



Laboratory Worksheet No. 2

Objective : Determination of group odour concentration estimate of the unknown sample by a Forced-choice Ascending Concentration Series Method

Introduction

The obtaining of odour thresholds requires the sensory responses of a selected group of individuals called panelists. These thresholds may be determined in order to note the effect of various added substances on the odour of a medium. They may also be determined in order to characterize and compare the odour sensitivity of individuals or groups.

It is recognized that precise threshold values for a given substance do not exist. The ability to detect a substance by odour is influenced by physiological factors and criteria used in producing a response by the panelist. The parameters of sample presentation to the panelist introduce further variations. Thus, the flowrate of sample presented to panelist has an influence on the delectability of an odour. However, a concentration range exists below which the odour of a substance will not be detectable under any practical circumstances, and above which individuals with a normal sense of smell would readily detect the presence of the substance.

Odour measurement is a basis for evaluation of potential nuisance. In the late 1970's, odour measurement was still mainly an academic pursuit. With the rapid increase of environmental awareness and the demand of a sound environment to live in, the measurement of odours has changed dramatically in its applications. Odour threshold measurements are now regularly used in planning procedures, as evidence in legal courts and as instrument for enforcing nuisance laws.

Procedure for student operator

1. Assign a number to each panelists, start from 1, then 2 and so on.
2. Install the sample into the sample drum.
3. Start WiNose by double click on the corresponding icon.
4. Login as “student” with password “student”.
5. Click on the “measure” icon.
6. Select appropriate number of panelists by adding “temp1”, “temp2”, etc.
7. Click on “start”.
8. Change begin setting to 14 and end setting to 5.
9. Click on “start” and wait for the beep sound to start.
10. When the test finished, make a copy of the result table for further calculations.

Procedure for student panelists

1. The sequence start with panelist no. 1.
2. When no. 1 hear a beep sound, the sequence starts.
3. The panelist should walk into the test room.
4. Type his/her corresponding panel number on the screen.
5. Smell the two ports and decide which port has the odourous substance.
6. Input the result onto the screen.
7. Answer the certainty question on the screen.
8. Operation finished.
9. Walk out the test room and ask the panelist with the successive number to begin.
10. The next panelist repeats steps 3 to 9.
11. Sequence complete until all the panelists finished their operations.

Calculations

In the session, panelists are asked to indicate both the position of the odour stimulus and if they are “certain”, “inkling” or “guessing” about their indication of position. The results are represented as the following coded system.

Result code	Choice result	Certainty
1	Wrong	Guess
2	Correct	Guess
3	Wrong	Inkling
4	Correct	Inkling
5	Wrong	Certain
6	Correct	Certain

For example :

Setting Dilution	5 128	6 256	7 512	8 1024	9 2048	10 4096	11 8192	12 16384	Z
temp1			6	<u>6</u>	4	2	1	1	1448
temp2	6	<u>6</u>	5	3	1	2	1	1	362
:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:
temp8				6	<u>6</u>	4	1	2	2896

$$\bar{Z} = 1961 \text{ ou/m}^3$$

where

$$Z_{\text{temp1}} = \sqrt{1024 \times 2048} = 1448 \text{ ou/m}^3, \quad \text{etc.}$$

and

$$\bar{Z} = \text{Geometric mean of } Z\text{'s} = \sqrt[8]{1448 \times 362 \times \dots \times 2896} \text{ ou/m}^3 = 1961 \text{ ou/m}^3$$

Questions

1. What is the definition of 1 ou/m³ ?
2. Calculate the individual and group concentration estimates of your classmates.
3. Can you compare the “forced-choice” method with the “yes/no” method ?

Appendix

Rules for odour panelist

1. Do not eat or smoke for one hour prior to the session.
2. Panelists should be in the odour laboratory waiting room 15 minutes before measurements begin.
3. Do not use perfumes, after shave lotions or any other fragrant essences before the session.
4. Do not attend a session if you have a cold, influenza or any other health problems which will affect your nose.
5. Eating, drinking or smoking is not permitted while a session is in progress, only water is allowed.
6. Panelists should not leave the waiting room during a session without the consent of the operator.
7. Panelists should not discuss the results or comment on their perceptions of the odour amount others during the session.