# 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 ≥0.5% decrease in weight or ≥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.

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