

Brontide[®]: A Sustainable Butylene Glycol for Deodorant Emulsions





BRONTIDE®

Natural butylene glycol

Good for people

Made from sugar, not carcinogenic acetaldehyde
Non-irritating, tested up to 40% (HRIPT).

Good for our planet

Made from natural and renewable sugar feedstocks. 100% biobased, reducing greenhouse gas emission equivalent by over 50%, compared to petroleum-based BG.

Good for formulators

No reformulation required. Increases preservative efficacy.
Stable price tied to natural sugars.

Geno Exploration of Antiperspirant Deodorant Emulsions

Study Concept: Understand the impact of different natural polyols on emulsions through the lens of rheology and viscoelastic behavior

Hypothesis: The [known inherent tactile benefits](#) of Brontide natural butylene glycol would be shown favorably in rheometer data compared to glycerin and propanediol in a deodorant emulsion formulation.

- Study Setup: An antiperspirant deodorant emulsion formulation was created using three different natural polyol solvents (Brontide™ natural butylene glycol, propanediol, and glycerin) at concentrations of 0, 2, 6, and 12 percent. The viscosity and linear viscoelasticity of each formulation were testing using a rheometer.



Antiperspirant Deodorant Emulsion Formulation

Emulsion composition

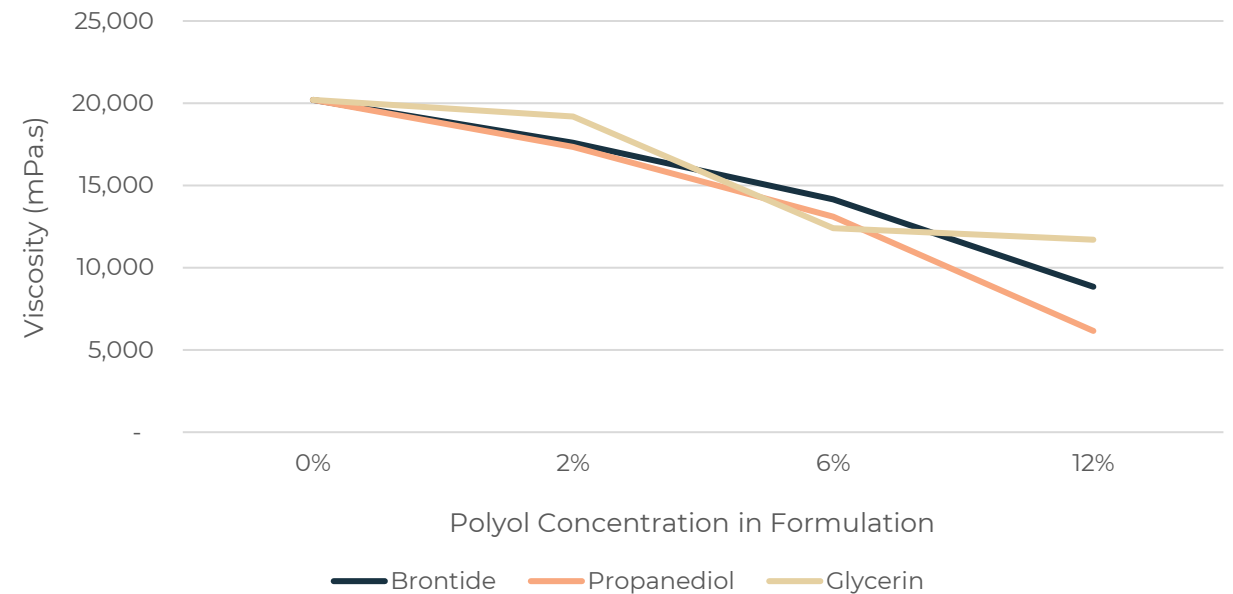
Phase	Ingredients (Trade Name)	Function	No Polyol	2 wt% Polyol	6 wt% Polyol	12 wt% Polyol
A	Zinc Ricinoleate	Deodorant active	2	2	2	2
	Almond Oil	Emollient	3	3	3	3
	Tego® alkanol s2	Surfactant/emulsifier	3	3	3	3
	Surfac® B721 MB	Surfactant/emulsifier	2	2	2	2
	Surfac® Stearic acid	Emulsifier	2	2	2	2
	Tamanu Oil	Emollient	3	3	3	3
B	Water	Vehicle	65.4	63.4	59.4	53.4
	Polyol	Humectant	0	2	6	12
C	Sepifine™ BB	Moisture absorber	1	1	1	1
	Arrowroot Powder	Antiperspirant/Thickener	15	15	15	15
	Sodium Benzoate	Antimicrobial/antioxidant	0.5	0.5	0.5	0.5
D	Phenoxyethanol	Preservative	0.8	0.8	0.8	0.8
	Sweet Apple Spice	Fragrance	0.1	0.1	0.1	0.1
	Lemon essential oil	Fragrance	0.2	0.2	0.2	0.2
	Marshmallow root extract	Moisture Retention	2	2	2	2
Total			100	100	100	100

Viscosity between natural polyols is consistent and predictable

Viscosity measurements of each formulation containing the different polyol were relatively similar within each polyol concentration. Polyol addition and viscosity is a negatively correlated linear relationship, where an increase in polyol results in a decrease in viscosity, regardless of the polyol chemistry.

Lower viscosity formulations are desired in roll-on deodorants, making the formulation easier to apply, delivering actives in a thinner layer, and ultimately a more enjoyable experience by the consumer.

