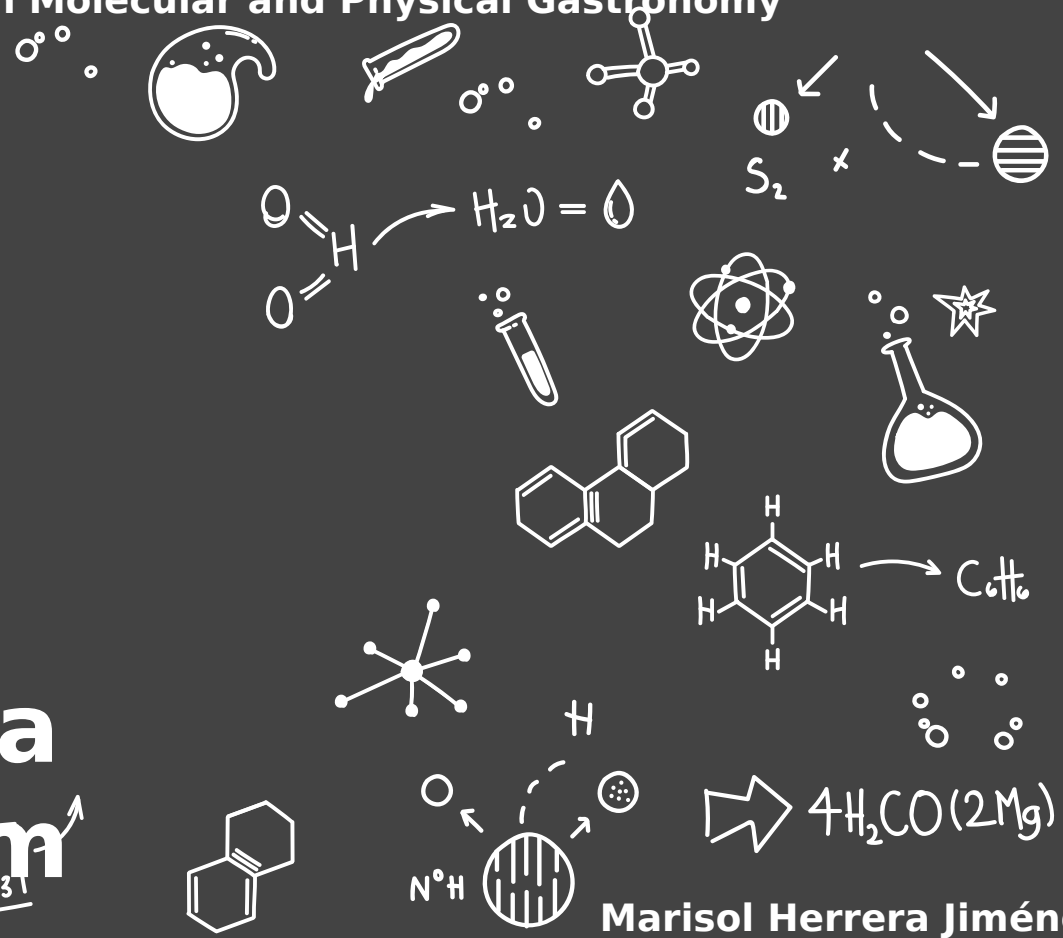
12 th. International Workshop on Molecular and Physical Gastronomy

Chemical interactions between odorant compounds and a meat emulsion as a model system



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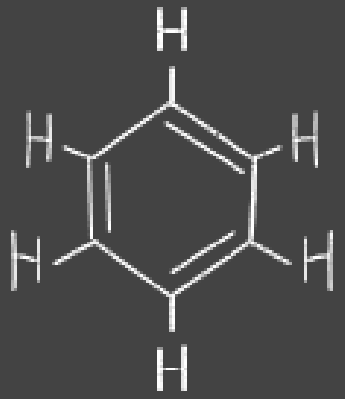
Introduction



Food Emulsion/ Meat Emulsion/ Oil/water.

