External Examiner’s report for the thesis entitled, “Development and validation of chromatographic techniques in pharmaceutical matrices: a novel approach” submitted by Mr. T. Kaleemullah for the award of Degree of Doctor of Philosophy in CHEMISTRY, Thiruvalluvar University, Vellore, Tamil Nadu, India.

In this Doctoral Research study Mr. Kaleemullah developed simple, reliable, cost effective Chromatographic methods for the quantitative measurement of impurities present different spectrum of pharmaceutical drugs. The impurities in the therapeutic agents are contaminating chemicals that remain with the active pharmaceutical ingredients or develop during formulation or upon aging of both API and formulation. The presence of these unwanted chemicals even in small quantity may impact the effectiveness and safety of pharmaceutical product. Number of methods were applied to control of impurities which currently a critical issue to the pharmaceutical industry.

The introductory part is highly relevant, Kaleemullah systematically elaborated on the drug manufacturing process, various impurities, acceptable impurity guide lines given by several agencies. Overview of various spectrum of commonly used drugs and the possible contaminates were discussed in this thesis. The threshold of various contaminates and their side effects such as carcinogenetic and genotoxicity were strengthening argument for the development of these methods. This research may open up new methodology for pharmaceutical industries quality control development and to develop manufacturing process contamination free and to safe to use in patients.

This research is well thought-out and executed with a great extent. Also, the thesis is well written and articulately composed with adequate background information which is well said in the introduction chapter. The methodology applied is clear and organized in a sequence to address the goal of the planned research study. Results were presented well to establish the need for new methods for the quantitative measurement of impurities left behind the final product, particular emphasis to the contaminates such as α- hydroxyl acid, brominating agents, chiral resolving agents, formylating agents and solvents present in the commonly used drug product belongs to therapeutic agent categories, antihypertensive, antibiotic, antipsychotic, anti-depressants by simple chromatographic techniques. Hence this examiner finds this research study is an outstanding piece of innovative research, which will help pharmaceutical industry to battle the critical issue of controlling of impurities in the common therapeutics agents.

I **RECOMMEND** that this thesis to be accepted and Mr. T. Kaleemullah be awarded the degree of Degree of Doctor of Philosophy in CHEMISTRY, Thiruvalluvar University, Vellore, Tamil Nadu, India. I congratulate both the doctoral Scholar Kaleemullah and the PhD advisor Professor Dr. Mansur Ahmed for their contribution to the science.

A few specific comments may, however, be directed at the candidate during viva interface.

Particular focus to the following drugs,

1. What are Critical factors for controlling impurities in active pharmaceutical ingredients?
2. What are allowed impurity level for the drugs analyzed and how can they controlled in the manufacturing process. If the impurities levels are above the recommend levels, what type of measure will be taken to reduce the impurities if any?