Antiperspirant Emulsion Viscosity with Natural Polyols



Rheometer results showed shear-thinning behavior at the range of shear speeds (1.5, 6, 12 30, and 60 rpm) tested for each polyol concentration tested. An example chart at 12 rpm and 21° C is shown above.

Brontide® Increases Emulsion Stability

May lead to increased product value, increasing *play time*

Brontide® natural butylene glycol was shown to increase formulation stability under shear strain, indicated by the longer linear elastic region (LVR), before the sample yielded to a more viscous (liquid-like) state.

This LVR plateau resembles the rub-out phase when applying a skin care product. The longer the LVR plateau, the longer the emulsion maintains its integrity, the more enjoyable the experience is for the user.

Brontide not only increases desirable 'play time' of the emulsion before it becomes more liquid-like, but also offers a smoother transition before the viscous properties of the emulsion are stronger than the elastic properties.

Formulation Polyol

Brontide® Natural Butylene Glycol

Propanediol

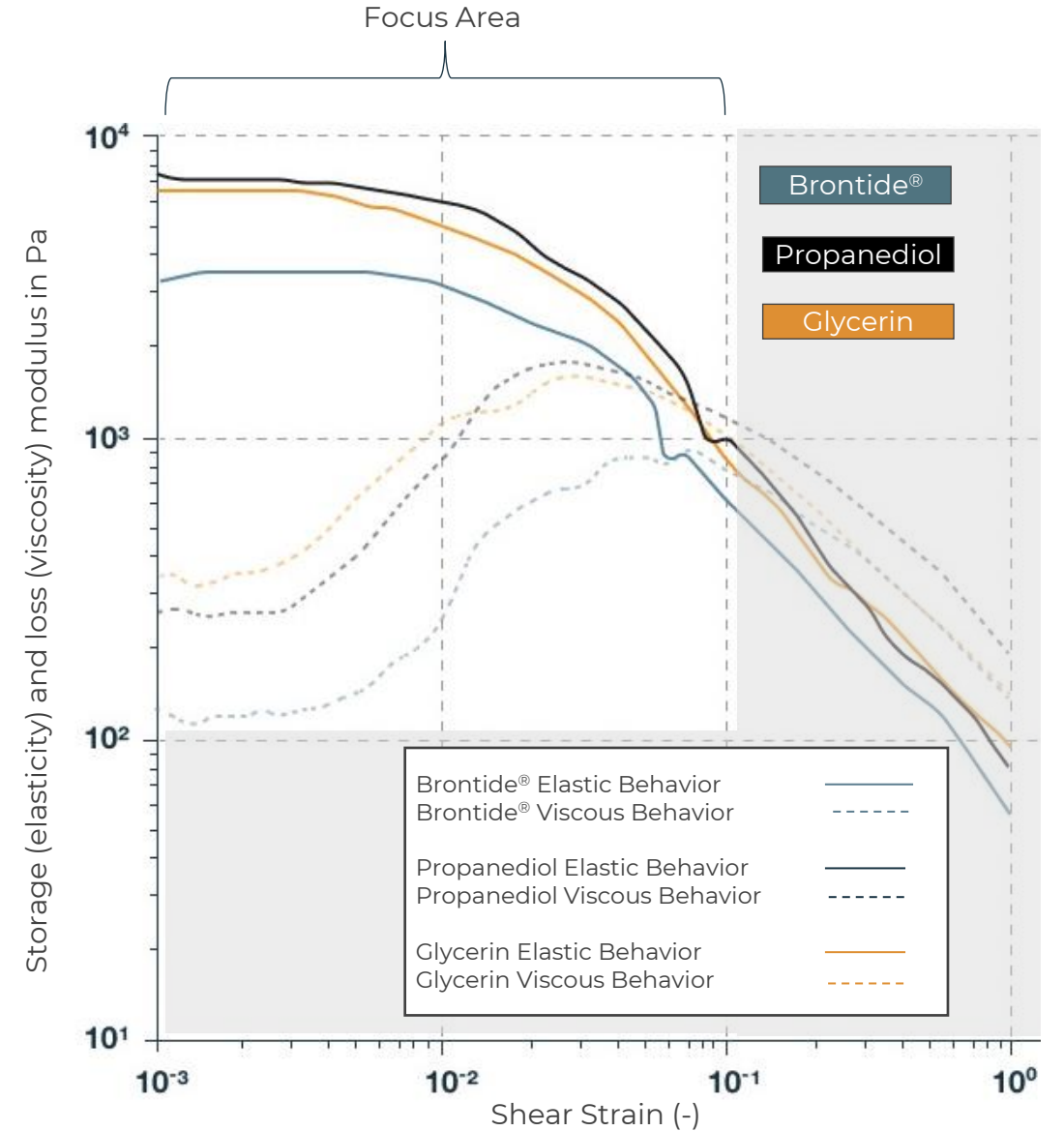
Glycerin

LVR (γ) Plateau Length

0.01072

0.00765

0.005605



The stability effect, extending the LVR was observed in all polyol concentrations, with Brontide showing the longest LVR for each concentration tested. The 12% polyol formulations are shown above.

Brontide™ Natural Butylene Glycol

Optimal Pick for Deodorant Emulsion Rheology

Brontide® natural butylene glycol can be used to lower viscosity of a deodorant emulsion, allowing for a more premium feel and user experience.

Brontide was observed to give deodorant emulsion formulations an extended linear viscoelastic region (LVR), correlated with a longer play time for consumers and the perception of a higher quality deodorant formulation.



