

Foam Formulations

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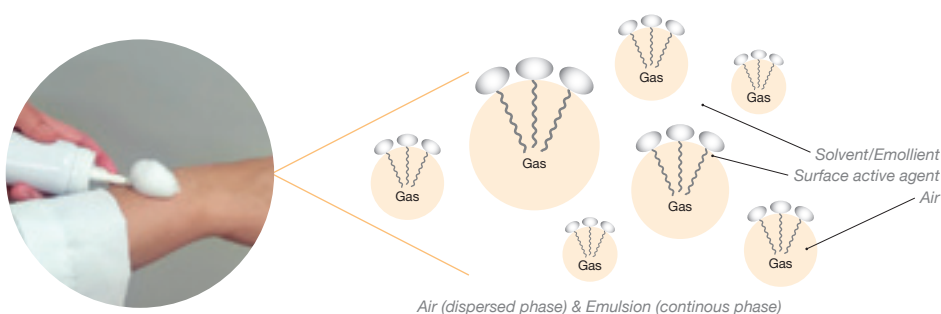
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Topical foams are growing in popularity, and in some cases preferred by panelists over a cream. Foams provide ease of application, pleasing sensory properties, simplicity and effective drug delivery.

Examples of topical pharmaceutical foams include:

- Evoclin® for acne treatment (dynamic foam, contains alcohol)
- Olux-E® for psoriasis and atopic dermatitis (incorporation of occlusive agents)
- Epifoam® for minor pain, itching and discomfort (dual functionality)



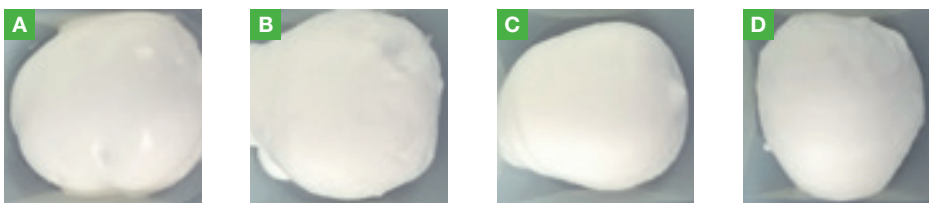
Material & Methods:

The foaming capability and properties of four topical aerosol foam formulations were evaluated. Formulations consisted of all BASF pharma excipients. The effects of varying ingredients (with and without Kolliphor® P188 and Kolliphor® CS 12 vs. CS 20) on the solubility of the formulations and foam properties (consistency, viscosity and spreadability) were investigated.

Topical Foams					
Ingredient	Role	A wt%	B wt%	C wt%	D wt%
Kolliwax® CSA 50	Foam Stabilizer	3	3	3	3
Kolliphor® CS 12	Foaming agent/emulsifier	0	0	6	5
Kolliphor® CS 20	Foaming agent/emulsifier	5	6	0	0
Kollicream® 3C	Emollient/Solubilizer	3	3	3	3
Kolliphor® P188	Foaming agent	1	0	0	1
DI Water	Solvent	82	82	82	82
A 46	Propellant/Solvent	6	6	6	6

Results:

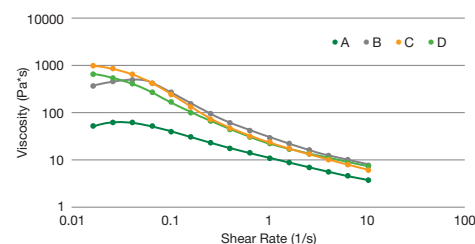
All formulations produced excellent foams that retain shape when dispensed on the skin, spread easily over the desired area and dry quickly. Stiffness (G') and viscosity (η) of the foams were analyzed via rheological measurements and summarized in the figure and table to the right. Rheological analysis revealed that stiffness and viscosity can be tailored by the choice of foaming agents. Using Kolliphor® CS 12 as the foaming agent results in higher G' and η values (i.e. thicker and creamier foams) than formulations prepared with Kolliphor® CS 20. Additionally, poloxamer can be added to modify the viscosity and sensory properties, yielding richer/creamier foams. Rheological and sensory results indicate that BASF excipients can be varied to obtain desired foam properties.



Resulting foams after aerosol packaging with propellant.

Formulation	G' (Pa)	η (Pa*s) (@0.01 1/s)
A	13.9	54.7
B	130.6	428.9
C	189.8	113.8
D	173.8	756.6

Summary of measured G' and η for studied foam formulations.



Rheological profiles of studied foam formulations (log-log plots).