



Formulating with new, easy to handle taurate technologies

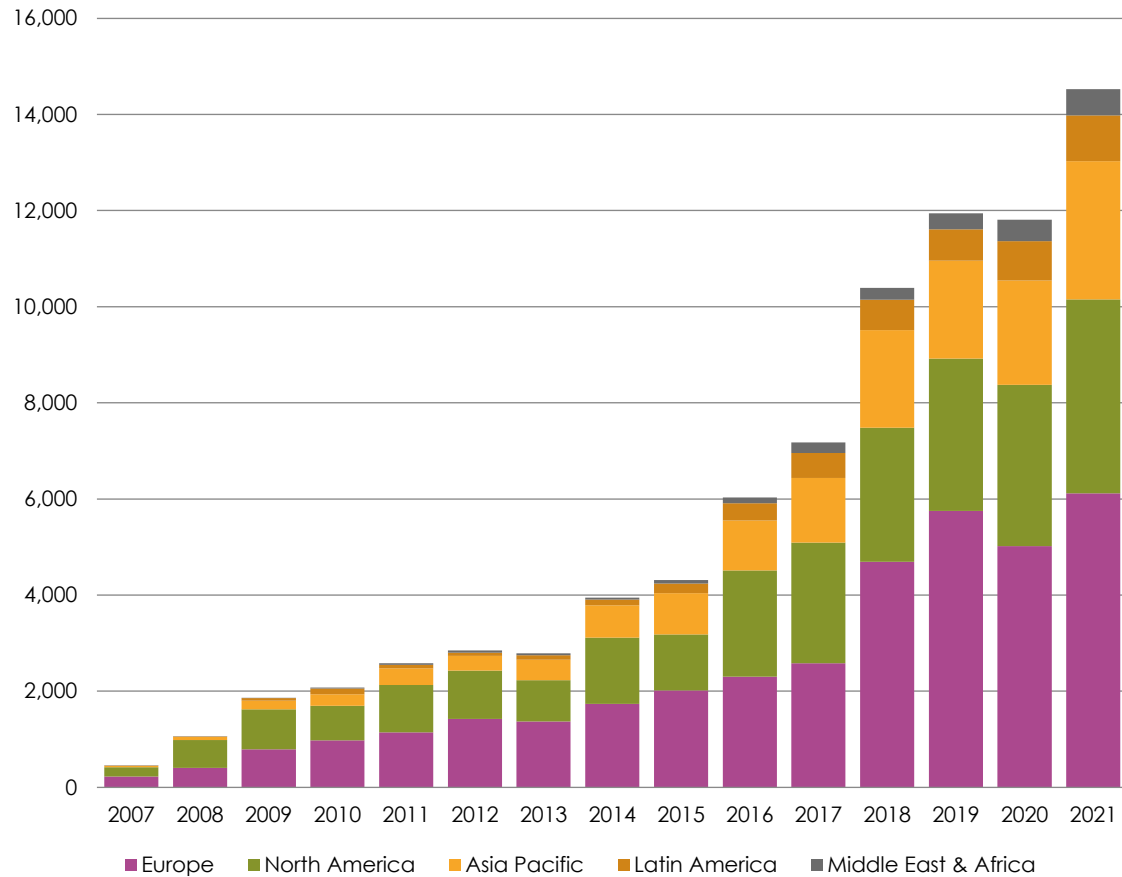
RSC Formulation Science and Technology Group
Sustainable Innovation in Personal Care

Russell Cox

history of our sulfate-free expertise



continuous rise: sulfate-free



in the UK

Top UK sulfate-free brands

- Tropic
- Ouai
- Friendly Soap
- Dove
- Faith in Nature
- Child's Farm

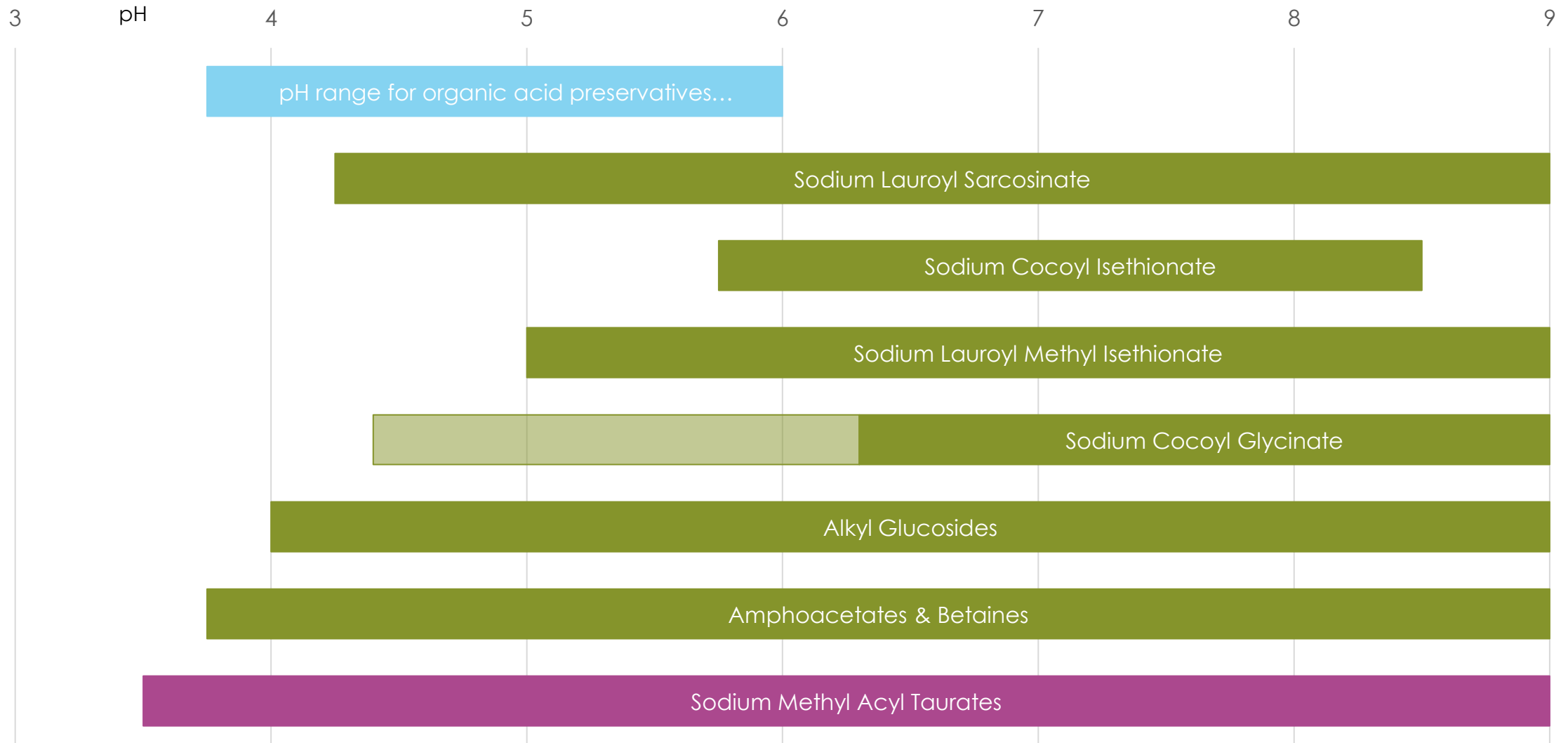
17k+ products have been launched since 2007 that use the claim 'sulfate-free'

