

# JUDGING OF DAIRY PRODUCTS



**B. Tech. (Dairy Technology) ► DT-8 ► Resources ► Lesson 4. BASIC PRINCIPLES: SENSES AND SENSORY PERCEPTION**

*Module.2 Requirement of sensory evaluation and physiology of human senses*

## Lesson 4

### BASIC PRINCIPLES: SENSES AND SENSORY PERCEPTION

#### 4.1 Introduction

Human Senses play an important role in sensory evaluation of dairy Products. The main senses are sight (eyes), smell (nose), taste ( tongue), touch ( Skin) and sound (ear).

#### 4.2 Role of Various Senses in Judging of Dairy Products

##### 4.2.1 Sight

- Protection afforded by seal of pouch/bottle closures.
- Relatively low numerical rating on the scorecard.
- Attempt to correlate defects in visible items with flavour.
- Neatness & cleanliness of package & finish,
- Caution: Sense of Smell & Taste -not unduly influenced by vision.

##### 4.2.2 Smell

- It has most important role in judging.
- Greatly influence the quality of dairy products.
- Odor & taste, combined with feel in the mouth, make up the concept "flavour".
- Because of pleasing, satisfying and palatable flavor, dairy products are consumed - it has greatest numerical value on scorecards.

##### 4.2.3 Taste

- Companion sense with smell in evaluating flavour.

- Four fundamentals taste -Sweet, Sour, Salty and Bitter.
- With few exceptions, the product must be tasted.
- The role of taste is more complex, as above tasting it involves tactual & olfactory sensations.

#### 4.2.4 Touch

- It plays a part in scoring of the dairy products.
- Pressure between teeth determines the presence of undissolved salt or of crystallized lactose.
- Fingertip and thumb may be used to substantiate findings of organs of mouth.
- Fingers play important role in examining body and texture of butter and cheese.
- Ease and difficulty in chewing/rolling/dissolving the food is recorded by tongue, floor, roof of palate.

#### 4.2.5 Sound

- Used sometimes in the judging of the dairy products.
- Relative size & distribution of the 'holes' in Swiss by gently tapping the outside of cheese

### 4.3 Fundamentals of Sensory Physiology

There are about 22 human Senses have been recognized. Five senses for perceiving stimuli.

Other includes temperature, pain, hunger, thirst, fatigue, sex, and equilibrium. Taste, smell & common chemical sense/pain are chemical stimuli.

**Table 4.1: Sensory reactions with corresponding stimuli and receptors**

Sensory Modality	Type of Stimulus	Receptors	Experience
<b><u>Distance Receptors</u></b>			
Visual	Radiant energy 10 <sup>-4</sup> to 10 <sup>-5</sup> cm wavelength	Rods and cones of Retina	Hue Brightness
Auditory	Mechanical vibrations in frequency	Hair cells of organ of corti	Pitch, Loudness
<b><u>Chemical Receptors</u></b>			
Gustatory	Chemicals in solution	Taste buds	Taste
Olfactory	Chemicals in gaseous solution	Olfactory cells in upper nose	Odours
<b><u>Somesthetic Receptors</u></b>			
Cutaneous	Temperature changes	Cells in skin	Warmth, Cold
	Mechanical Pressure	Cells in skin	Contact (light pressure)
	Extreme energy of any class	Free Nerve endings	Pain
Kinesthetic	Mechanical Pressure	Cells in tendons muscles & Joints	Active movement weight, deep pressure
Vestibular (static)	Movement of head	Cells in semicircular canals and vestibules	Equilibrium
Organic	Chemical & mechanical action	Cells in viscera	Pressure, hunger, nausea

(Source: Amerine et al. (1965))

#### 4.4 Sensory Receptors

These are the detectors that inform us of physical and chemical changes in our environment.

Usually sensitive to single stimulus but may react to other stimuli. Eye, ear, skin, nose and tongue are organs.

Each one of them has sensory receptor devices responding to particular range of environmental influences (stimuli) and transmits corresponding information to brain via the central nervous system.

Specific sites in brain are stimulated by the sensory input.

Upto certain extent, response of sensory cells is proportional to intensity of stimulus. Objectively, the response of the nerve is a function of the frequency of the electrical discharge of the nerve.

Nearly all the receptors vary in their sensitivity to stimuli.

### **Modality**

A group of similar sensory impressions, mediated by a given organ, is referred to as a "sense" more precisely "modality"

### **Quality**

It refers to the further distinction of the sensory impression within each modality E.g. sweet, sour etc. is taste qualities.

### **Stimuli**

Factors from the environment of that elicits sensory impressions/perceptions of a certain quality are called stimuli. It reacts with sensory receptors.

## **4.5 Sensory Impression**

It is an experience. The perceived odor "goaty", the taste "salty", "gritty" mouthfeel, etc. would be the examples of sensory impression.

### **Sensation**

Sensory impressions are very seldom received in partial/total isolation; a combination of such impression is called "sensation" (subjective)

## **4.6 The Chain of Perception**

When sensory analyst study the relationship between a given physical stimulus and the subjects' response, the outcome is often regarded as a one step process. in fact there are at least three step process as shown in Fig.4.1. the stimulus hits the sense organ and is converted to a nerve signal which travels to brain. The brain then interprets the incoming sensation into perceptions. finally the response is formulated based on the subjects' perceptions. **Fig. 4.1** Sequence of Perception.

A pure sensation is accompanied by an interpretation, with reference to experience of an individual, and the resultant overall impression is called "perception". We express a perception when we say, "This milk is too sweet" (subjective)

It has four basic dimensions:

Time, Space, Quality, Intensity (quantity).

#### 4.7 Objective & Subjective Sensory Physiology

The response of nervous system to a stimulus is "objective".

The analysis of sensation by the subject in the formation of statement is "subjective".

The relationship between a stimulus and its perception by a 'sensory component' of the central nervous system can be principally described as a physical &/or chemical process within humans, but it is eventually manifested as a subjective statement.

The area of natural science, dealing with subjective sensory physiology, is often termed as "Psychophysics".

One of its major effort is to measure more effectively and accurately the variety & intensity of sensations.

Last modified: Wednesday, 19 December 2012, 03:50 PM

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DT-8