

TLC Limit Test for Related Substances

Objective

To test Naproxen Tablet Using Thin Layer Chromatography Limit Test

Materials

- Naproxen tablets
- Toluene
- Tetrahydrofuran
- Methanol
- Acetic Acid

Introduction

Naproxen is (+) -2-(6-methoxyl-2-naphthyl)-propionic acid. Naproxen falls into a category of compounds known as non-steroidal anti-inflammatory drugs (NSAIDS), is very light sensitive and together with its derivative compound, Naproxen Sodium, is used for making pain and fever relieving drugs. The Naproxen drugs are also very effective in treating stiffness and inflammation caused by ailments like kidney stones. Figure 1, below, shows the structure of naproxen, which has the formula C₁₄H₁₄O₃.

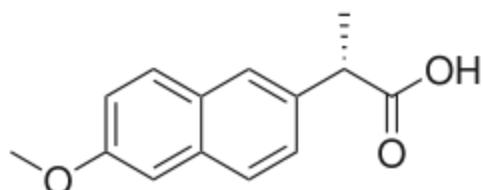


Figure 1

Procedure

The average weight of the tablets was first determined, after which ten tablets were taken from the lot, weighed and ground into powder form. The next step involved following the procedure for thin-layer chromatography, wherein silica gel GF254 is used as coating and a blend of toluene, 18 volumes of tetrahydrofuran and 6 volumes of 6 M acetic acid as the mobile phase. 10 µL of methanol solution, containing 2.0 per cent w/v of Naproxen solution (1), was

applied to the chromatoplate. In the same way, 10 μ methanol solution, containing 0.010 per cent w/v of Naproxen solution (2), was applied to the chromatoplate. The chromatoplate was then taken out and allowed to dry. It was then examined under an ultraviolet lamp with a maximum output of 254 nm.

Calculations

$$RF = \frac{a}{b} \text{ where } a = \text{weight of sample way}$$
$$b = \text{weight of mobile phase way}$$

$$b = 13.5$$

$$Rf_1 = a/b = 5.1/13.5 = 0.378$$

$$Rf_2 = 4.9/13.5 = 0.363$$

$$Rf_3 = 4.3/13.5 = 0.319$$

$$Rf_4 = 4.4/13.5 = 0.326$$

Results and Discussion

Number of sample	B	A	Rf
1	13.5	4.4	0.33
2	13.5	4.3	0.32
3	13.5	4.9	0.36
4	13.5	5.1	0.39

In the Naproxen analysis, the TLC method was used. This method is a liquid-solid technique. It involves the mobile phase moving up the thin layer of the stationary phase through the action of the capillaries. The TLC technique has a comparable correlation with column chromatography, which involves the solvent passing through the absorbent column. This association enables TLC to be a faster technique for establishing the composition of solvents for preparative separations. For the separation to be successful, the sample must possess a fairly equal affinity for solvent and packing material. The sample will not move from the origin, if the sample possesses a greater attraction to the stationary phase than the solvent, resulting in a low Rf value. Effective removal of the solution can be achieved by optimizing the relative affinity of sample, solvent and support.

Conclusion

Naproxen is (+) -2-(6-methoxyl-2-naphthyl)-propionic acid. It's from a category of compounds known as non-steroidal anti-inflammatory drugs (NSAIDS). It's very light sensitive and should be shielded from it. Together with its derivative compound, Naproxen Sodium, it's used for making pain and fever relieving drugs. The Naproxen drugs are also very effective in treating stiffness and inflammation, brought about by ailments like kidney stones. The formula for Naproxen is $C_{14}H_{14}O_3$.