UK sulfate-free launches doubled from 2017 to 2018

Challenges of going Sulfate Free

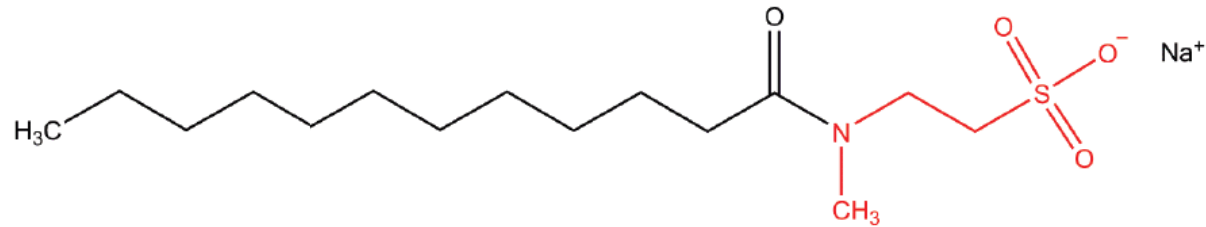
- **Cost** – sulfate-free surfactants and thus formulations of them are invariably more expensive versus Sulfate ones
- **Solids/actives levels** – can be much higher in sulfate-free surfactant systems since higher levels are needed for foam volume, etc
- **Thickening** – Sulfate-free surfactants can be difficult to thicken with salt – need co-surfactants or rheology modifiers
- **Performance** – Often the need for acceptance of deficiencies versus Sulfates. Formulators often compromise on performance to achieve sulfate-free systems

Recommended formulating pH ranges for Innospec Surfactants



Taurate Surfactants

- The most common taurate surfactants in the industry are alkyl acyl taurates, such as sodium methyl cocoyl taurate



Sodium methyl cocoyl taurate – an alkyl taurate amide
(C12 shown)

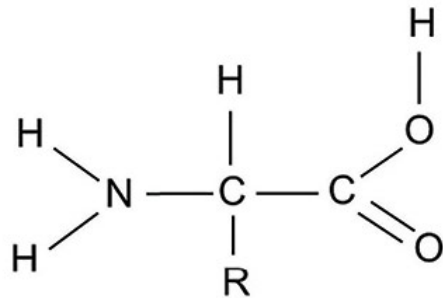
- The naming of methyl acyl taurate surfactants is dependent on carbon chain composition

Understanding Taurates

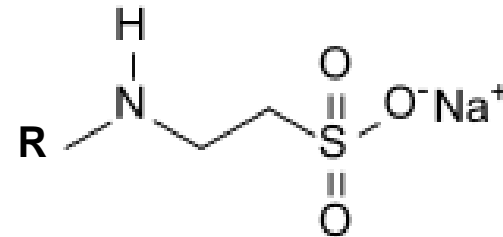
Taurates are grouped with amino acid surfactants



In the strictest sense, taurates do not belong to the amino acid group, however, they have similar properties and taurine is an amino-sulfonic acid.



Basic amino acid structure



Taurate salts

Sodium taurate R = H

Sodium n-methyl taurate R = CH₃

Sodium Methyl Cocoyl Taurate

- Typical properties of 30% active form

Appearance, 25°C	White to off-white paste
Appearance, 50°C	Clear, viscous liquid
Odor	Mild, fatty acid
Anionic Activity, %	30.0 – 31.5
Total Solids, %	38 – 43
Sodium Chloride, %	4.0 – 7.5
Free fatty acid	3.0 max
pH, 10% solution	7.5 – 8.5

- Features and Benefits

- Detergency
 - Good wetting agents
- Mild to skin
- Excellent foam
 - Rich lather, stable foam plus, foam well in the presence of oils
- Stability
 - Stable to hydrolysis by acids and alkali
- Effective in both hard & soft water, are not sensitive to low pH
- Easy to use in a variety of formulations

Optimizing Taurates Foam Performance

mild, sulfate-free surfactants can produce a wide range of foam textures to enhance consumer appeal.

By incorporating various co-surfactants, different foam quality can be achieved.

For example combining **taurates (SMCT) with Sodium Cocoyl Isethionate** will result in a tight, creamy, and dense foam.

SMCT with Coco-Glucoside will contribute to a looser foam with larger bubbles.