Odour compounds / Aroma Food.

Odour Release

Mass Tranfer

Thermodynamic Factor

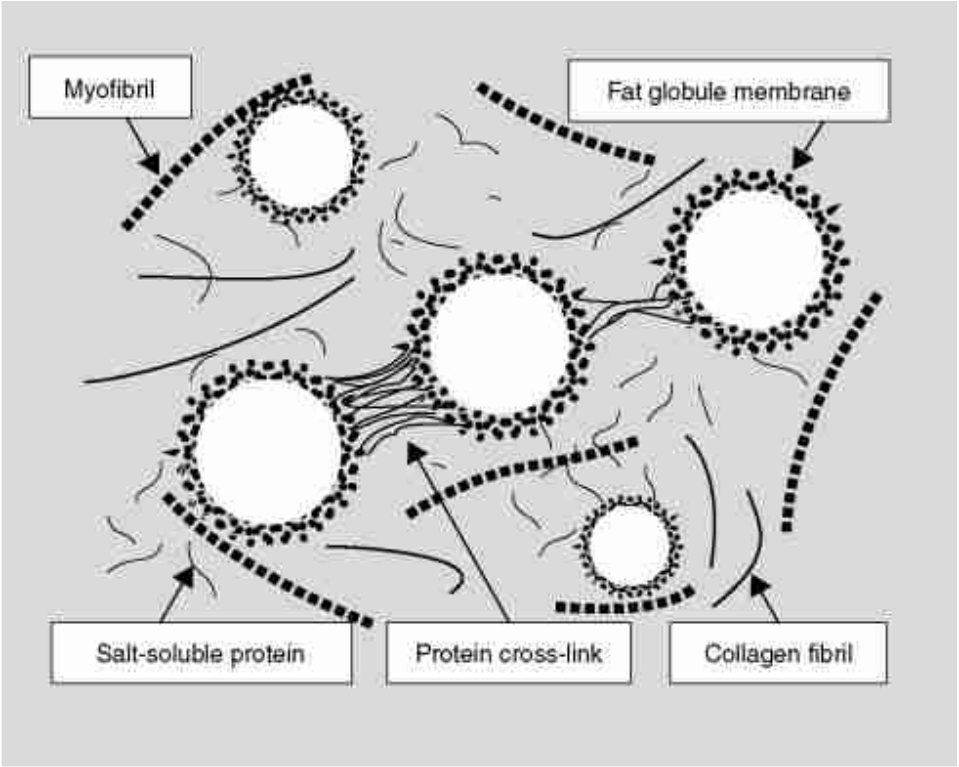
Model System studied.

Meat EMulsion

Disperse Phase (oil)

