

## Appendix A

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### A.1 Graphical abstract depicting the methodological pathways

Chapter-1 included the problem identification process in which the problem has been identified bygone through the various literature, especially on gasification and filtration of the producer gas. Producer gas obtained from the downdraft gasifier system by using solid biomass feedstocks as a fuel. The problem is to reduce the contaminant present in the producer gas by designing a filtration unit an integral part of the gasifier system. Also, investigating the multistage filtration system for regulating the pressure with minimum losses in the system.

In the view of the present problems, a novel filtration unit has been designed in which different hole geometry of the honeycomb substrate was kept for the filtration process when producer gas passes through it.

So, for effective filtration following parameters are taken in consideration: Pressure drop across the filter, thickness of the honeycomb substrate, the distance between the two adjacent substrates and the hole geometry of the honeycomb substrate hence, a numerical model was developed to study the best configuration of filter parameters. The numerical model was validated with the experimental results. Finally, filtered producer gas used together with only conventional diesel / biodiesel blend with conventional diesel, as fuel to run the dual fuel diesel engine for energy or power production.

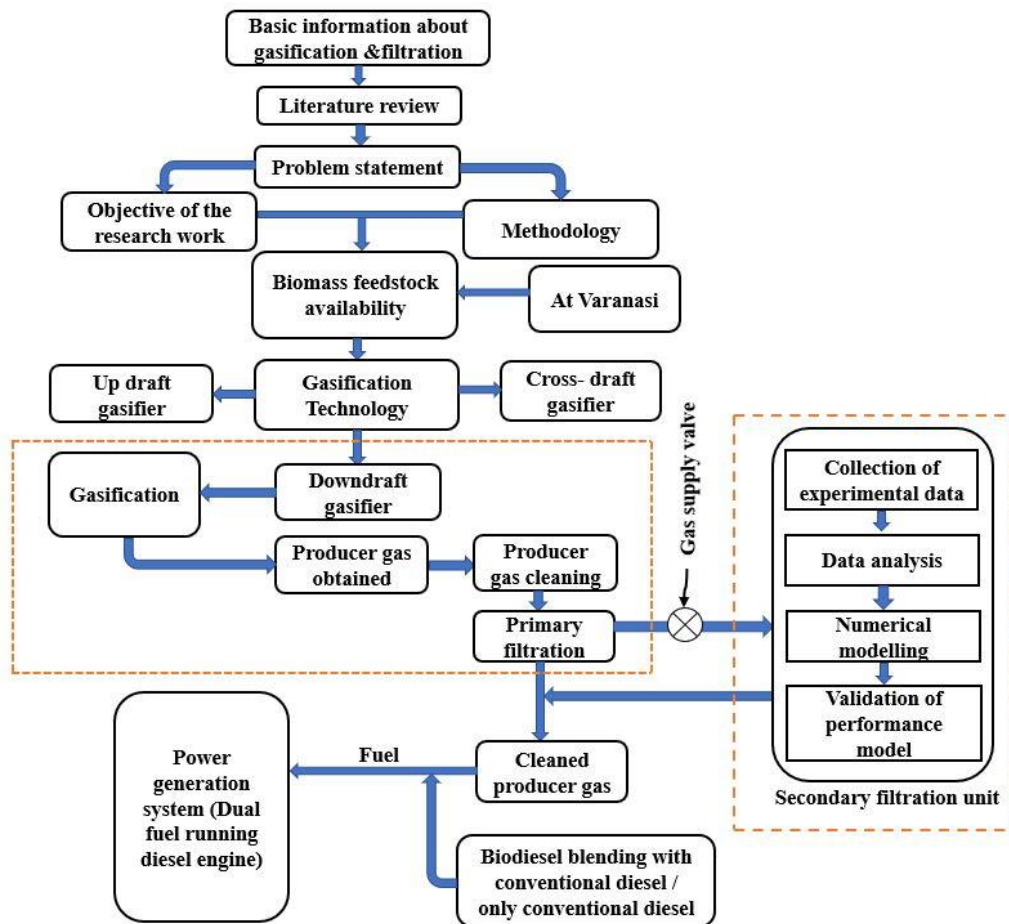


Figure A.1: Flow chart of methodology adopted for the present work.