Sodium methyl cocoyl taurate & CAPB



Sodium methyl cocoyl taurate & CAPB & SLMI



Sodium methyl cocoyl taurate & CAPB & SCI



Sodium methyl cocoyl taurate & CAPB & sarcosinate



Sodium methyl cocoyl taurate & CAPB & coco-glucoside



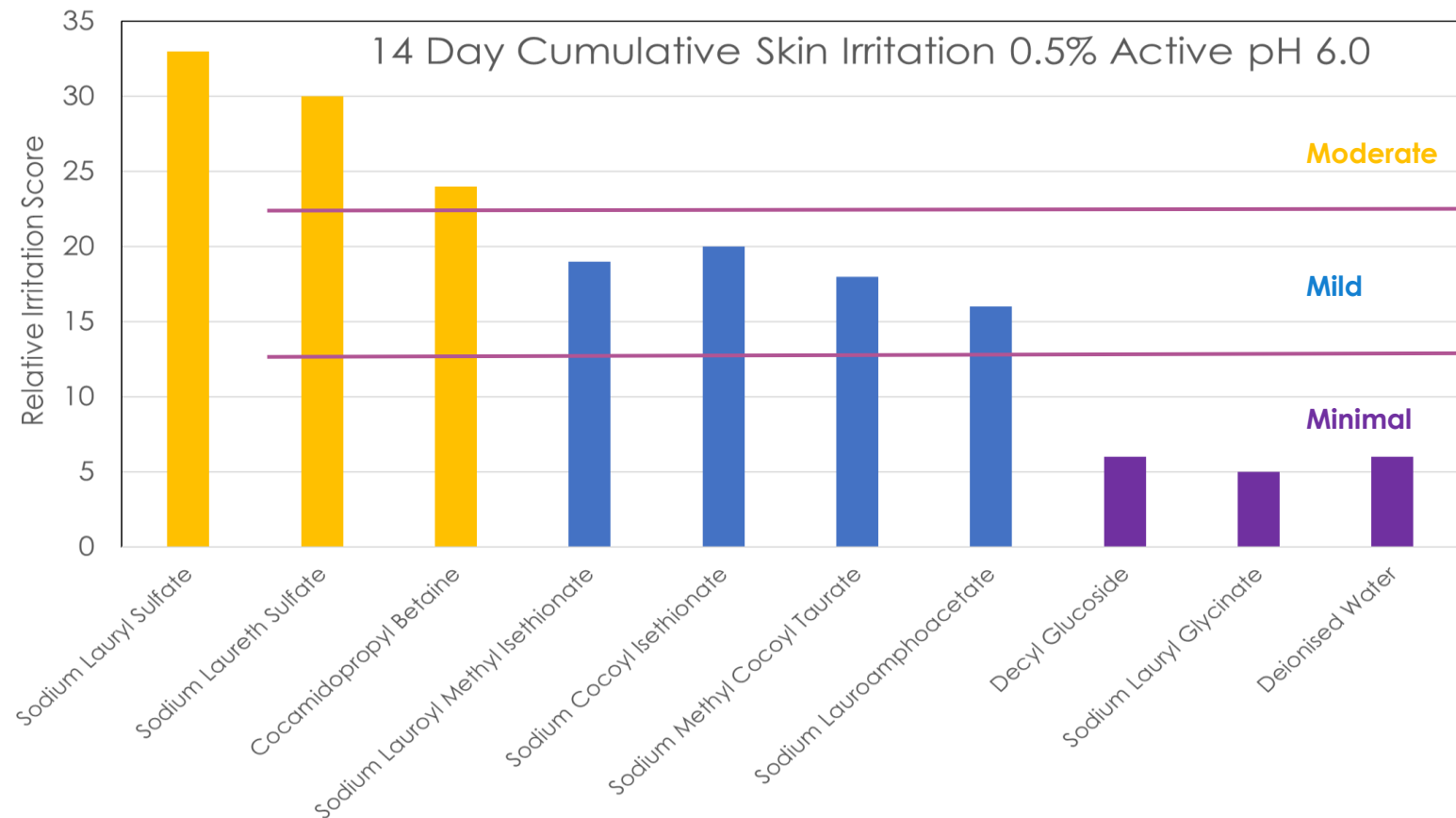
Sodium methyl cocoyl taurate & sodium lauroamphoacetate



Sodium Methyl Cocoyl Taurate is a Mild Surfactant

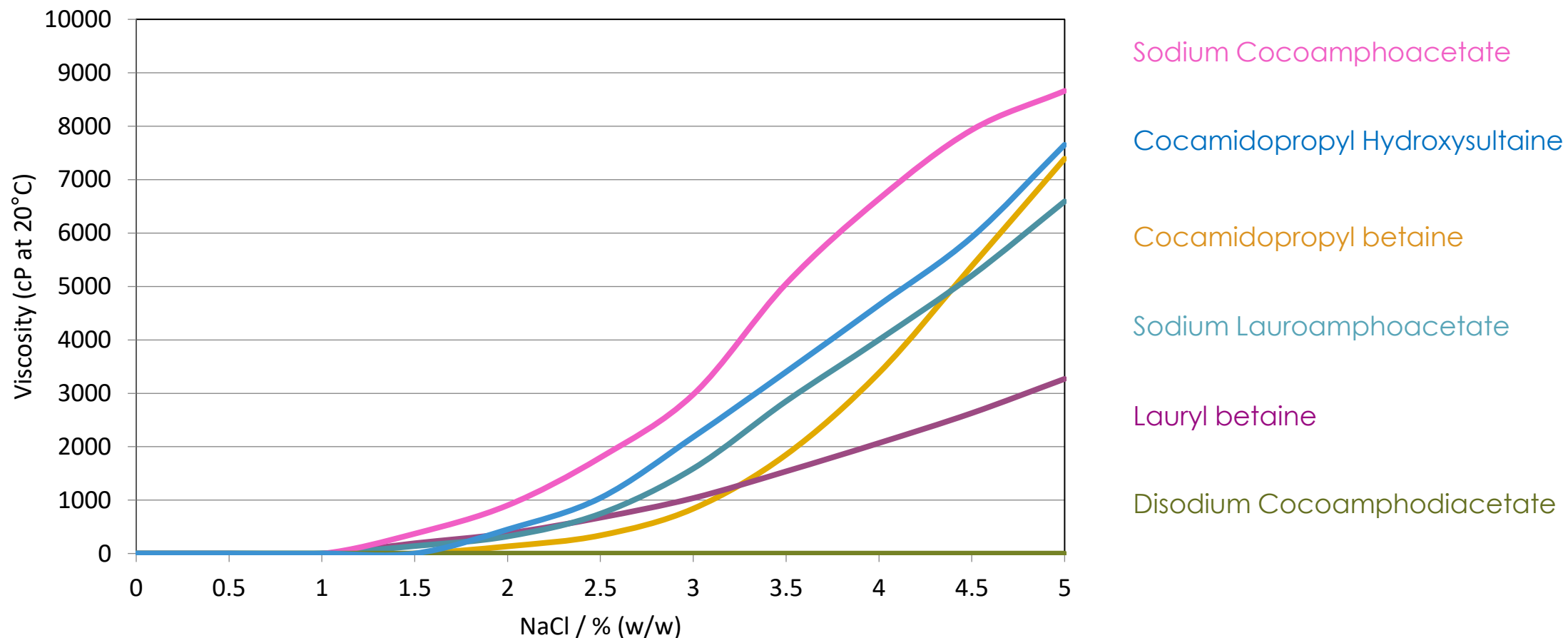


The Repeat Insult Patch Test was performed on 29 panelists.
Results concluded that the sulfate-free surfactants are milder than conventional surfactants.



