Frequently asked Questions

3.1. What are the important techniques followed for odour measurement?

Odour measurement can be carried out by two methods. Sensory methods and Instrumental methods. Sensory measurements employ the human nose as the odour detector and human odour is directly experienced which is related to properties.

3.2. Describe the sensory methods.

Sensory methods are available to monitor odour both from source emissions and in the ambient air. These two diverse circumstances require different approaches for measuring odour. The sensation of odour has four properties related to threshold and tolerance. They are odour concentration, odour intensity, odour quality and hedonic tone. Thus sensory measurements techniques comprise of two categories. These are quantitative measurements which couple the nose with some instrumentation and parametric measurements in which the nose is used without any other device.

3.3. Describe instrumental methods.

In instrumental methods, olfactometer called the dilution instrument has been coupled with the sensory method to provide to the panel of human assessors. Later, in 1988, electronic sensing technologies have undergone development for the technicalities as well as for commercial applications. Electronic sensing equipment called e -nose or electronic - nose is capable of reproducing human senses using sensor arrays and pattern recognition systems.

3.4. Sensory methods looks to be realistic. Can it be justified.

Odours are mixture of light and small molecules that, coming in contact with various human sensory system, also at very low concentrations of inhaled air, are able to stimulate an anatomical response. The experienced perception is called odour. The human olfactory system is still regarded as the most important and effective analytical instrument for odour evaluation, the demand for objective methods still exist. Many a time, the comparison of subjective and objective methods of odour evaluation has been researched to arraive at a more confident, realistic picture of the odours and the compounds responsible for the sensing of odours. But still human nose can be most promising. The complexity of odour involves psychological and physiological response which perceives the odour. Sensory measurements employ the human nose as the odour detector and human odour is directly experienced which is related to properties. Sensory methods are available to monitor odour both from source emissions and in the ambient air. Therefore, human organ will be more effective in detection of odours, however, the constitutional differences differing from person to person has to be considered.

3.5. Which are the instrumental methods used for odour measurement?

Olfactometer is used many a time with the sensory methods.Gas chromatograpyolfactometer is used for quantifying the odorous compounds.GC-mass spectrometer is also used. In the recent years e-nose has come into force and is capable of reproducing human senses using sensor arrays and pattern recognition systems.

3.6. What is parametric measurement?

The second approach for odour evaluation by parametric sensory measurements has the advantage of being quick to obtain at relatively low cost, as no particular equipment is required. The subjective measurement of parameters of odour perception by the well trained panel. The parameters include odour character, odour intensity and hedonic tone.

3.7. What is hedonic tone?

Hedonic tone is the process of scaling odours on a scale ranging from extremely unpleasant via neutral up-to extremely pleasant. The method is followed by serving the different dilution sample through an olfactometer to the panelists. If the panelists detects an odour, the hedonic odour tone of the perceived concentration must be evaluated according to the category scale.

3.8.Can hedonic tone be used for quantitative measurement?

Hedonic tone can be semi quantitative, since the perceptions are given fixed scores. It is described as Extremely unpleasant -4, Very unpleasant -3, Fairly unpleasant -2, Unpleasant -1, Neither pleasant or unpleasant 0, Pleasant +1, Fairly pleasant +2, Very pleasant +3, Extremely pleasant +4. Moreover, it is important to note that perception of an odour may change from pleasant to unpleasant with increasing concentration, intensity, time, frequency and previous experience with a specific odour. All these factors are determining the response. Considering the scores , the average can be drawn, a declaration of the status can be given which serves as the semi quantitative measurement.

3.9. How does e- nose functions?

The electronic nose consists of head space sampling, sensor array and pattern recognition modules to generate signal pattern that are used for characterizing odours in terms of perception as a global fingerprint. The major parts of E-nose are a sample delivery system, a detection system and a computing system. The sample delivery system enables the generation of the headspace ie.volatile compounds of a sample. The system then injects this headspace into the detection system. The sample delivery system is essential to guarantee constant operating conditions. The detecting system consists of a sensor set, a reactive component of the instrument. When volatile compounds come in contact, the sensors react through the interfaced transducer electrical signal. A specific response is recorded. A specific response is recorded by the electronic interface transforming the signal into digital value. Recorded data are then computed based on statistical models. In most E-noses, each sensor is sensitive to all volatile molecules, but each in their specific way. However in bio-E-nose receptor proteins cloned from biological organisms eg. humans respond to specific odour molecules through binding. The more commonly used sensors are metal-oxide semiconductors devices. In recent years, other types of E-noses have been developed that utilize mass spectrometry or ultra gas chromatography as detection system. Several studies concerning the use of nanomaterials as gas sensor materials have been reported. The Computing System combines the responses of all of the sensors which represent the input data. This instrument performs global fingerprint analysis and provide results that can be easily interpreted.

3.10. What are clinical tests? where those can be adopted?

The clinical tests can evaluate the threshold of odour detection, identification and quantification. These tests include butanol threshold test, the university of Penssylvania smell identification test (UPSIT) and the sniffin stick test.

3.11. What is butanol threshold test?

The butanol threshold test involves a forced-choice test using an aqueous concentration of butyl alcohol in one sniff bottle and water in the other. The person is asked to identify the bottle containing the odourant, with each nostril tested separately. After each incorrect response, the concentration of butanol is increased by a factor of 3 until the person either achieves 5 correct responses or fails to correctly identifies the bottle with 4% butanol. The detection threshold is recorded as the concentration at which the person correctly identifies the butanol on five consecutive trials.

3.12. What is UPSIT?

The UPSIT involves 40 encapsulated odours in a scratch and sniff format, with 4 response alternatives accompanying each odour. The person takes the test alone, with instructions to identify, if not, atleast to guess the odour. The scores are compared against sex age related norms and the results are analysed. This test has excellent test-retest reliability.

3.13. Which is the advanced varied UPSIT test?

A varint of the UPSIT called cross cultural smell identification test (CC-SIT) can be given in 5 minutes. This test gives a quick measure of olfactory function.The12-item CC-SIT has been developed using input on the familiarity of odours in several countries including China, Colombia, France, Germany, Italy, Japan, Russia, and Sweden.The odourants chosen include banana, chocolate, cinnamon, gasoline, lemon, onion, paint thinner, pineapple, rose, soap, smoke and turpentine. The odour identification was most consistant.The test is an excellent alternative in clinical testing. It is rapid and reliable But the disadvantage is that its brevity limits its sensitivity in detecting the subtle changes in olfactory function.

3.14. What is sniff stick test?

The sniff stick test use a series of reusable pen-like odour dispensing devices and tests odour threshold by a single staircase method. The overall evaluation of olfactory function is done by odour discrimination with forced choice among 3 of 16 different common odourants. For research studies, olfactory-evoked response method is normally used

3.15. Where clinical tests can be adopted?

The clinical test approach is adopted for detecting the odour identification ability of the panelists can be followed. However, the clinical testing can be time consuming and difficult to perform precisely. The major goal of sensory testing is to assess the chemosensory property. In this direction, simplified and standardized commercial kits are available. These can provide a reliable measure of olfactory ability. These can also be well used for research studies.