

Chapter 7 Future scope

Solid product of biomass carbonization, i.e., the charcoal, was characterized for its use in ironmaking. Gaseous product evolved during carbonization can also have use in ironmaking. Gases might also find some use as well depending on their composition. Quality and quantity of gaseous and solid products are dependent on parameters during carbonization. Gas emission monitoring and carbonization kinetics of selected species should be studied in details to help with the process optimization and hence, in controlling the quality control of the solid product i.e., charcoal.

Three hardwood biomass species were studied in the present work. Similarly, other hardwood species shortlisted in the beginning of Chapter 2 can be studied. The characterization and reduction results can be compared and a better biomass species may be discovered. Agronomy aspects such as biomass productivity, yield and land availability need to be researched in order to get a complete picture in terms of economics and industrial suitability of the process.

Biomass has several advantages which has been already discussed in chapter 1. Encouraging results of the study and decreasing prices of renewable electricity indicate that this approach has a huge potential to become an industrial process. However, the scale up of the composite pellet reduction with an aim to make the process energy efficient and economically competitive in future will require a multipronged research activity. These activities involve material selection and reactor design, optimization of the operating conditions, process modelling and optimisation in addition to further fundamental studies at lab scale.