

## ANALYSIS OF DRUGS BY THIN LAYER CHROMATOGRAPHY

### EXPERIMENTAL TECHNIQUES REQUIRED

[Chromatography](#) (thin-layer) (T 13)

### OTHER DOCUMENTS:

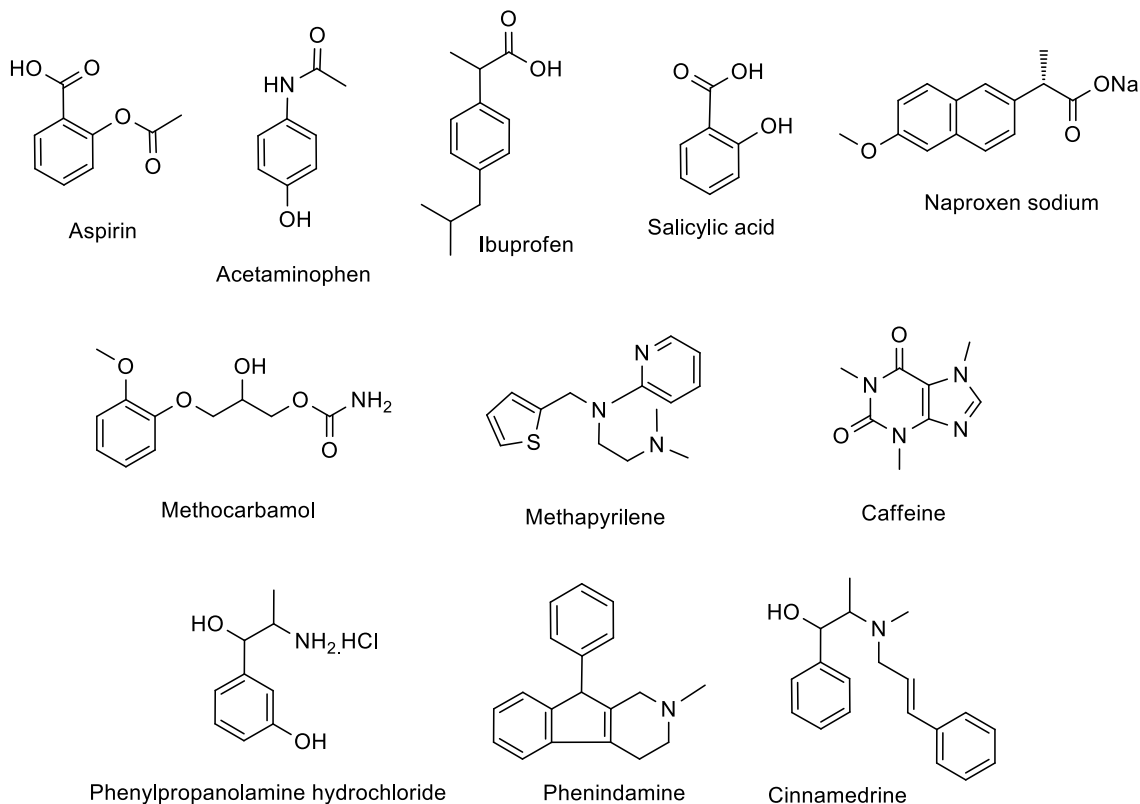
[Experimental procedure](#), report 2 page template [WORD](#)

### INTRODUCTION

In this “capstone” experiment, thin layer chromatography (TLC) will be used to examine the composition of various analgesic (pain-relieving) drug preparations by comparison of an “unknown” drug preparation sample with the samples of aspirin, acetaminophen and caffeine you obtained from previous Chem351 experiments.

The best known of these analgesics is aspirin, but several other chemically similar compounds are also used as analgesics. Among these are acetaminophen, ibuprofen and naproxen. Caffeine is sometimes added to formulations to overcome drowsiness. Other compounds such as N-cinnamylephedrine (cinnamedrin) and methapyrilene are sometimes added for other therapeutic effects, such as antispasmodic or slight sedative action. Phenylpropanolamine is a nasal decongestant. Phenindamine is an antihistamine. Methocarbamol is a muscle relaxant.

In addition to the active ingredients, the tablets of these drugs may contain starch, lactose and other substances that act as binders and permit rapid solution, and sometimes inorganic bases.



In this experiment, you will be provided with an unknown preparation that is one of the common proprietary analgesic drug preparations from the list provided in the table below. Make sure to record your unknown number. The objective of the experiment is to identify the unknown preparation based on the TLC analysis and comparison with several known reference compounds including aspirin and acetaminophen that were prepared and caffeine that you extracted in other experiments. Using student samples of these three reference compounds also allows you to further investigate their purity.

The known compounds to be used for reference are the following:

**Aspirin** (acetyl salicylic acid) - use material prepared in the analgesic experiment

**Acetaminophen** (4-acetamidophenol) - use material prepared in the analgesic experiment

**Caffeine** - use material isolated in the extraction experiment

**Ibuprofen** (2-(4-isobutylphenyl)propanoic acid)

**Salicylic acid** (2-hydroxybenzoic acid)

In our solvent system (ethyl acetate : acetic acid 10:1), the  $R_f$  of methocarbamol = 0.43 and naproxen sodium = 0.72.

### **COMMON ANALGESIC CONTAINING PREPARATIONS**

The amounts of ingredients in the various preparations are also provided

Brand Name	Ingredients
Aleve	Naproxen sodium (220 mg)
A.S.A.	Aspirin (325 mg)
Anacin	Aspirin (325 mg), caffeine (32 mg)
Tylenol Ultra	Acetaminophen (500 mg), caffeine (65 mg)
Tylenol	Acetaminophen (325 mg)
Motrin	Ibuprofen (200 mg)
Robaxisal	Aspirin (500 mg), methocarbamol (400 mg)
Robaxacet	Acetaminophen (500 mg), methocarbamol (400 mg)
RobaxPlatinum	Ibuprofen (200 mg), methocarbamol (500 mg)