

# Designing Real Time and Safe TLC Instrument as an Efficient Device in Accurate Purification of UV-Active Therapeutic Compounds

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## 1-Introduction

Pharmaceutical companies are looking to discover new compounds to design new drugs to treat various diseases such as antibiotics for infectious and therapeutic compounds for metabolic diseases like cancers, cardio-metabolic disorders, hypertension, and diabetes and so on. So they screen promising natural sources including plants and microorganisms. After finding source which contain therapeutic compound they are faced with a very complex mixture of biocompounds which should be purified after several fractionations. Many fractions are obtained during purification steps. In order to accurately separate same fractions should be mix with each other. The researchers using various strategies detect same and different fractions one of these methods is thin layer chromatography (TLC). Thin layer chromatography (TLC) is used to primarily characterize the fractions and detect same and different fractions. Usual approach is running the spotted TLC plates in a TLC tank which contain solvents and observing formed bands on the TLC plates under UV-light. There are some limitations in this current method. For example, if the fractions have more polarity than solvent system in TLC box their spots don't move on TLC plates and the research does not understand this issue until the end of the experiment and has to repeat this test several times to find suitable polarity for running TLC. Another disadvantage of this method is that if some compounds with same polarity were present in the mixture it is possible that they form single band on TLC and cause misunderstanding for researchers. In addition, UV-lamps don't have protective layer to protect the users and can damage in long time.

## 2-Materials and Methods

In order to eliminate existing limitations, we designed and manufactured real time TLC box. Real time TLC box consist of two glass TLC tanks which are resistant to solvents to observed TLC profiles of fractions in more than one solvent system which have different

polarity index to prevent misunderstanding about unpurified compound or mixture which show single band in TLC but contain more than one compounds. In new designed devise the researchers can observe movement of existing compounds in a spot because of joining TLC tanks and UV-lamp in a one space and therefore users can adjust the polarity of solvent systems and find the suitable polarity of uninvestigated extracts in one running. Safety is considerable advantages of real time TLC box because using a protective glass layer between UV lamp and users' life threatening effect have been minimized. And most importantly we have used LED lamps and special filter in manufactured real time TLC box using these conditions the researches can observe UV-active bands without need to UV therefore this option make this instrument safer. The used UV and LED lamps in real time TLC box have low ampere and this property makes long term use possible and prolongs life-time of designed real time TLC box.

## 3-Results and Conclusion

Therefore, we designed real time and safe TLC instrument which have two small TLC tanks to use two different solvent systems to prevent misunderstanding about compounds with same polarity in a mixture. Researchers can easily find polarity of uncharacterized fractions because UV-active bonds can be observed during TLC. The UV-active bond can be safely observed using LED-light and special filter instead of UV-light.