Investigatory projects

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1. TO DETERMINE THE CONCENTRATION OF CONTENTS IN COLD DRINKS.

The era of cold drinks began in 1952 but the industrialization in India marked its beginning with launching of Limca and Goldspot by parley group of companies. Since, the beginning of cold drinks was highly profitable and luring, many multinational companies launched their brands in India like Pepsi and Coke. Now days, it is observed in general that majority of people viewed Sprite, Fanta and Limca to give feeling of lightness, while Pepsi and Thumps Up to activate pulse and brain. *Theory* Cold drinks of different brands are composed of alcohol, carbohydrates, carbon dioxide, phosphate ions etc. These soft drinks give feeling of warmth, lightness and have a tangy taste which is liked by everyone. Carbon dioxide is responsible for the formation of froth on shaking the bottle. The carbon dioxide gas is dissolved in water to form carbonic acid which is also responsible for the tangy taste. Carbohydrates are the naturally occurring organic compounds and are major source of energy to our body. General formula of carbohydrates is CX (H2O)Y. On the basis of their molecule size carbohydrates are classified as:- Monosaccharide, Disaccharides and Polysaccharides. Glucose is a monosaccharide with formula C6H12O6 .It occurs in Free State in the ripen grapes in bones and also in many sweet fruits. It is also present in human blood to the extent of about 0.1%. Sucrose is one of the most useful disaccharides in our daily life. It is widely distributed in nature in juices, seeds and also in flowers of many plants. The main source of sucrose is sugar cane juice which contain 15-20 % sucrose and sugar beet which has about 10-17 % sucrose. The molecular formula of sucrose is C12H22O11. It is produced by a mixture of glucose and fructose. It is non-reducing in nature whereas glucose is reducing. Cold drinks are a bit acidic in nature and their acidity can be measured by finding their pH value. The pH values also depend upon the acidic contents such as citric acid and phosphoric acid.

2. Chemistry Project on Presence of Insecticides & Pesticides in Fruits & Vegetable

In the past decade there has been a tremendous increase in the yields of various crops to meet the demand of overgrowing population, achieved by using pesticides and insecticides. These are chemicals that are sprayed over crop to protect it from pests. For example, DDT, BHC, zinc phosphide, Mercuric chloride, dinitrophenol, etc. All pesticides are poisonous chemicals and are used in small quantities with care. Pesticides are proven to be effective against variety of insects, weeds and fungi and are respectively called insecticides, herbicides and fungicides. Most of the pesticides are non-biodegradable and remain penetrated as such into plants, fruits and vegetables . From plants they transfer to animals , birds and human beings who eat these polluted fruits and vegetables. Inside the body they get accumulated and cause serious health problems. These days preference is given to biodegradable insecticides like malathion. The presence of Insecticides residues in even raw samples of wheat, fish, meat , butter etc. have aroused the concern of agricultural administrators, scientists and health officials all over the world to put a check over the use of insecticides and to search for non insecticidal means of pest control.

3. Chemistry Project to Prepare Rayon Threads From Filter Paper

Cellulose is nature's own giant molecule. It is the fibrous material that every plant from seaweed to the sequoia makes by baking glucose molecules in long chains; the chains are bound together in the fibers that give plants their shape and strength. Wood has now become the main source of cellulose. Since it contains only 40% to 50% cellulose, the substance must be extracted by 'pulping'. The logs are flaked, and then simmered in chemicals that dissolve the tarry lignin, resins and minerals. The remaining pulp, about 93% cellulose, is dried and rolled into sheets-raw material for paper, rayon and other products. It can be obtained in 2 ways: Viscose Process: Cellulose is soaked in 30% caustic soda solution for about 3 hrs. The alkali solution is removed and the product is treated with CSi. This gives cellulose xanthate, which is dissolved in NaOH solution to give viscous solution. This is filtered and forced through a spinneret into a dilute H2SO4 solution, both of which harden the gumlike thread into rayon fibers. The process of making viscose was discovered by C.F.Cross and EJ.Bevan in 1891. Cuprammonium Rayon: Cuprammonium rayon is obtained by dissolving pieces of filter paper in a deep blue solution containing tetra-ammine cupric hydroxide. The latter is obtained from a solution of copper sulphate. To it, NH)OH solution is added to precipitate cupric hydroxide, which is then dissolved in excess of NH/.

4. STERILIZATION OF WATER USING BLEACHING POWDER

1. A known mass of the given sample of bleaching powder is dissolved in water to prepare a solution of known concentration. This solution contains dissolved chlorine, liberated by the action of bleaching powder with water. CaOCl2+H20 I >> Ca(OH)2+Cl2 2. The amount of Chlorine present in the above solution is determined by treating a known volume of the above solution with excess of 10% potassium iodide solution, when equivalent amount of Iodine is liberated. The Iodine, thus liberated is then estimated by titrating it against a standard solution of Sodium thiosulphate, using starch solution as indicator. Cl2+2KI i > 2KCl+I2 I2+2Na2S2O3 i > Na2S4O6+2NaI A known Volume of one of the given samples of water is treated with a known volume of bleaching powder solution. The amount of residual chlorine is determined by adding excess potassium iodide solution and then titrating against standard sodium thiosulphate solution. From the readings in 2 and 3, the amount of chlorine and hence bleaching powder required for the disinfection of a given volume of the given sample of water can be calculated.

5. Bio diesel and Bio petrol also study extraction process of Bio diesal

Bio-diesel is an eco-friendly, alternative diesel fuel prepared from domestic renewable resources i.e. vegetable oils (edible or non- edible oil) and animal fats. These natural oils and fats are made up mainly of triglycerides. These triglycerides when rea w striking similarity to petroleum derived diesel and are called "Bio-diesel". As India is deficient in edible oils, non-edible oil may be material of choice for producing bio diesel . For this purpose Jatropha curcas considered as most potential source for it. Bio diesel is produced by transesterification of oil obtains from the plant. Jatropha Curcas has been identified for India as the most suitable Tree Borne Oilseed (TBO) for production of bio-diesel both in view of the non-edible oil available from it and its presence throughout the country. The capacity of Jatropha Curcas to rehabilitate degraded or dry lands, from which the poor mostly derive their sustenance, by improving land's water retention capacity, makes it additionally suitable for up-gradation of land resources. Presently, in some Indian villages, farmers are extracting oil from Jatropha and after settling and decanting it they are mixing the filtered oil with diesel fuel. Although, so far the farmers have not observed any damage to their machinery, yet this remains to be tested and PCRA is working on it. The fact remains that this oil needs to be converted to bio-diesel through a chemical reaction – trans-esterification. This reaction is relatively simple and does not require any exotic material. IOC (R&D) has been using a laboratory scale plant of 100 kg/day capacity for trans-esterification; designing of larger capacity plants is in the offing. These large plants are useful for centralized production of bio-diesel. Production of bio-diesel in smaller plants of capacity e.g. 5 to 20 kg/day may also be started at decentralized level.