

Bun solvent & surfactant compatibility

Introduction

This technical note provides information on the composition and chemical compatibility of the Bun, the consumable used in Honeybun. Chemical compatibility is important when considering the potential use of Honeybun in determining the viscosity of different aqueous solutions containing antibodies, other proteins, vaccines, viral vectors, and other injectable drugs.

The compatibility of the Bun's microfluidic channel with solvents & surfactants depends on their concentration. Higher concentrations of solvents or surfactants are prone to self-loading

(that is, wicking of the analyte into the channel before Honeybun applies any pressure). Self-loading may impact viscosity measurements and some self-loading solutions may contaminate Honeybun. **Table 1** shows the highest concentration of solvent or surfactant in aqueous solution that does not self-load. Be advised that this is not an exhaustive list. Further, the components listed were tested individually; an aqueous mixture of two or more components may have different properties.

In any case where suitability or compatibility is in doubt, please contact Unchained Labs (support@unchainedlabs.com) before proceeding.

Component	Maximum Compatible Concentration
Acetic acid	3.1% (v/v)
Acetone	5% (v/v)
Acetonitrile	6.3% (v/v)
DMSO	25% (v/v)
Ethanol	6.3% (v/v)
Isopropanol	3.1% (v/v)
Methanol	12.5% (v/v)
PEG 3000	0.3% (w/v)
PEG 8000	20% (w/w)
Poloxamer 188	0.04% (v/v)
Polysorbate 20	0.05% (v/v)
Polysorbate 80	0.05% (v/v)
Triton X-100	0.06% (v/v)
1-Octanol	Not compatible
1-Decanol	Not compatible
Silicone oil	Not compatible
Mineral oil	Not compatible

Table 1: Highest concentration of solvents & surfactants in aqueous solutions compatible with the Bun's microfluidic channel, determined at 20 °C. This table serves as a guide; even minor changes in composition (e.g., mixture of two components listed) can change the properties of a solution.

Buns are made from cyclic olefin copolymer (COC) plastic, which is resistant to hydrolysis, acids, alkalis, as well as a wide range of polar solvents and molecules. However, COC plastic is damaged by non-polar organic solvents such as toluene and benzene. The chemical compatibility of the Bun material itself is shown in Table 2. Compatible chemicals caused <0.5% decrease in weight or <3% increase in weight of the COC during testing. Incompatible chemicals caused $\geq 0.5\%$ decrease

in weight or $\geq 3\%$ increase in weight. Please note that not all of the substances listed in the chemical compatibility Table 2 have been evaluated for their interaction with the Bun's microfluidic channel or may have practical concentration limitations: methanol and ethanol are *chemically* compatible with COC, but the Bun and Honeybun can *practically* be used for aqueous solutions of max. 12.5% and 6.3% (v/v), respectively.

	Chemical	Compatible?
pH <7 (acidic/aqueous)	Hydrochloric acid 36%	Yes
	Sulfuric acid 40%	Yes
	Nitric acid 65%	Yes
	Acetic acid >94%	Yes
pH =7 (acidic/aqueous)	Water	Yes
	Soap solution	Yes
	Saline	Yes
pH >7 (acidic/aqueous)	Sodium hydroxide 50%	Yes
	Ammonia 35%	Yes
Polar organic solvents	Methanol	Yes
	Ethanol	Yes
	Butanol	Yes
	Isopropanol	Yes
	Acetone	Yes
	Butanone	Yes
Aromatic solvents	Benzaldehyde	No
	Toluene	No
	Benzene	No
	Chlorinated solvents	No
Non-polar organic solvents	Pentane, hexane, heptane, etc. (Alkanes)	No
	Gasoline (Petrol ether)	No
	Norbornene	No
Other	Oleic acid	No

Table 2: Chemical resistance of the Bun consumable, made of COC plastic.



Unchained Labs
6870 Koll Center Parkway
Pleasanton, CA 94566
Phone: 1.925.587.9800
Toll-free: 1.800.815.6384
Email: info@unchainedlabs.com

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