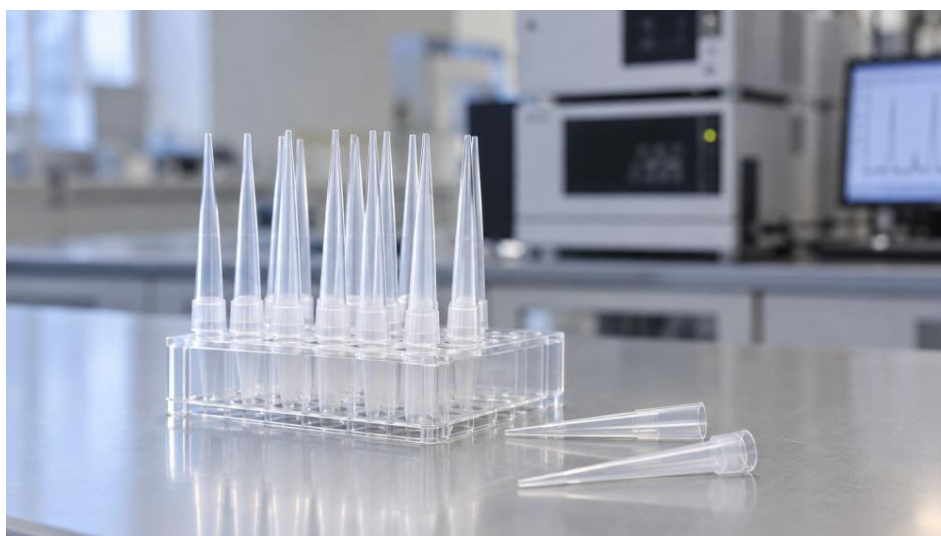


## Do PP Pipette Tips Affect THF Measurements?

Polypropylene (PP) pipette tips are among the most routinely used consumables in analytical laboratories. But what happens when they come into contact with a strong organic solvent such as tetrahydrofuran (THF)? Can the solvent extract enough material from the plastic to become visible in a sensitive RI measurement?

We decided to find out. PP pipette tips were exposed to THF for periods ranging from less than one minute, representative of normal pipetting, to one week. The resulting samples were analyzed by RI detection and compared directly with an untreated THF blank.



*Figure 1. Polypropylene pipette tips.*

The question is particularly relevant in polymer characterization. Material introduced by a laboratory consumable does not need to be visually obvious to become analytically detectable. A sensitive concentration detector may reveal an interaction long before there is any visible change in the plastic itself.

## EXPERIMENTAL APPROACH

PP pipette tips were brought into contact with THF for different periods. The investigated contact times ranged from **less than one minute**, representing normal laboratory handling during liquid transfer, to prolonged exposure periods of **one hour, four hours and one week**. An untreated THF sample was used as the blank.

Following the respective contact periods, the resulting samples were analyzed using RI detection and compared directly with the THF blank. The purpose of the experiment was deliberately practical. It was not intended to identify individual compounds potentially extracted from the polypropylene, nor to provide a comprehensive chemical-compatibility study. The objective was to answer a laboratory question: **does using a PP pipette tip with THF produce an analytically detectable effect, and does that effect depend on contact time?**

## RESULTS

The chromatograms show a clear dependence of the observed RI response on the duration of contact between THF and the PP pipette tips. For **normal use with a contact time below one minute**, the chromatographic trace remained close to that obtained from the untreated THF blank.

The situation changed as exposure time increased. An additional chromatographic response became visible between approximately **12 and 14 mL elution volume**, and its magnitude increased with increasing contact time.