Interphases

Types of Emulsifiers

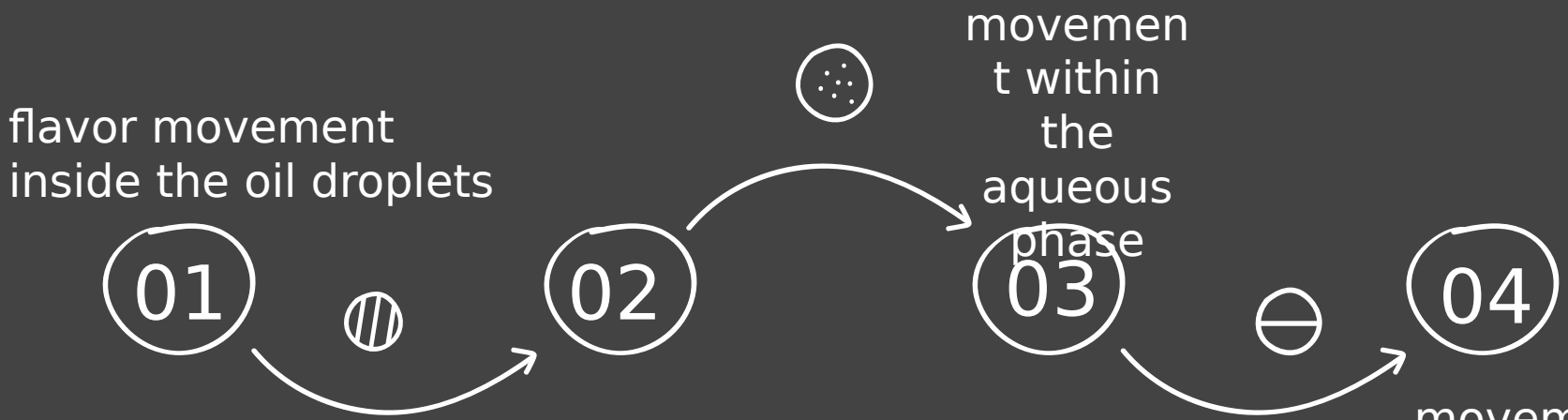


Continuous Phase (wáter)

Oil Dropets size and distribution

Other factors

Odour Release



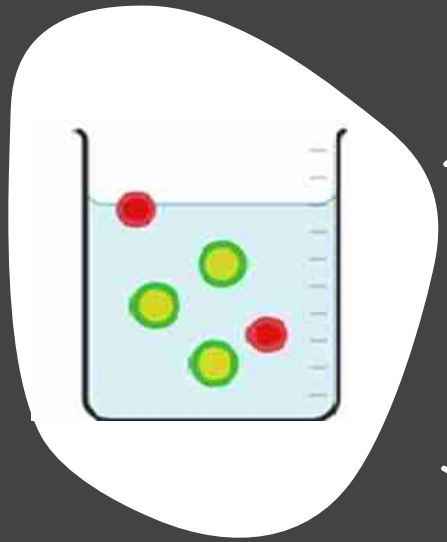
Emulsion Formulation and characterization.

	$D_{3,2}$ (μm)	η_{app} (Pa s)	EC ($mL_{oil}/g_{protein}$)	Fraction volume (ϕ_{dp})
Fixed variables: 25% canola oil, 35% protein extract, Γ = 0.6				
pH				
4.5	37.65[a]	6.21[a]	6.329[a]	0.2692[a]
5.5	37.39[a]	9.31[a]	7.338[a]	0.3067[b]
6.5	6.34[b]	11.25[b]	8.016[b]	0.4311[c]
7.5	3.43[c]	21.20[c]	8.581[c]	0.7713[d]
Fixed variables: 25% canola oil, pH 7.5, Γ = 0.6 % protein extract				
20	39.56[a]	5.05[a]	8.89[a]	0.0664[a]
25	32.37[b]	13.12[b]	10.94[a]	0.4419[b]
30	3.53[c]	15.70[b]	11.15[a]	0.6689[c]
35	3.49[c]	21.23[c]	11.74[b]	0.7713[d]

[a,b,c,d]Different letters indicate significant differences (α = 0.05).

Emulsion mean particle diameter (D3,2), apparent viscosity (ηapp), emulsifying capacity (EC) and fraction volume of the disperse phase (φdp), varying pH and protein extract concentration

Model system studied.



01 → Continuous phase → **35% myofibrillar protein extract, 0.1 M phosphate buffer and 0.01% sucrose, pH 7.5, Γ = 0.6**

