



# SCOVILLE ORGANOLEPTIC PUNGENCY TESTING METHOD-*HIBISCUS ROSASINENENSIS*

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## Abstract:

Organoletic testing method is helpful to determine various types of odour using five senses and analyse sensory characterisation of sample such as food and its supplements, aqua or crude drug. Scoville testing method is helpful to determine pungency odour of sample using heat as a component. This subjective type assessment was analysed to measure physical, cognition and psychosocial dimensions and compared with four different types of organoleptic testing method. This method is utilised to overcome difficulty arising from Non-volatile and indistinct type of plant origin as well as fixed oil and fats. Our study was targeted to identify thermoregulation, inflammation, Neuro protection, Gastro intestinal motility and release of inflammatory mediators. Scoville testing method -Bio enzyme sample is utilised in halidosis treatment, breast cancer treatment, anti -plague, anti oxidant, obesity assessment comparing with vulnerability factor such as physical, economic, social and attitudinal vulnerability comprises of emotional and literal.

**Key words:** Bio enzyme, Scoville organoleptic test, Vulnerability, pungent odour assessment, breast cancer, obesity.

## Introduction:

Sensory fatigue, Cinderella of affective syndrome is kind of distressing neurological conditions (Annapoorna Kuppaswamy, 2022). Prediction towards various pathological fatigue model assessment could produce knowledge about inflammation setting into motion a cascade of molecular and cellular events in brain and periphery, effects of inflammation on dopaminergic and glutamate transport systems. The sensory attenuation model of fatigue (Chaudhuri A et al, 2004, Penner IK et al, 2017, Hewlett S, et al, 2011) the metacognitive dyshomeostasis and fatigue and inhibitory sensitization model of fatigue could express relating concept in between sensory attenuation with motor effort perception, visual effort perception and auditory perception. On the basis of sensory attenuation model could result in core body temperature regulation with achievement of high perceived effort of sensory fatigue via increases metabolic demand resulting from peripheral and central alteration.

Sensory adaptation and sensory fatigue occurs in human being whose neural response was drop down due to desensitization process. But slight difference occurs in between adaptation and fatigue in respective sensory threshold. Higher sensory threshold was achieved in adaptation (Barry Wark ,2007,Victor JD et al,2006) due to repetitive stimulus whereas lower sensory threshold was achieved in fatigue due to overwhelmed stimulus. Finally sensory adaptation and fatigue were analysed using organoleptic test using odour as main component in psychosocial complications. Odour can be analysed using different factorial method like a) Scoville organoleptic test (Twilight Greenaway,2013,Collins MD et al,1995) using heat b) High performance liquid chromatography using content quantification (Al Othman et al,2011)c) European odour unit method using concentration (CEN EN 13725:2003,Jiang J et al, 2006) d) weber-fechner law method using odour intensity e) Hedonic tone assessment using variation in concentration,intensity,time,frequency f) FIDOL method using character as well as descriptive evaluation of odour (Spengler, F.i.d.o.l,2021,MFE.govt,2012,Spengler et al,1926) Bio -enzymatic sample preparation odour -Hibiscus leaves were analysed by Scoville organoleptic test belongs to subjective assessment in which exact weight was extracted heat components in alcohol and dilute in sugar water. Heat units was detected using five trained tasters depending on taste palate and number of Mouth heat receptors as well as rating of heat level using multiples of 100 SHU referred as Scoville Heating units. Higher dilution is main key to determine pungency of substance and perceptive test on tongue.

### Methodology:

**Sample preparation:** Samples were prepared using following composition Leaves (180 grams), Jaggery (60 g) /Karupatti (60 grams), yeast 500 mg and water 600 mL represented in Table :1.

Five different samples were prepared on the basis of sequence and Non sequence arrangement in ratio proportion calculated as 1:3:10:15 (Abbas Al-mulla,2017,Desai SK et al,2013, Awang NA et al,2012,Begum Z et al,2015). 450 sampling data for five different category were evaluated by odour -subjective assessment using scoville organoleptic test 1912 on evaluation of ninety days (90 days). The samples were evaluated as pungent odour on 6 th day evaluation among four category samples named as FAAB-I,FAAB-II,FAAB-III and FAAB-IV. FAAB V samples were evaluated as Decay, acrid odour on 6 th day evaluation (Vengaiah pc et al,2013,Singh A et al,2015,Javad sharifi Rad et al,2023).

Table 1: Composition of bio-enzyme preparation

S.N O	FORMU LA	LEAVE S IN Grams	JAGGE RY IN Grams	PALM JAGGE RY Grams	WATE R	YEAST Grams	CONTAINE R CAPACITY (I litre)
1.	FAAB-I	180 (NS)	60 (NS)	-	600 ml	-	Utilised
2.	FAAB-II	180 (S)	60 (S)	-	600 ml	-	Utilised
3.	FAAB-III	180 (NS)	-	60 (NS)	600 ml	-	Utilised
4.	FAAB-IV	180 (S)	-	60 (S)	600 ml	-	Utilised
5.	FAAB-V	180 (NS)	-	-	600 ml	500	Utilised

Note : All samples were prepared by ratio based project (1:3:10:15).

