IICC 2021 International Industrial Chemistry Conference

Virtual
1st International Industrial Chemistry Conference
26-28th February 2021

Sustainable Pakistani Industries for Lasting Future

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Background and Objectives:

The founding stone of Green Chemistry was laid down by Paul Anastas in 2012 [1], providing twelve guiding principles (Figure 1). The environmental aspect of industrial productions had been a low priority area especially in developing countries, including Pakistan. The cost of such compromises is born by the whole nation and sometimes even the surrounding nations in worst cases. Even the best products in mass production, loose their worth when produced with serious environmental impacts, such as leather. Considering these facts, the only affordable alternate is sustainable production practices that are safer for human health as well as for the environment.

The modern tools for measuring this are carbon foot print evaluation, release of greenhouse gases, quality of discharged effluent etc.

The current study has been Formulated on the following objectives:

- Identification of issues confronted by Pakistani industrial sector
- Suggested remedies and directions for sustainable industrial productions
- Expected outcomes from important measures.

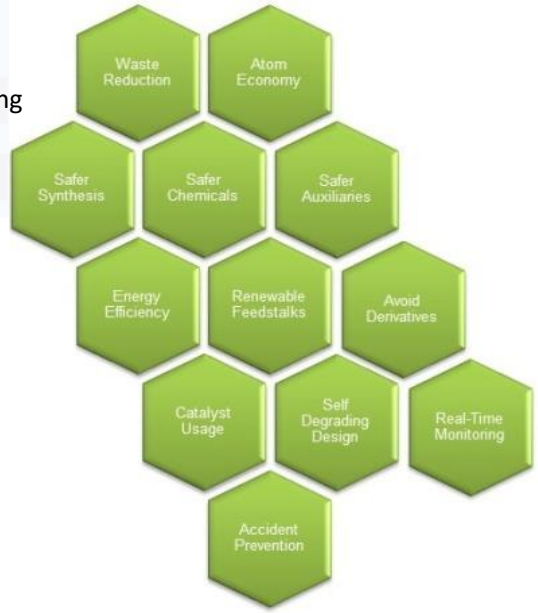

Figure 1: Twelve principles of Green Chemistry

Experimental and Results/Discussion

The most common industries of Pakistan have been analysed on the basis of wastage and by-product generation, yielding pertinent data for possible industrial interlinks as shown in Figure 2.

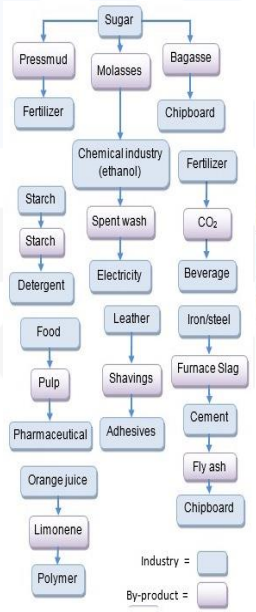

Figure 2: Suggested linkages between industries through By-product utilization

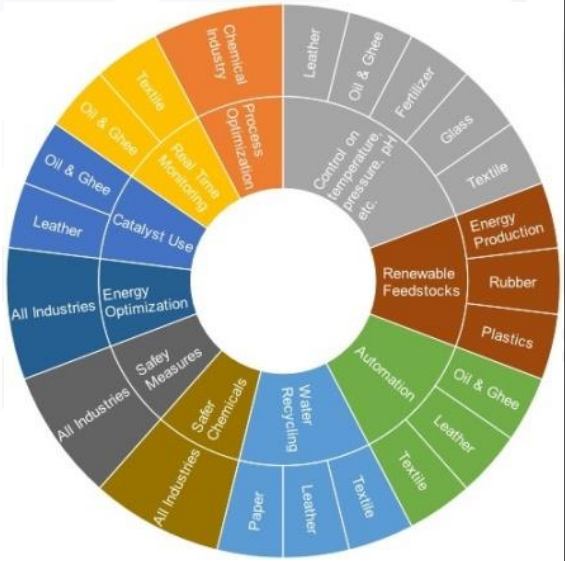

Figure 3: Suggested areas for industries improvement

Feasible improvements in chemical processing are automation, temperature & pressure control, real time monitoring, use of catalysts etc. Catalytic reactions are very efficient in terms of yield per unit of energy as they tend to shift reactions to pathways of lower activation energy. Some plastic products have already been replaced with polylactic acid, a biodegradable plastic made from renewable source i.e. lactic acid [6].

Conclusions

The economy of Pakistan could flourish even after the deadly blow of Covid-19 that has affected industries and businesses worldwide. The industrial sector of Pakistan could regain its place in the international market by adopting sustainable production practices, establishing industrial linkages through utilization of by-products and through application of green chemistry principles in commercial manufacturing units for a sustainable future.

References

1 de la Guardia, M. and S. Garrigues, *Handbook of green analytical chemistry*. 2012: Wiley Online Library.

2.Barthel, M., et al., Advances in Cement Research, 2016. **28**(7): p. 458-468.

3.Tabinda, A. B., et al., Energy Sources, Part A: Recovery, Utilization, and Environmental Effects, 2019: p. 1-10.

4.Ince, B. K., Cetecioglu, Z., *Environmental management in practice*, E. Broniewicz, Editor. 2011, BoD–Books on Demand.

5.Sadh, P.K., Duhan, S. and Duhan, J. S., *Review.* Bioresources and Bioprocessing, 2018. **5**(1): p. 1-15.

6.Datta, R., et al., *FEMS microbiology reviews*, 1995. **16**(2-3): p. 221-231.