02 → Dispersed Phase → canola oil

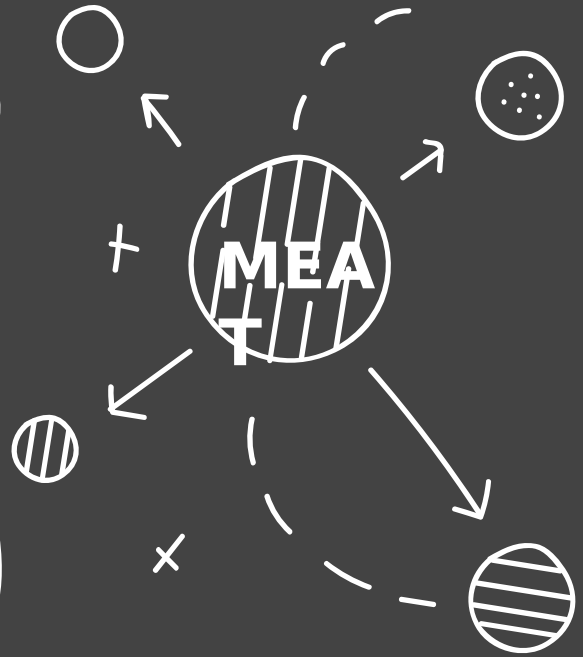
Volatiles compounds

A

Glycation

B

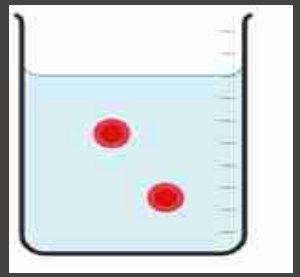
Lipid Oxidation



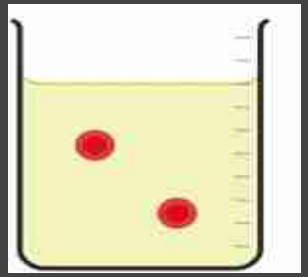
hexanal, octanal and nonanal

2-ethyl-3,5-dimetyl pyrazine and 2-methyl pyrazine

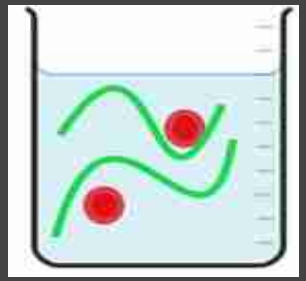
voltiles compounds were added to the following systems:



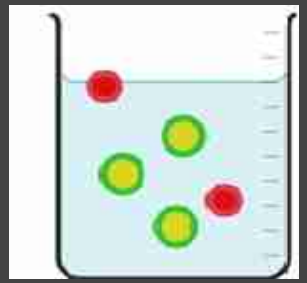
phosphate buffer 0.1 M



canola oil.