Stands for sequence arrangement , NS- stands for Non-sequence arrangement.

### In-process development:

The samples were confirmed as pungent odour on week I ,Week 4, week 8 ,week 12 & 13 evaluation among four category samples named as FAAB-I,FAAB-II,FAAB-III and FAAB-IV. FAAB V samples were confirmed as Decay, acrid odour on week-1, Week 4, 8 ,week 12 & 13 evaluation through noxious stimulus by five different human subjects (Mercy JP et al,2022,Vellard M,2003,Oodley JM,2008,Adrio JL et al,2014,Varun Dhavale et al,2020,Anshal Kumar et al,2020).



Fig 1: Sampling Week I



Fig 3: Sampling week VIII



Fig 2: Sampling week IV



Fig 4: Sampling week 90 days

**Process development:**

Step:1: One gram filtered sample from each category (FAAB I To FAAB V) were taken from 90<sup>th</sup> day and diluted in 50 ml of ethyl alcohol in each category sample. Allow to stand for 24 hours and isolate DNA of plant.

Step:2: 1000mL of 5% Sugar solution was prepared using distilled water.

Step: 3: One mL sample was pipette out from step 1 and mix up with 150 mL of 5% sugar solution from step 2.

Step:4: Identify 7500 SHU fermented alcoholic sugar-based preparation odour as barley perceptual sensation of pungency and characterise as moderately pungent using scoville pungent rating scale.

Step:5: SHU rating is verified and mentioned in Table No.2 using scoville pungent rating scale as follows (Scoville WL,1912):

Table 2: Organoleptic character Evaluation of Bio-enzyme method

S.NO	BIO-ENZYME SAMPLE	SHU -HEAT COMPONENTS	ORGANOLEPTIC CHARACTER
1.	FAAB I	>80000	Very high pungent
2.	FAAB II	>80000	Very high pungent
3.	FAAB III	>80000	Very high pungent
4.	FAAB IV	>80000	Very high pungent
5.	FAAB V	>80000	Very high pungent
6.	FAAB I #	7500	Moderately pungent
7.	FAAB II#	7500	Moderately pungent
8.	FAAB III#	7500	Moderately pungent
9.	FAAB IV#	7500	Moderately pungent

Note: SHU units is measured using rating scale range mentioned as:

0-700 SHU: Non -Pungent,700-3000 SHU: Mild Pungent,3000-25000 SHU: Moderately Pungent,25000-70000 SHU: Highly pungent,>80000 SHU:Very high pungent.

# sign indicates higher dilution preparation using ethyl alcohol,sugar and distilled water.

### Process checking:

Scoville method assessment could report as moderately pungent Hibiscus in sugar based alcoholic condition(Peter KV,2012,Tainter et al,2001,Barry-Jester et al, 2014,Guzmán I et al,2017,Stoica R et al,2016).In this method,separate fats insoluble in alcohol which may vary from 5 to 50 % and weak pungent stated as 5%.After that followed by swallowing 5 mL sample tend to give absence of pungency in throat and roof of mouth.These are evaluated by cycling other sensory taste such as sweet,salty,bitter and sour using food supplements followed by swallowing Hibiscus sugar alcoholic substance in every 10 days once. Repeat in five times and confirmed as moderately pungent and shown absence of pungency at throat,papillae,fungiform as well as front edge of tongue comprises of 10000 taste buds.

This test method was compared with Non perceptive analytical method -Non aqueous titration method.A)Mix up 10 ml of filtered sample with 25 ml of ethanol , 25 ml of glacial acetic acid , 15 ml of mercuric acetate solution and 5% crystal violet 2-3 drops .Then titrate against 0.1M perchloric acid.violet colour was changed into blue colour.

B) Mix up 10 ml of filtered sample with 25 ml of glacial acetic acid, and 5% crystal violet 2-3 drops.Then titrate against 0.1M perchloric acid. Violet colour was changed into emerald green colour.

C) As per Hedonic tone assessment ,Test A -blue colour intensity was confirmed as neither pleasant or unpleasant having value as Zero. Test B -emerald green colour intensity was confirmed as unpleasant having Negative value -1. Pasi green colour shown in alcoholic condition was confirmed as pleasant value having positive value +1.

