

Novel Methodologies in Science Research Pertaining to the Environmental Ethics

Paper

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Ethics refers to moral principles. Environmental ethics inculcates a precious code of conduct in the individuals and society. Therefore, it is to be developed in each person. It commands an individual to make decisions and take actions on the different aspects of environment which are not harmful to any community.

Human beings are competent enough in application of science and technology for the improvement in wellbeing of the mankind. But they are not so aware of the environmental effects of their behaviour and extensive use of the technology. This incompetence of them leads to environmental pollution which is the reflex reaction to their insensitive point of view towards exploitation of resources available on the globe for their life. The research in science is focused on the discovery and study of existing facts and phenomena in the flora and fauna, invention of newer technology, programs, tools and gazettes to improve the lifestyle of the human beings as well as synthesis and identification of newer compounds as potent drugs to add quality to the living by overcoming diseases. This paper suggests some novel methodologies being accepted and administered in the research in science stream to make the research more eco-friendly and environmentally sustainable.

1. Many botanists disturb the natural ecosystem as well as biodiversity for the purpose of their study. They can rather grow the endangered and endemic species in their natural habitat by seed germination or in-vitro culture method.
2. Due to over irrigation and excessive use of synthetic fertilizers, the fertile land under agriculture becomes saline one. Hence for the reclamation of saline soil, it is necessary to identify and grow the plants which are tolerant to the salinity of the soil.

3. Modern methods of agriculture wherein the application of pesticides and insecticides is inevitable, the disturbances in the food chain and entire ecosystem are experienced. Instead, the limited use of pesticides or development of pest resistant varieties of plants can be practiced.
4. For the preparation of herbarium the botany students destroy the wild flora with their flowers and fruits which results in the declined number of plants year by year. Hence it is suggested to stop making herbarium of dried and preserved plant bodies/ parts and use a colored photograph of the plant species in natural habitat.
5. Dissection of Frogs have caused declined population of frogs leading to increase in the population of insects which is harmful to the food grains. Instead of using useful animal for dissection, they have started dissecting Rats and Cockroaches. Syllabus is Modified accordingly.
6. Green Chemistry: For chemists, it is becoming increasingly important to be green by applying the principles of green chemistry to all facets of the chemical sciences: basic and applied research, production, and education. Introduced in the early 1990's, Green Chemistry is defined as the utilization of a set of principles that reduces or eliminates the use or generation of hazardous substances in the design, manufacture and application of chemical products. Green chemistry protects the environment, not by cleaning up, but by inventing new chemistry and new chemical processes that do not pollute.
7. MORE (microwave –induced organic reaction enhancement) chemistry: The use of domestic microwave oven in this regard is now a well established procedure. Microwaves have been proven as very important tool for functional group transformation when compared to the conventional method.
8. Solvent free reactions: Avoiding organic solvent during the reactions in organic synthesis leads to a clean, efficient and economical technology. When the reactions are carried out on solid support like silica/ alumina powder, or supported on some polar medium like DMF which can be

easily removed from the reaction mixture by simply addition of water, one avoids the voluminous solvents being added to the environment.

9. Drug designing: With the application of combinatorial/ computational Chemistry to identify the most active and potential drug, one can design the selected molecule before the synthesis and also ensures the success in getting the most promising drug. The drugs so selectively designed and synthesized can be effectively screened for the selected tests only, saving more on time than money.
10. QSAR: Establishment in the relationship between the Structure of the compound and properties shown by them is done with the help of mathematical Chemistry/ Computational Chemistry / Combinatorial Chemistry.
11. PASS: Prediction of Activity Spectrum of the Substances allows the researcher to know the probability of the compound to be active and inactive for 565 possible biological activities. The PASS training set consists of 16,000 known drugs and 15,00 compounds that are in clinical or advanced pre-clinical trials. which predicts the [biological activity spectrum](#) for a compound on the basis of its structural formula. 'PASS Inet' predicts [more than 700](#) pharmacological effects, mechanisms of action, mutagenicity, carcinogenicity, teratogenicity and embryotoxicity.
12. Significance of PASS: It is significant to reduce the time lag between the synthesis of a compound and actual identification of the compound as an efficient drug. It saves not only money, which will be rather wasted for screening of the compounds for any biological activity, but also the efforts of the analyst to try each and every compound for screening and most valuable time required to identify a potential drug. This is available at the link: “ <http://www.ibmh.msk.su/PASS/>”.
13. Modern Electronics: The research in Eletronics focuses onEfficiency and Energy Consumption. Eg. Switch mode power supplies (SMPS): The small size, higher efficiency and ability to operate over a wider

input voltage range have made the SMPS the preferred power supply technology. Normally the design procedure involves assumptions, approximations, estimates and guess-figures for specifications at the beginning, and adjustments in the parameters to yield the optimized design results. Simulations can be applied for designing.

14. Fuzzy Logic: Fuzzy Logic directly deals with uncertainty by attaching degree of certainty. Fuzzy Logic has been used with great success in design problems. Such systems are simple to design, easy to modify and can be understood and implemented by non-specialist. It can be done with the application of Matlab

This way the researchers in Science enhance the quality of their research for the improved life of mankind without disturbing the biodiversity, ecological balance, in little time with saved energy and money with sustained environmental equilibrium. All it requires is only the enthusiastic, proactive and innovative approach of young Researchers, Awareness for environmental impacts of their research making the research valuable, applicable, acceptable and useful to the life on the planet.