Viscosity building of Sodium Methyl Cocoyl Taurate, with Amphoteric Surfactants

6%(w/w) sodium methyl cocoyl taurate & 4%(w/w) amphoteric surfactant (active); pH 5.0

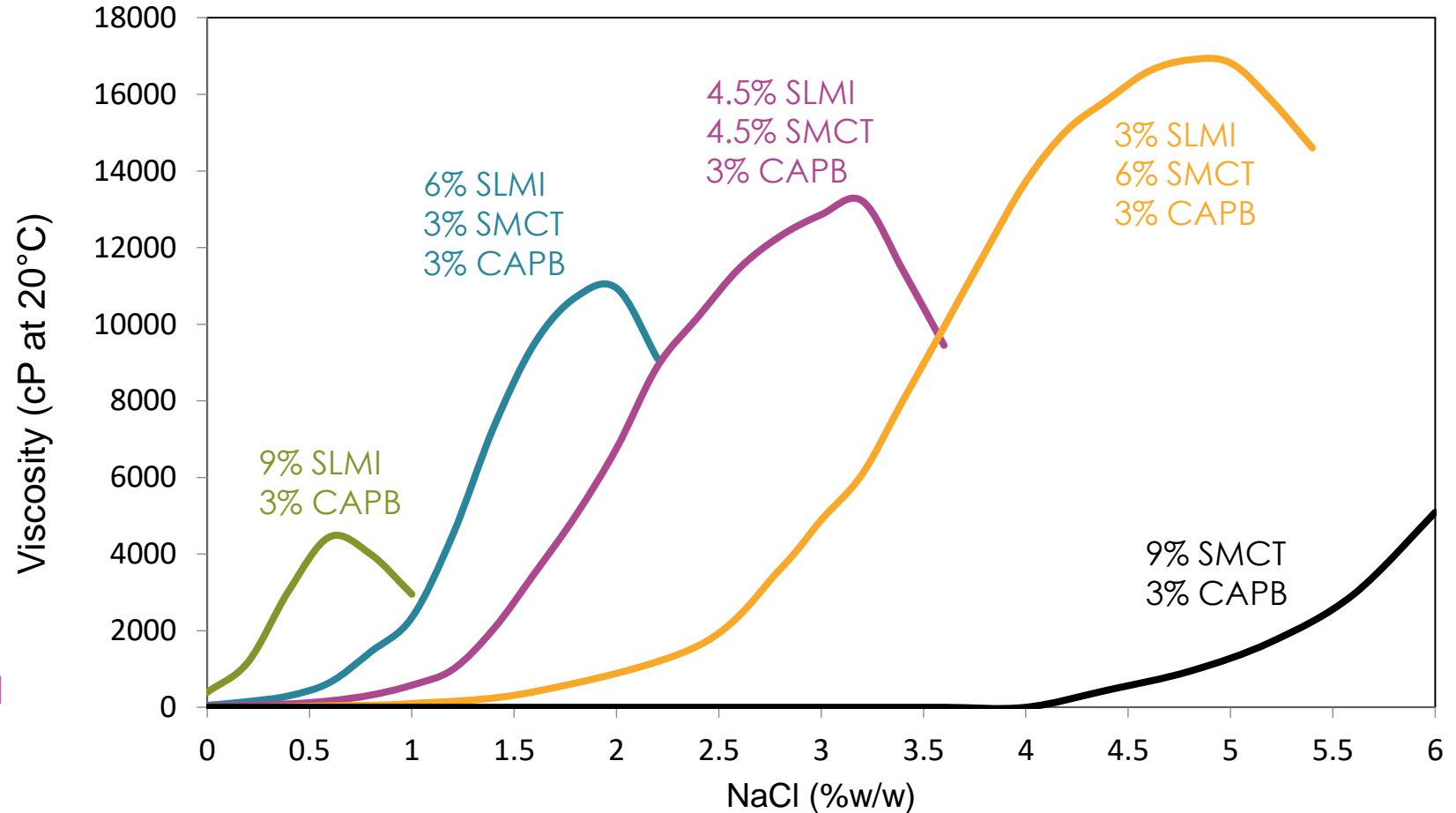


Taurates synergy with anionic surfactants

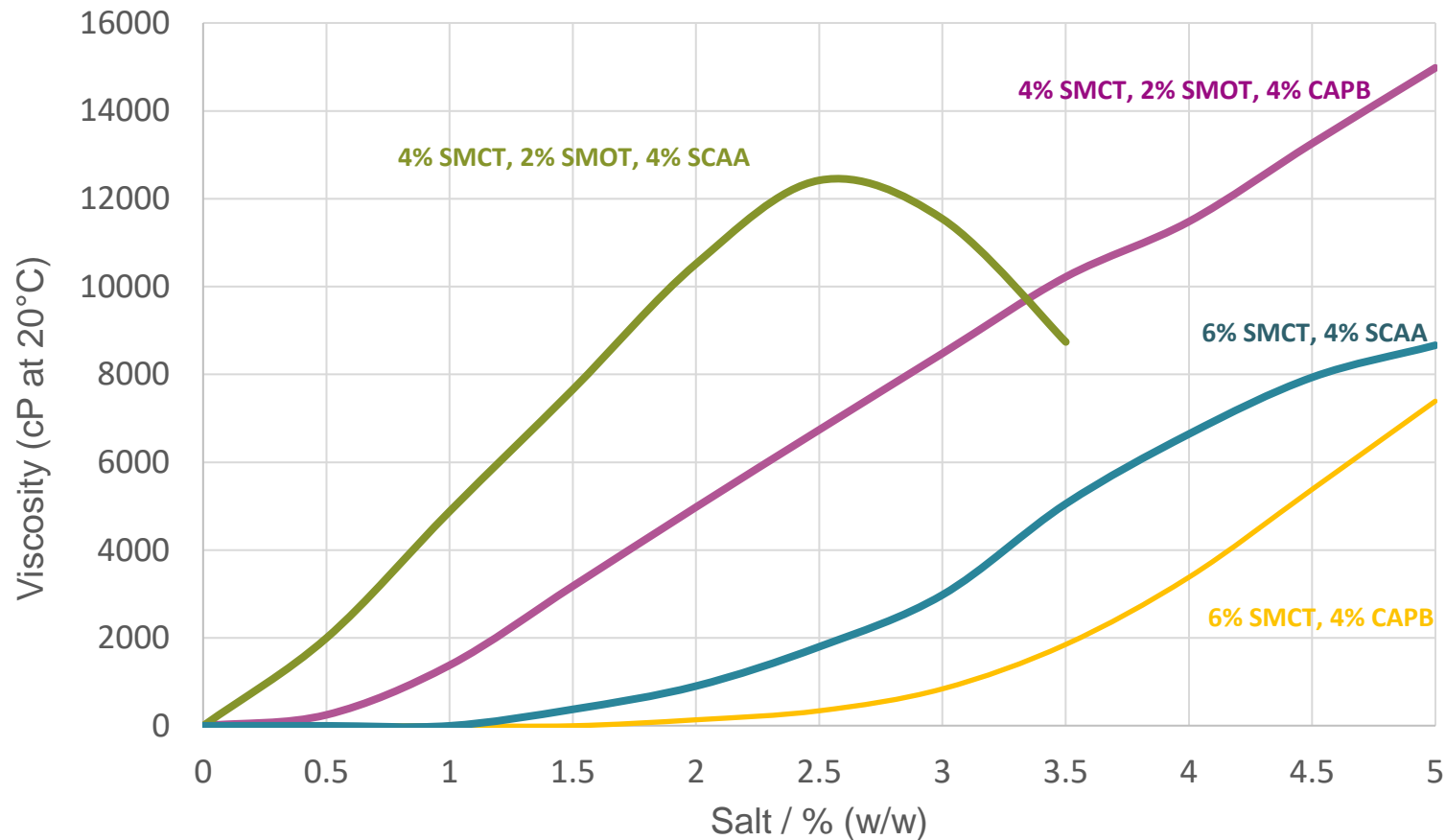


SLMI = sodium lauroyl methyl isethionate
SMCT = sodium methyl cocoyl taurate
CAPB = cocamidopropyl betaine

Electrolyte Thickening: SMCT synergy with SLMI



Electrolyte Thickening: Sodium Methyl Cocoyl Taurate synergy with Sodium Methyl Oleoyl Taurate