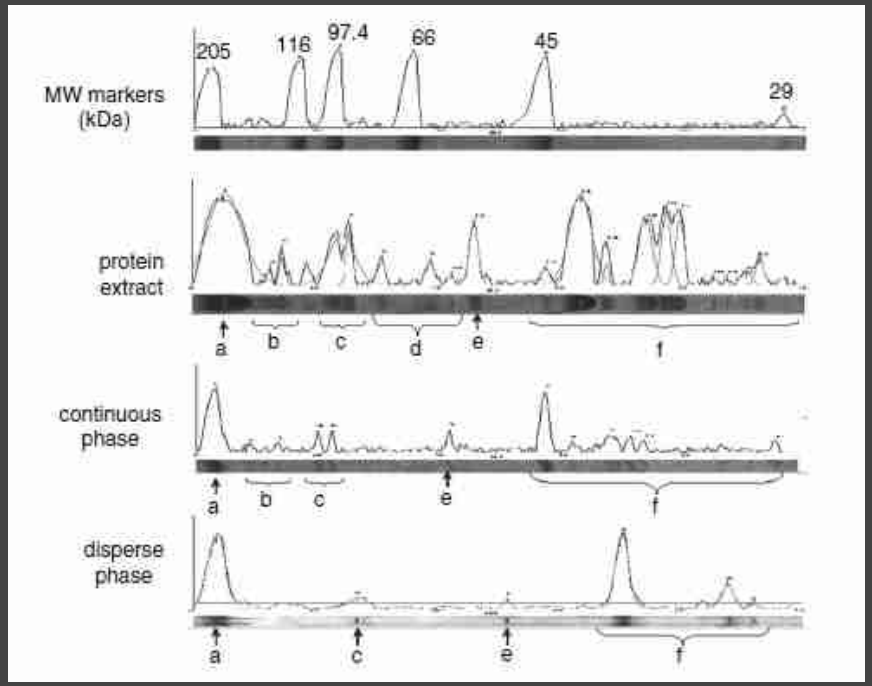


Phosphate buffer 0.1 M + miofibrillar protein



model meat emulsion

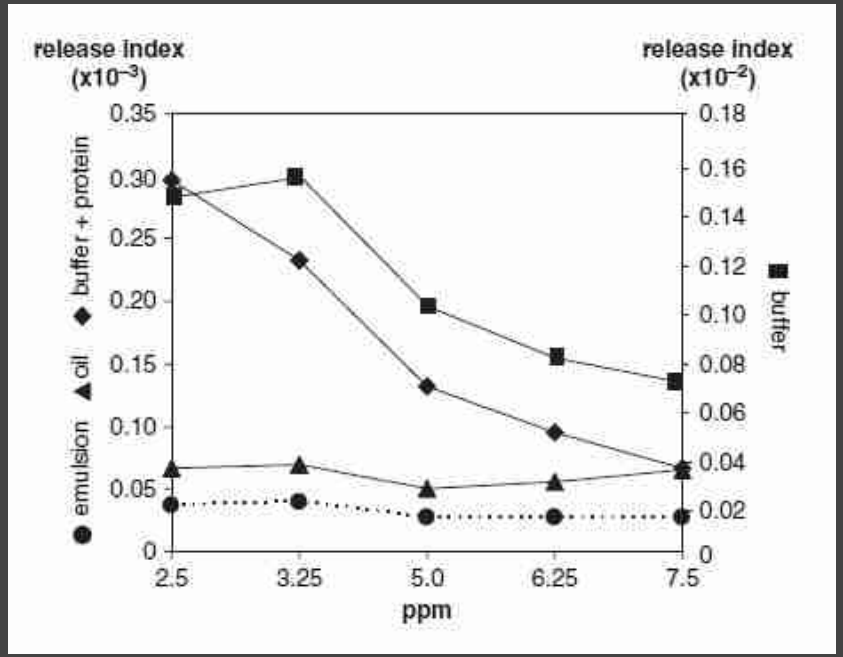
SDS-PAGE densitograms of proteins



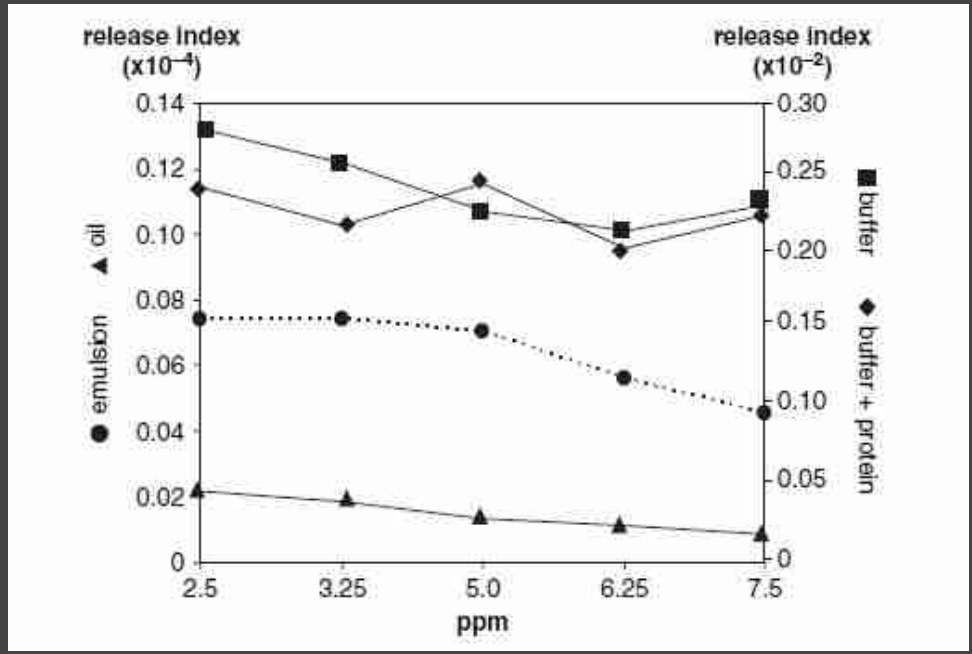
SDS-PAGE densitograms of proteins in the extract, the continuous and the disperse phases. a) myosin(<200 kDa); b) 120 to 100 kDa; c) 100 to 80 kDa; (d) intermediate or regulatory proteins; e) 60 to 50 kDa; and f)degradation products (<45 kDa).

