SUMMARY

The past two decades remained unexplored in terms of contribution on designs for basic forms of constrained mixture experiments, perhaps because of the availability of software for generation of mixture designs. The present work is outcome of an idea that, improved algorithms can be obtained for the construction of various forms of mixture experiments. As a result, four new algorithms for the construction of four types of mixture designs have been presented. JC method is the base method which is followed by JC1 method, JC method for categorized component mixture experiment and JCL method.

The advantageous features of all four methods are that, they are easy to implement manually and hence easy to program, and they yield small size efficient designs with least effort. For two of the cases, the JC method for categorized mixture experiments and JCL method for all linearity constrained mixture, no parallel methods exist in literature. Altogether thesis provides insight into the nature of points in irregular polyhedron. In particular, a new term called M vertex is introduced.

This thesis suggests that, two studies must be taken up in future, further properties of mixture designs and construction of small size response surface mixture designs, in the presence of process variables.