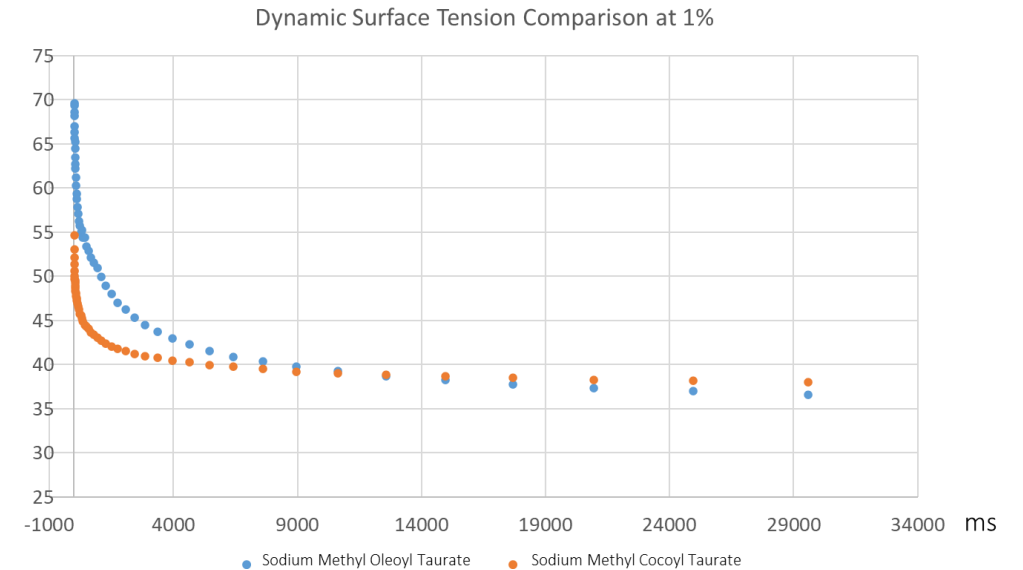
SMCT = sodium methyl cocoyl taurate
SMOT = sodium methyl oleoyl taurate
CAPB = cocamidopropyl betaine
SCAA = sodium cocoamphoacetate



Sodium Methyl Cocoyl Taurate

Surface properties and features

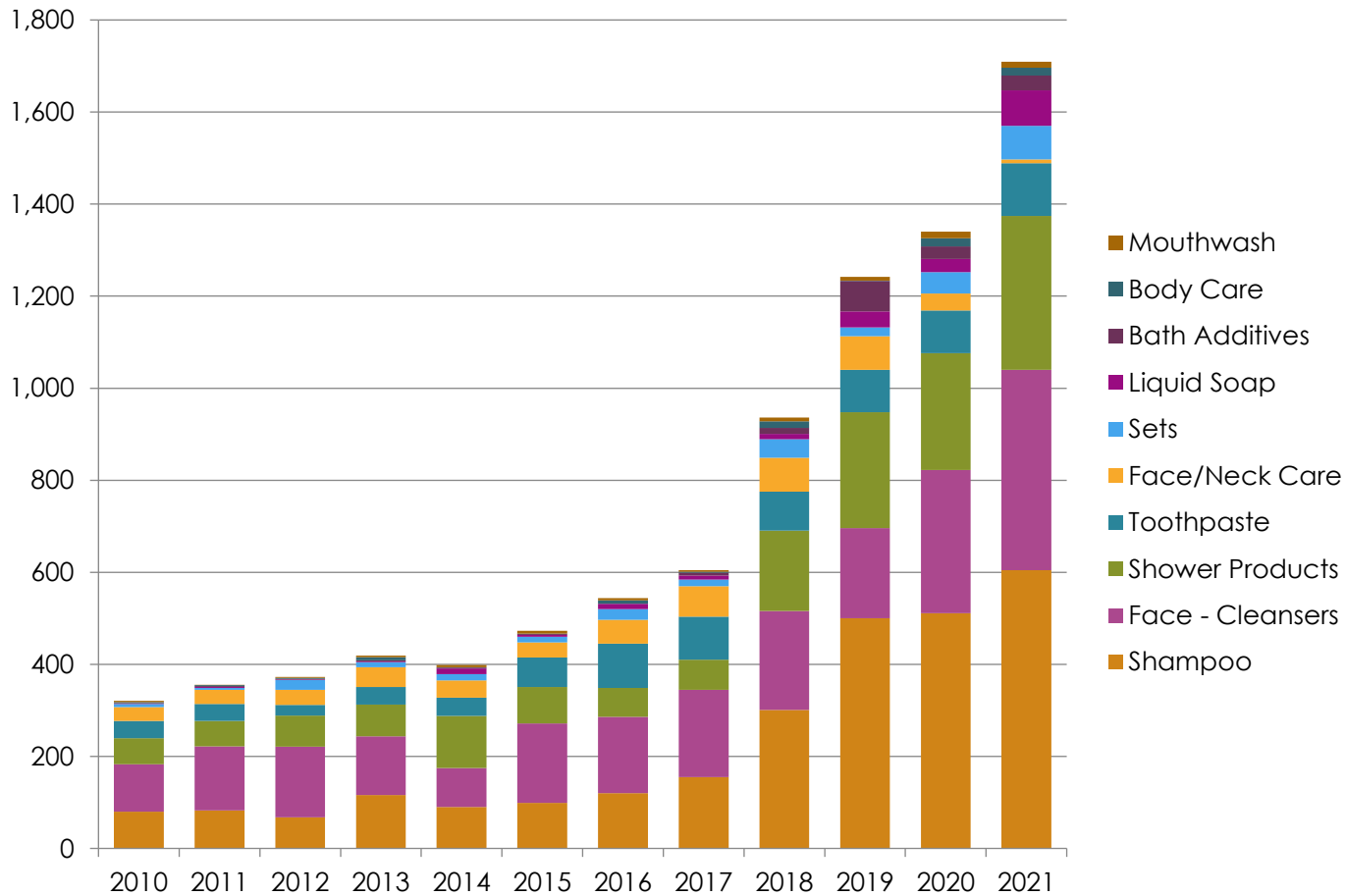
Properties	Sodium Methyl Cocoyl Taurate	Sodium Methyl Oleoyl Taurate
Static surface tension 1% (aq)	37 mN/m	35 mN/m
Solubility in water	160 -200 g/L	160 - 200 g/L
1000ppm Hard Water Solubility	160-200gL ⁻¹	>200gL ⁻¹
1000ppm Hard Water Static surface tension 1%	33 mN/m	31 mN/m
CMC	0.035 %wt	0.04 %wt