Release Index

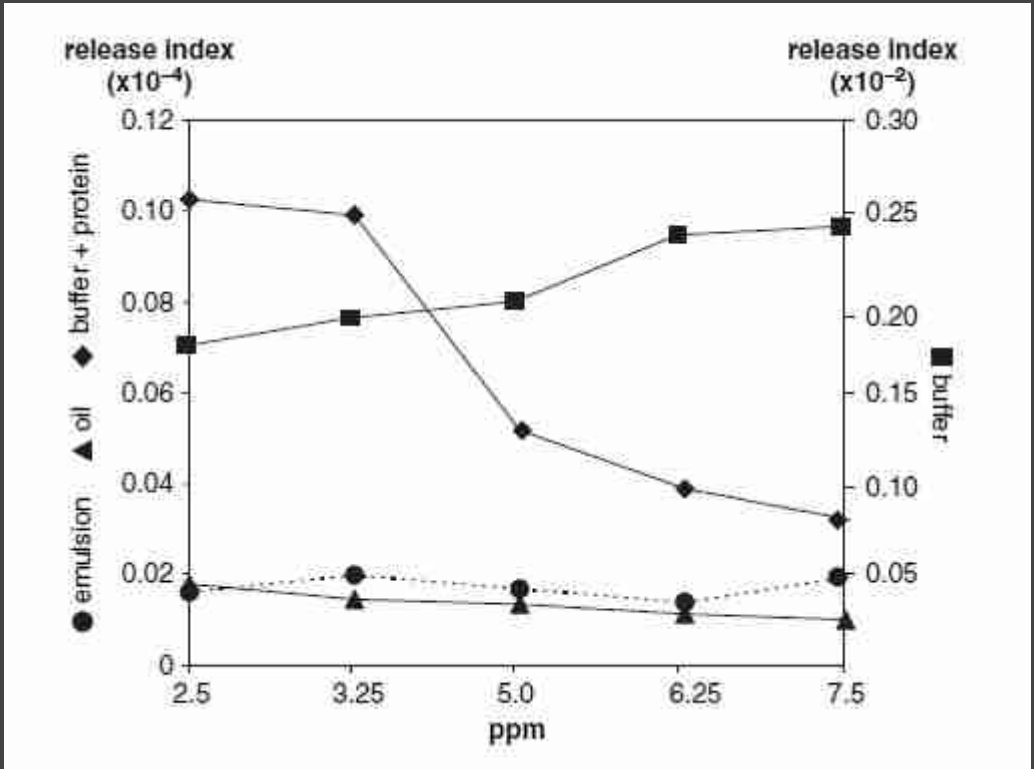
hexanal



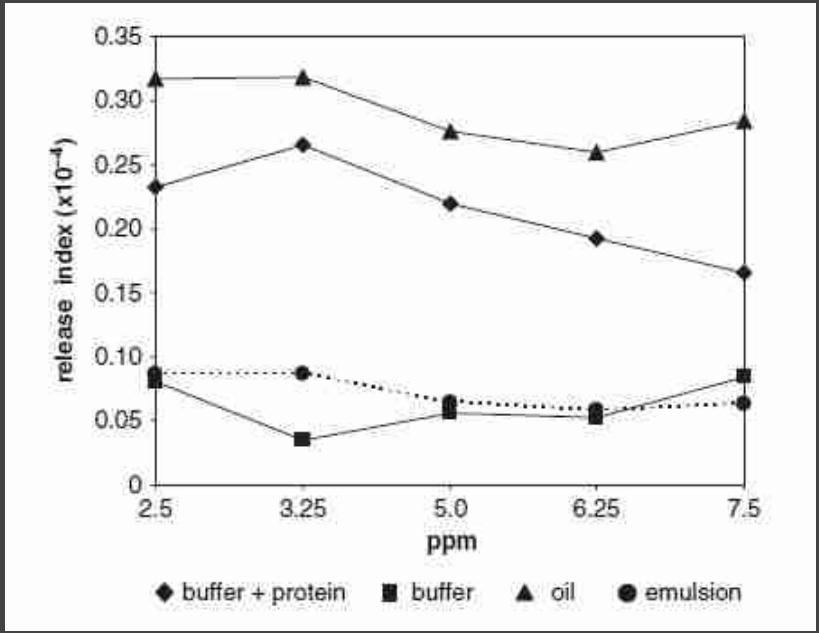
octanal



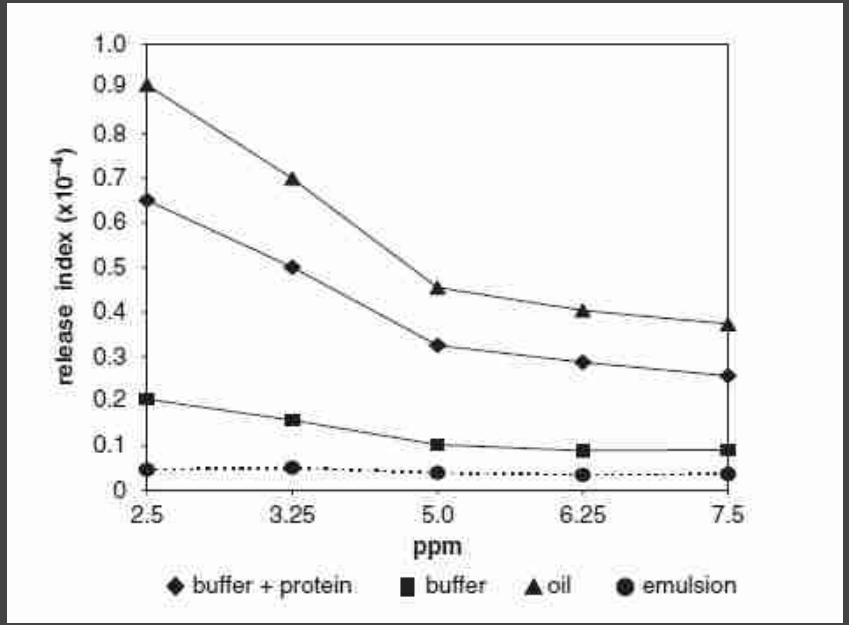
Release Index nonanal



Release Index



2-methyl pyrazine



2-ethyl-3,5-dimetyl pyrazine

Conclusions

- **Pyrazines mainly contributed to aroma in lipid systems and in protein solutions but not in emulsions and non protein aqueous systems.**
- **Hexanal, octanal, and nonanal were minor aroma contributors in lipid media,**
- **Whereas hexanal and nonanal were released in small amount from protein emulsions.**
- **Octanal can be considered of an important aroma contributor in emulsions;**
- **The three aldehydes showed a high release from aqueous systems, with and without protein**

Thank you for your time.