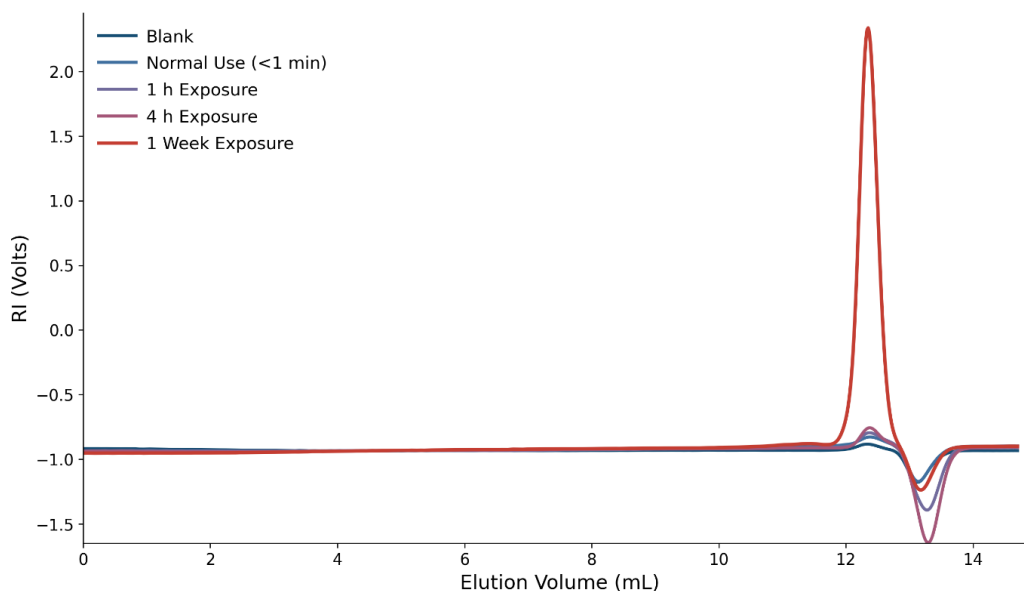


Figure 2. RI chromatograms recorded after different PP tip contact times.

After **one week of exposure**, the difference was impossible to miss: a very strong chromatographic response appeared that was absent from the THF blank and dramatically larger than the response obtained after normal short-term use.

## INTERPRETATION

The progression of the chromatograms is particularly informative. Rather than showing an isolated difference between a blank and a single exposed sample, the measurements demonstrate a systematic relationship between exposure time and chromatographic response. **The longer THF remained in contact with the PP material, the larger the observed effect became.**

## WHAT IS BEING DETECTED?

The observed response is consistent with the extraction of **THF-soluble low-molecular-weight material** from the PP tips. Potential contributors could include additives, stabilizers or oligomeric species.

**The chemical identity of the extracted material was not investigated in this experiment.** The measurements demonstrate that material producing a detectable RI response appears following prolonged THF/PP contact; they do not establish its molecular composition. Identification would require additional analytical work and was outside the scope of this practical investigation.

## WHY CONTACT TIME MATTERS

A material may be entirely adequate for **brief handling of a solvent** without necessarily being suitable for **prolonged solvent storage or exposure**. During normal pipetting, THF remains in contact with the inner surface of the tip only briefly. The opportunity for extraction is therefore limited and, under the conditions investigated here, the resulting trace remained close to the blank.

Increasing the contact time changes the situation. Even if the polypropylene remains mechanically intact and visually unaffected, soluble material can progressively enter the solvent. The absence of obvious physical damage should therefore not automatically be interpreted as the absence of an analytical interaction.

## RELEVANCE TO POLYMER ANALYSIS

THF is widely used as a solvent in polymer characterization, while RI detection is commonly used as a concentration-sensitive detector. An unintended soluble contribution originating from sample-preparation equipment therefore has the potential to appear in the analytical measurement even though the consumable itself appears perfectly normal.

The magnitude and practical significance of such contamination will depend on the analytical conditions, sample concentration, amount of extracted material and detector sensitivity. The present experiment was not designed to quantify all of these variables. It does, however, demonstrate that **contact time is an experimentally observable factor** and should be considered when PP consumables are used with THF.

## PRACTICAL RECOMMENDATION

**BRIEF CONTACT IS FINE. PROLONGED CONTACT IS NOT.**

For routine laboratory work, the result is reassuring and straightforward. Under the conditions investigated, conventional PP pipette tips can be used for the **brief transfer of THF** without producing a significant effect on the measurement. They should not, however, be treated as containers for THF or used in procedures that leave THF in prolonged contact with the polypropylene.

In practical terms:

- use the pipette tip to transfer the solvent or sample promptly;
- avoid leaving THF standing inside a PP tip;
- do not use pipette tips as temporary storage vessels;
- where unusually long solvent contact is unavoidable, consider whether the consumable itself should be represented in the analytical blank.

## CONCLUSION

A simple experiment produced a very clear result. Polypropylene pipette tips showed little detectable influence on the RI measurement when their contact with THF was limited to the short period associated with normal pipetting.

As contact time increased, however, an additional chromatographic response developed and progressively increased. After one week of exposure, the effect was very strong. The observations are consistent with extraction of THF-soluble low-molecular-weight material from the PP tips, although the chemical identity of this material was not investigated.

The experiment therefore does not suggest that PP pipette tips should be avoided when working with THF. Instead, it demonstrates something more useful: **the suitability of a laboratory consumable depends not only on which solvent it contacts, but also on how long that contact lasts.**

**For normal transfer operations, PP pipette tips are suitable under the conditions investigated. For prolonged THF exposure, they are not.**

**Scope note.** No chemical identification of the extracted material was performed, and no broader solvent-compatibility claim is intended.