- Taurate surfactants are highly soluble in water, excellent foamers and display good wetting properties

significant growth: taurates

Innospec's taurate surfactants are globally compliant



Innospec's taurates

Key Benefits

- Mild & sulfate-free
- >80% naturally derived
- Readily biodegradable
- High foaming performances
- Long lasting foam
- Performs well in the presence of oil & sebum

Formulating pH Range

- A wide pH range of 3.0 – 11.0

However...

Taurates can be difficult to handle

Sodium Methyl Cocoyl Taurate

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introducing

LUXURIACT

a revolutionary, pourable taurate surfactant

innospec 

Say hello to LUXURIACT

INCI: Sodium Methyl Cocoyl Taurate



LUXURIACT is a pourable, cold-process, premium surfactant brand

- sulfate-free, 28% active
- 80% naturally derived anionic surfactant
- developed to meet the need for mild, effective & easy to use ingredients
- **cold processable material, allows for reduction of processing time during scale-up manufacture**
- clear, flowable liquid at room temperature
- EU Ecolabel compliant



luxurious & premium

- premium product
- provides rich, creamy foam
- clear formulations

sustainable & mild

- sulfate-free
- highly naturally derived

revolutionary

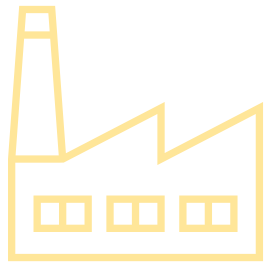
- breakthrough surfactant technology
- meets consumer trends
- creates a mild, innovative product

flexible & easy to use

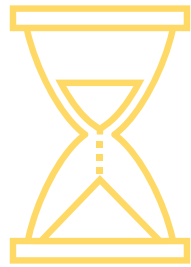
- pH 3-11 formulating range
- achieve next level formulating
- easy to use, pourable taurate

why cold process?

If a batch doesn't require heating or cooling there are a number of benefits



Equipment flexibility



Time saving

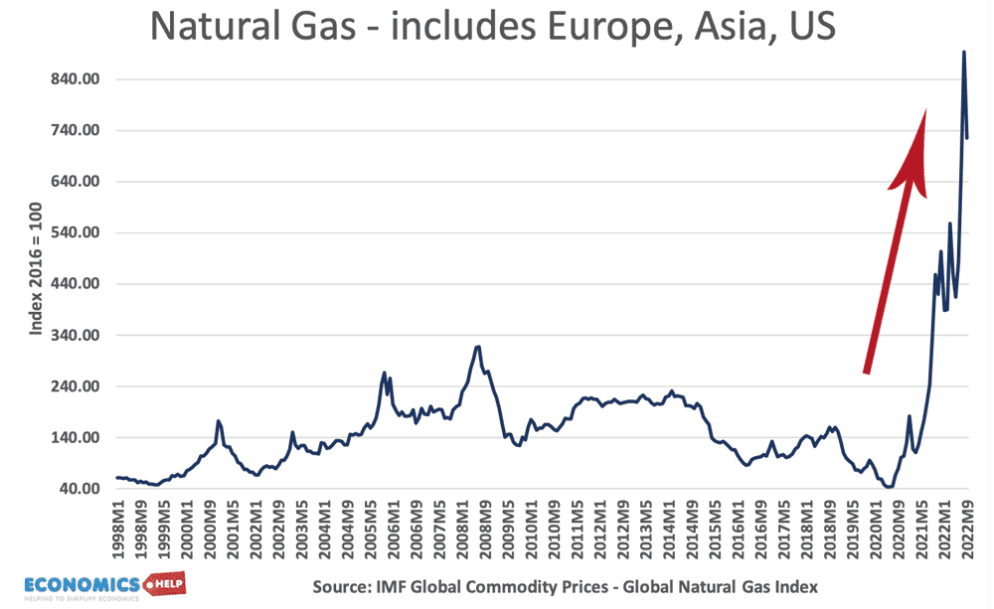


More sustainable



Cost saving

...And the
economy?