### Result &Discussion:

Pungent odour was confirmed comparatively using avacado sampling reference review data (Dreher ML et al,2013).Due to activation of exogenous compounds presented in Hibiscus named as stigmasterol,carotenoids and protocatechic acid ,it tend to cause perception of heat and detect in multiple of SHU via stimulation of transient receptor potential cation channel subfamily V number 1.Due to presence of double bond at 22 carbon stigmasterol could provide inhibitory action of apoptosis cancer cells via activation of caspase enzyme. Pungency character was confirmed in steroidal saponin stigmasterol and phenolic compounds protocatechic acid. Higher dilution proportion of Bio-enzyme, sugar and alcohol in odour testing could report to involve nociceptive process.7500 SHU units of hibiscus leaves were reported as moderately pungent. As per relating concept, this method was producing noxious heat in range of 3000-25000 SHU whereas providing analgesic effect via release of inflammatory mediators as well as thermoregulation.

Compared with Hedonic tone assessment Bio enzyme samples could show variation in concentration, intensity, time and perception rate and would give report as pleasant from unpleasant smell at 57.5 mg/mL (57500 µg/mL) concentration represented in Table.3.The reason too add up alcohol in odour checking was to separate fat with decrement of neuronal response (intensity colour variation and DNA isolation) and reach to sensory fatigue in mapping concept with lower sensory threshold in response high Gastro intestinal motility and indigestion process. 90 days bioactive samples was confirmed as highly pungent in range of >80000 without separation of fat and exhibit decrement of neuronal response. This effect could attain sensory adaptation in mapping concept with higher sensory threshold. These characterisations of samples could give impact towards neuroprotection function in response towards optimum gastro intestinal motility and promotes digestion process.

Compared with Dynamic olfactometry using European unit EN 13725:2003. Number of dilutions required in order to bring an odourous sample to its odour detection threshold concentration.Bio enzyme samples were confirmed as very weak (1) represented in Table No.4. Compared with webner -fechner law using vulnerability factor,Bio enzymatic sample (FAAB-1 to FAAB-IV) were confirmed as more favourable and FAAB V was confirmed as more dangerous reprinted in Table No:5.

Table 3: Comparative chart organoleptic evaluation odour intensity

S.No	Bio enzyme sample	Webner-pechner law		Perceived Hedonic Tone	
1.	FAAB I	Very strong	5	unpleasant	-3
2.	FAAB II	Very strong	5	unpleasant	-3
3.	FAAB III	Very strong	5	unpleasant	-3
4.	FAAB IV	Very strong	5	unpleasant	-3
5.	FAAB V	Intolerance	6	Very unpleasant	-4
6.	FAAB #	Very weak	1	pleasant	+4
7.	FAAB #	Distinct	3	Mild unpleasant	-1

Table 4: Comparative chart organoleptic evaluation odour threshold

S.No	Bio enzyme sample	European Unit		Hedonic Tone	
1.	FAAB I	weak	2	unpleasant	-1
2.	FAAB II	weak	2	unpleasant	-1
3.	FAAB III	weak	2	unpleasant	-1
4.	FAAB IV	weak	2	unpleasant	-1
5.	FAAB V	weak	2	unpleasant	-1
6.	FAAB #	Very weak	1	pleasant	+1
7.	FAAB #	Very weak	1	pleasant	+1

Table 5: Comparative chart organoleptic evaluation scale indicator value

S.No	Bio enzyme sample	Danger & threat	vulnerability	Lack of resilience	Integral risk indicator
1.	FAAB I	1.54-2.71	1.83-3.20	3.32-4.95	2.3-3.25
2.	FAAB II	1.54-2.71	1.83-3.20	3.32-4.95	2.3-3.25
3.	FAAB III	1.54-2.71	1.83-3.20	3.32-4.95	2.3-3.25
4.	FAAB IV	1.54-2.71	1.83-3.20	3.32-4.95	2.3-3.25
5.	FAAB V	4.38-10.00	5.06-10.00	6.73-10.00	4.64-10.00
6.	FAAB #	0-1.54	0-1.83	0-3.32	0-2.3
7.	FAAB #	0-1.54	0-1.83	0-3.32	0-2.3

### Summary and conclusion:

Sensory adaption and sensory fatigue were analysed using 90 days analytical sample among five different categories of 450 sampling data. Moderate pungent and weak perception odour 7500 SHU as per heat assessment. Very highly pungent >80000 SHU as per dense characterisation using FIDOL method, 57500 SHU was confirmed as highly pungent using in variation of concentration. Pasi green colour intensity was confirmed peak maximum in range of 520-580 nm using colour wheel (chakra) using webner fechner law method. Finally, 7500 SHU samples were confirmed as barley perceptual sensory odour among testing over five different taste evaluations. Due to stimulation of analgesic effect of TRPV1 and oral response category stimulation of TRPM5 in reduction of fat preference. This kind of sample preparation was helpful for obesity person as well as diabetic patients.

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### Authors' Contributions:

Sengamalam Ravindran: Data curation, data analysis, drafting, writing and formatting.

Ravindran Muthukumarasamy

Conceptualization, draft correction and editing, and suggestions for improvements.

**Conflict of interests:**

The authors declared no conflict of interests.

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