganimals, and collecting and analyzing data. Ph. D. level toxicologists interpretthe results of studies, conduct risk assessments, and integrate data from manydifferent studies.

They then create reports and recommendations fororganizations and regulatory agencies, putting the data into context andproviding risk analyses to ensure the safety of the products and compounds fortheir intended use.

HISTORYParacelsus, was a 16th century physicianand is considered to be the “ Father of Toxicology.” Toxicology as adistinct scientific discipline is fairly modern; however, knowledge of poisonsand poisoning incidents date back to ancient times. Humankind’s desire toassure its health and safety has always been present, but drawing conclusionsabout harmful chemicals required learning. Initially this was done bytrial and error, where substances were tested to see which were safe and whichwere best avoided. There are written documents dating back to around 450BCE have been recovered that describe the toxicity of venom released in asnakebite and how it can be treated. Cleopatra herself is reputed to havecommitted suicide by a self-inflicted bite from an asp, although this widelytold narrative may be more fiction than fact. The Greeks and Romans alsohad a good knowledge of many naturally occurring poisons.

In fact, death bypoison was not an uncommon form of capital punishment. Socrates, forexample, was sentenced to drink poisonous hemlock for supposedly corrupting theyouth of Athens and failing to recognize official state deities. Manyexpert poisoners have continued over the centuries to be employed to dispatchspouses, other family members, and enemies of every shade and hue. The science of toxicologyadvanced significantly throughout the middle ages with an understanding ofoccupational diseases connected with mining operations.

Paracelsus, was aSwiss/German physician and alchemist best known for articulating the concept of” The dose makes the poison,” and who is considered today to be the bedrock oftoxicology. Over time, research

toxicologists have studied the toxicityof a vast range of chemicals, both naturally occurring and synthetic. More recently toxicologists have embraced “ green chemistry” as an approach toidentifying and developing chemicals and products with properties that minimizenegative impacts on humans and on the environment. Modern toxicology hastried to move away from the traditional approach of animal testing and towardsa harm-free route of experimentation.

Toxicologistshave been at the forefront in seeking alternative methods to traditional typesof testing that are at least as reliable in determining toxicity. Thecontemporary era has embraced research in additional areas includingmolecular-, computational-, and nano-toxicology. Although newmethodologies continue to be explored, for some toxic endpoints there are noalternatives to animal testing. TESTINGMETHODSToxicity experiments may beconducted in vivo (using the whole animal) or in vitro (testing on isolated cells or tissues), or in silico (in a computer simulation). INVIVOStudies that are in vivo (Latin for “ within theliving”; often not italicized in English) are those in which the effectsof various biological entities are tested on whole, living organisms or cells, usually animals, includinghumans, and plants, as opposed to a tissue extract or dead organism. Thisis not to be confused with experiments done in vitro(“ within the glass”), i.

e., in a laboratoryenvironment using test tubes, petri dishes, etc In vivo testing is oftenemployed over in vitro becauseit is better suited for observing the overall effects of an experiment on aliving subject. IN VITROIn

vitro (meaning: in the glass) studies are performedwith microorganisms, cells, or biological molecules outside their normal biological context. Colloquiallycalled “ test-tube experiments”, these studies in biology and its subdisciplinesare traditionally done in labware such as test tubes, flasks, Petri dishes, and microtiter plates. Studies conducted usingcomponents of an organism that have been isolated from their usual biologicalsurroundings permit a more detailed or more convenient analysis than can bedone with whole organisms; however, results obtained from in vitro experiments may notfully or accurately predict the effects on a whole organism. IN SILICOIn silico (literally Latin for “ in silicon”, alluding to the massuse of silicon for semiconductor computer chips) is anexpression used to mean “ performed on computer or via computer simulation.

” The phrase was coined in 1989 as an allusion tothe Latin phrases in vivo, in vitro, and in situ, which are commonly used in biology , refer to experimentsdone in living organisms, outside living organisms, and where they are found innature, respectively TYPES OF TOXICOLOGY Analytical toxicology: It is thebranch of toxicology which deals with the study of detection and assay ofpoisonous chemicals including their metabolites that could affect thebiological system. Applied toxicology: It is theapplication of new and modern methods or technologies for early detection oftoxicants in the field setting or practice area. Clinical toxicology: It is mainlyinvolved in the study of diagnosis and treatment of poisoning that can occurrinhumans. Veterinary toxicology: Veterinarytoxicology focus in the study of diagnosis and treatment of animal poisoningincluding the transmission of toxin from animals to humans via milk, meat, fish, food stuff and etc.

Environmental toxicology: It is thebranch of toxicology in which study of presence of different toxicantsincluding their metabolites and degradation products in the environment andtheir effects on humans and animals. Industrial toxicology: It is thestudy of selective and specific are of environmental toxicology. Medical toxicology – It is a subspecialty of medicine focusingon toxicology andproviding the diagnosis, management, and prevention of poisoning andother adverse effects due to medications, occupational and environmental toxicants, and biological agents.

Medicaltoxicologists are involved in the assessment and treatment of a wide variety ofproblems including acute or chronic poisoning, adverse drug reactions (ADRs), drug overdoses, envenomations, substance abuse, industrial accidents, andother chemical exposures. Medical toxicology is officially recognizedas a medical subspecialty by the AmericanBoard of Medical Specialties. Itspractitioners are physicians, whose primary specialization is generally in emergency medicine, occupational medicine, or pediatrics. Medical toxicology is closely relatedto clinical toxicology, with the latter discipline encompassing non-physiciansas well (generally pharmacists or scientists).

TOXICITYLEVELS – WATER PARAMETER Average values of 7 sites and six bimonthly measurements STANDARD VALUES WHO 12 EPA 9 CCME 8 ICMR 11 BIS 7 EU 10 sulphate 278. 18 500 250 250 400 400 250 pH 8. 70 8 9. 5 9. 5 8. 5 8. 5 8. 5 EC 1345 2500 1500 2500 300 300 2500 Total Hardness 332 300 200 500 300

300 500 chloride 20. 46 250 250 250 1000 1000 250 Value of K —— 7. 42 8. 40 7. 73 8. 04 8. 04 8. 64 TOXICITYLEVELS – AIR: Air Quality Index (AQI) Values Levels of Health Concern Colors When the AQI is in this range: .. air quality conditions are: ...as symbolized by this color: 0 to 50 Good Green 51 to 100 Moderate Yellow 101 to 150 Unhealthy for Sensitive Groups Orange 151 to 200 Unhealthy Red 201 to 300 Very Unhealthy Purple 301 to 500 Hazardous Maroon