Rising energy costs: Russia/Ukraine conflict
Sending customers product to heat isn't cost effective

S0281 Luxuriact Shampoo

Phase	INCI	Trade Name	%
A	Aqua		q.s. to 100
B	Sodium Lauroyl Methyl Isethionate	Iselux® LQ-CLR-SB (Innospec)	14.06
	Sodium Methyl Cocoyl Taurate	Luxuriact® (Innospec)	5.00
	Cocamidopropyl Betaine	Empigen® BS/H50 (Innospec)	8.57
C	Sodium Benzoate (and) Potassium Sorbate (and) Aqua	Euxyl K712 (Ashland)	1.20
D	Citric Acid	Citric Acid Solution (50% w/w)	q.s. to pH 5.6 - 6.0
E	Sodium Chloride		q.s. to 4,000- 6,000 cP

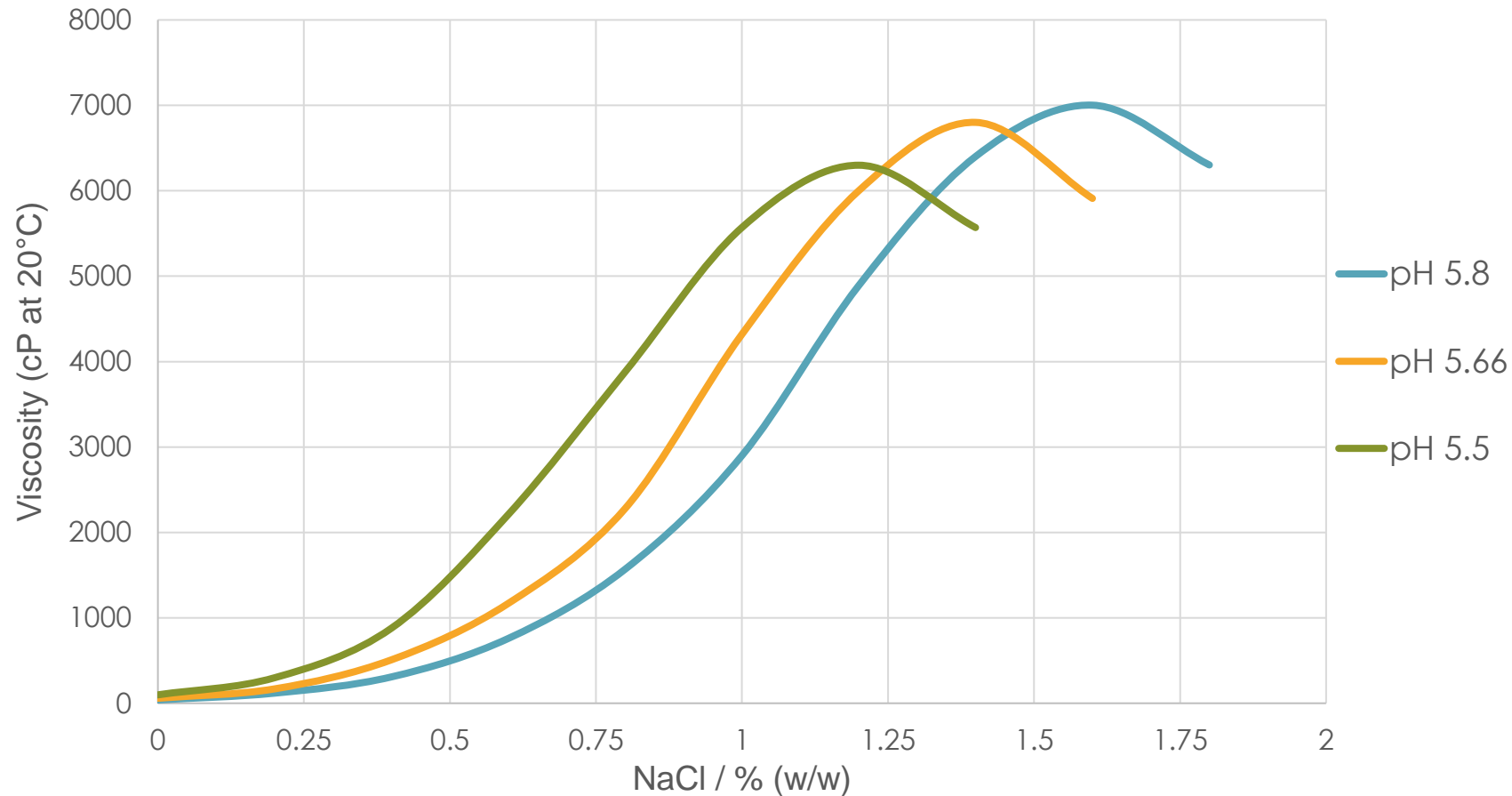


METHOD	Steps
	1. Charge water into beaker and start stirring (A)
	2. Add Iselux® LQ-CLR-SB, Luxuriact® and Empigen® BS/H50 (B) and mix until homogeneous
	3. Add preservative and mix until homogeneous (C)
	4. Adjust to pH 5.6-6.0 with citric acid solution (D)
	5. Slowly add sodium chloride in aliquots of 0.2% until required viscosity is achieved (E)

