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# Time-Intensity Assessment of Perceived Indoor Air Quality

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**Summary:** Our senses give us instantaneous information on our environment. Time-intensity assessments can provide an instantaneous perception and detailed temporal profile. The objective of this paper is to discuss the feasibility of time-intensity assessments to describe perceived indoor air quality focusing firstly on the perception of odour intensity. Time-intensity data interpretation and inter-individual differences are discussed.

**Keywords:** time-intensity, odour, perceived air quality

## 1 Introduction

Our senses give us instantaneous information on our environment. Succession of varying states contributes to our perception of the spending time. This evolution may either come from stimulus transformation with time (e.g. decreasing concentration), physiological and cognitive aspects (e.g. olfactory adaptation and habituation) or movement of the assessor in a space. Perception evolution must be understood to better understand perceived air quality and in the future predict it. Even with constant stimulus, perception temporal information (i.e. perception kinetics, intensity duration at maximum perception, time to achieve maximum intensity, latency time, total perception time, total perception area...) is quite never recorded at all. Time-intensity assessments [1] can thus provide an instantaneous perception and detailed temporal profile that can be interpreted in different ways. They can be practically useful to record fugitive odours.

The objective of this paper is to discuss the feasibility of time-intensity assessments to describe perceived indoor air quality focusing firstly on the perception of odour intensity. Time-intensity data interpretation and inter-individual differences are discussed.

## 2 Methods

Time-intensity assessments are easy to conduct as they only need a high frequency data acquisition system (at least one record every second) to match perception instantaneity associated with an easy to use interface (potentiometer, lever, pedal, fingerspan...). In the present study, a portable linear potentiometer (6 cm long scaling from 0 to 10 V) was used in association with a pocket data acquisition system with a 10 Hz frequency (TAUPE-M, MIS France).

Panel training remains however difficult due to the need to concentrate from the beginning till the end of the sensation. But an acceptable intra-individual

repeatability was achieved. A solution of n-butanol diluted in water was used to calibrate each panelist before entering the assessed room.

## 3 Results

Time-intensity assessments of odour were performed in several indoor environments (example Fig. 1).

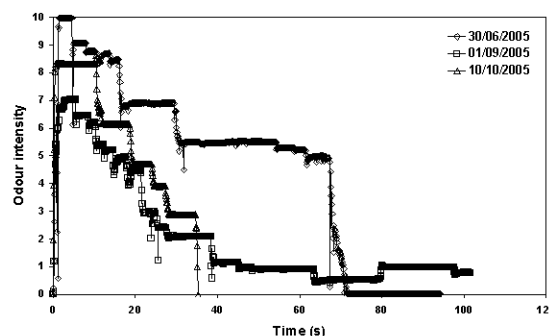


Fig. 1: Typical raw odour intensity pattern of one subject entering a storage room filled with chemical substances.

Perception kinetics depend mainly on the individual and on the assessed room. Other factors may also interfere: temperature, lighting conditions, air movement. Individual breath behaviour during assessment also acts on the shape of the perception profile.

Perception profile can be modelised to a trapezium shape, formed by several extracted parameters during the ascending phase (time to reach 5% and 90% of the maximum intensity) and the decreasing phase (time to reach 90% and 5% of the maximum intensity). These extracted parameters are useful to discriminate indoor environments (or odorous products) on intensity and temporal differences.

## References

- [1] M Cliff & H Heymann. 1993. Development and use of time-intensity methodology for sensory evaluation: a review, *Food Research Int.*, 26, 375-385.