



## Energy Shot Formulations

**Description:** 1,3-Propanediol (PDO) demonstrates a solvent advantages over propylene glycol (PG) for taste applications. In this study, we unexpectedly determined that PDO rather than PG effectively modulates the overall positive taste qualities (sweet, sour and bitter) of commercial energy shot and drink under their super-concentrated matrix systems, but not individually in distilled water. Energy shots and drinks are well known to contain high levels of caffeine, acidulants, sweeteners, branched chain amino acids (BCAA) and vitamin Bs designed to provide a boost of energy when you need a little help powering through the day; however, the off-taste profile for these beverages is typically poor at best. Sweeteners (i.e. Sucralose) are used in these systems to help mask the off-tastes, but typically do an inadequate job. The addition of Zemea<sup>®</sup> USP-FCC Propanediol (1,3-Propanediol) positively and effectively modulates the off-taste profile by reducing bitterness and enhancing sourness, therefore, resulting in a much improved tasting product and a more pleasant sensorial experience. An optimized concentration range of PDO was determined to be from 0.01% to 0.15%, but more preferably at 0.10%. These results reveal a novel taste modulation finding of PDO in a concentrated aqueous matrix systems.

### Energy Shot with 1,3-Propanediol (Zemea USP-FCC Propanediol)

Ingredient	
Distilled Water	98.047
Sodium Benzoate	0.026
Zemea <sup>®</sup> USP-FCC PDO	0.138
Disodium EDTA	0.002
Sucralose	0.199
Caffeine	0.337
Taurine	0.017
Citicoline	0.017
DL-Malic Acid	1.027
FD&C Red 50	0.006
Vitamine B6 (Pyridoxine hydrochloride)	0.003
Vitamin B12 (Cyanocobalamin)	0.000009
Berry Flavor	0.181
<b>Total WT%</b>	<b>100.00</b>

### Energy Shot with Propylene Glycol USP

Ingredient	
Distilled Water	98.047
Sodium Benzoate	0.026
Propylene Glycol USP	0.138
Disodium EDTA	0.002
Sucralose	0.199
Caffeine	0.337
Taurine	0.017
Citicoline	0.017
DL-Malic Acid	1.027
Yellow #6	0.006
Vitamine B6 (Pyridoxine hydrochloride)	0.003
Vitamin B12 (Cyanocobalamin)	0.000009
Berry Flavor	0.181
<b>Total WT%</b>	<b>100.00</b>

Supplement Facts:		
Serving Size - 2.02 fl. oz.		
<b>Name</b>	Amt per serv.	% DV*
Vitamin B6 (as Pyridoxine Hydrochloride)	2 mg	122
Vitamin B12 (as Cyanocobalamin)	5 mcg	216
Sodium	3 mg	<1%
<b>Energy Blend</b>		
of Taurine, Malic Acid, Caffeine (200 mg), Citicoline	837 mg	**
<b>Other Ingredients</b>		
Distilled Water, Sucralose, Natural and Artificial Flavors, 1,3-Propanediol/ Propylene Glycol, Sodium Benzoate, EDTA (to protect freshness) and FD&C Red 50/Yellow #6.		
* Percent Daily Values are based on a 2,000 calorie diet		
** Daily Value not established		



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