Ease of use for Luxuriact demonstrated at the Incos Formulation Lab session

Luxuriact responds well to electrolyte thickening

Viscosity build Formulation S0281 with pH



LUXURIACT: foam characteristics



LUXURIACT
in combination with
Empigen® BS-ON, Pureact Gluco C



LUXURIACT
in combination with
Empigen® BS-ON, ISELUX®

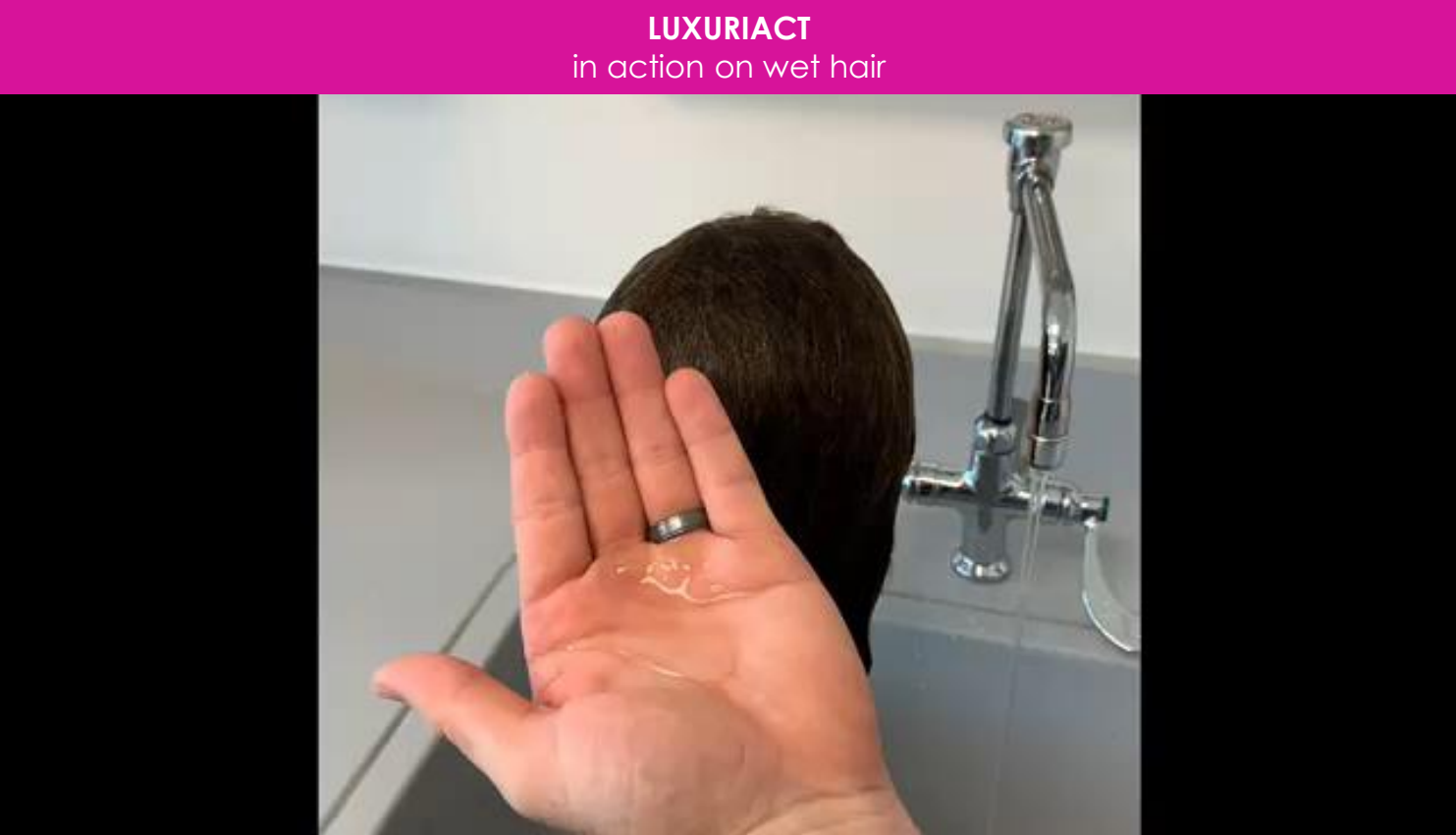


LUXURIACT
in combination with
Empigen® BS-ON, Nansa® LSS 38-AV

Application and dosage

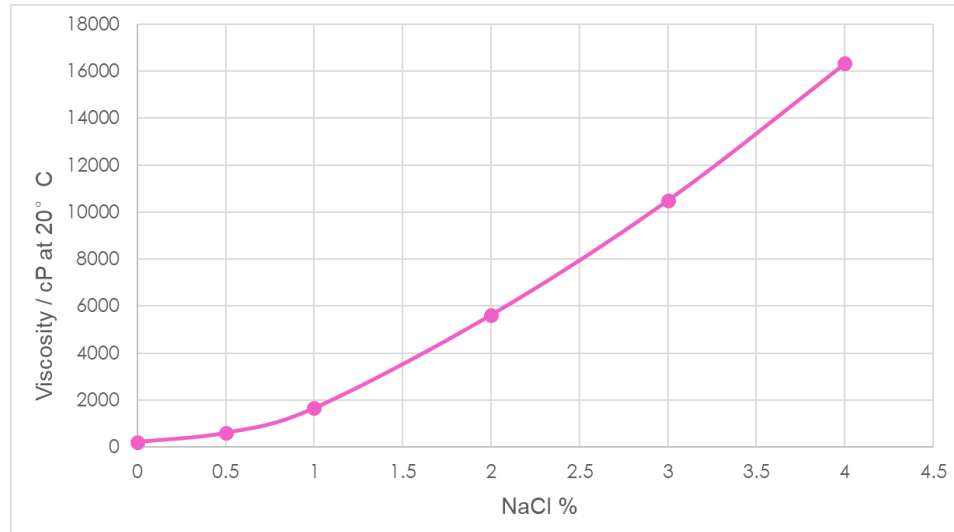
hand washes	2-15%
body washes	5-30%
shampoos	5-30%
facial cleansers	2-15%
solid formats	1-5%

LUXURIACT in action

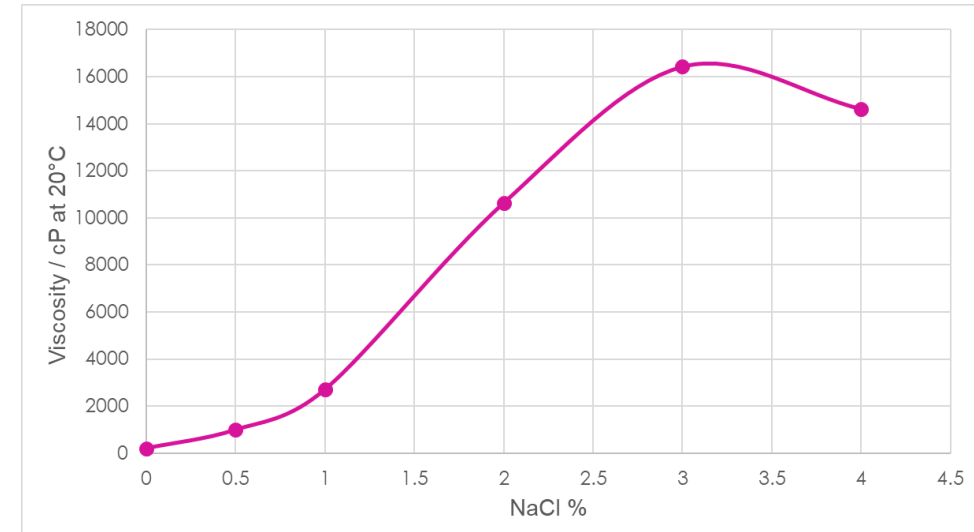


Formulating Advice

- Using Dual or Triple surfactant systems by pH and salt adjustment, to achieve the required viscosity.

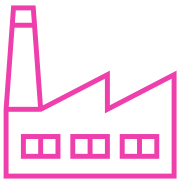


Surfactants (Active)	
Luxuriact	9%
CAPB	7.9%
pH	~6



Surfactants (Active)	
Luxuriact	6.9%
CAPB	6%
SLMI	3.2%
pH	~6

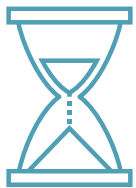
Summary



Due to changes in the economy, manufacturers will benefit from cold process ingredients



LUXURIACT is a cold process, sulfate-free & mild surfactant offerings



Using Innospec's knowledge & expertise, we can help you to formulate creative, effective formulation solutions



EXPLORE
our creativity

personalcare@innospecinc.com

Thank you

Please visit us at
<https://innospec.com/personal-care/>
today to read more about our new cold
process ingredients