

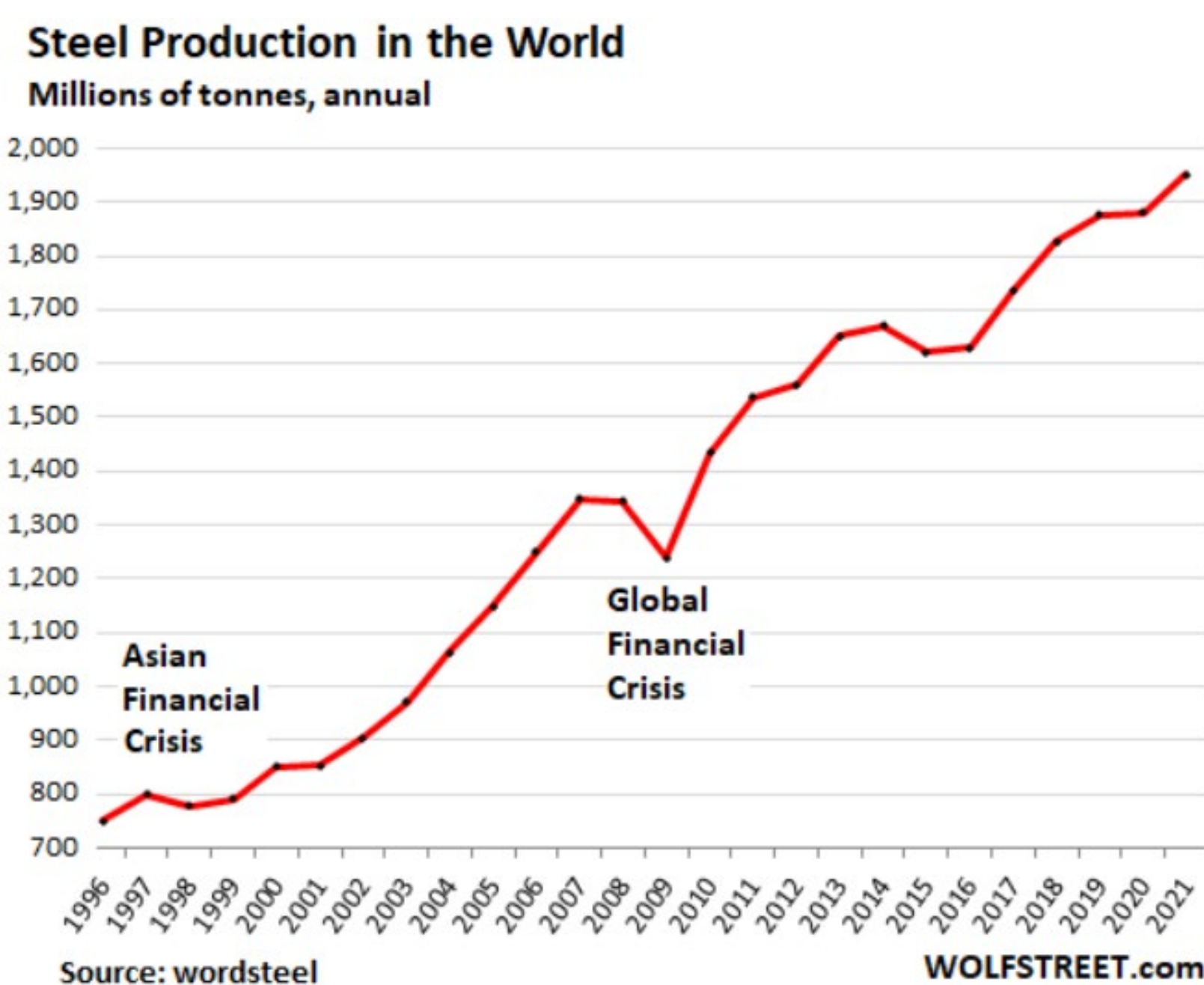
Physical properties optimization of the Zimbabwean limonite ore- carbon composite pellet as a sustainable feed for pig iron production

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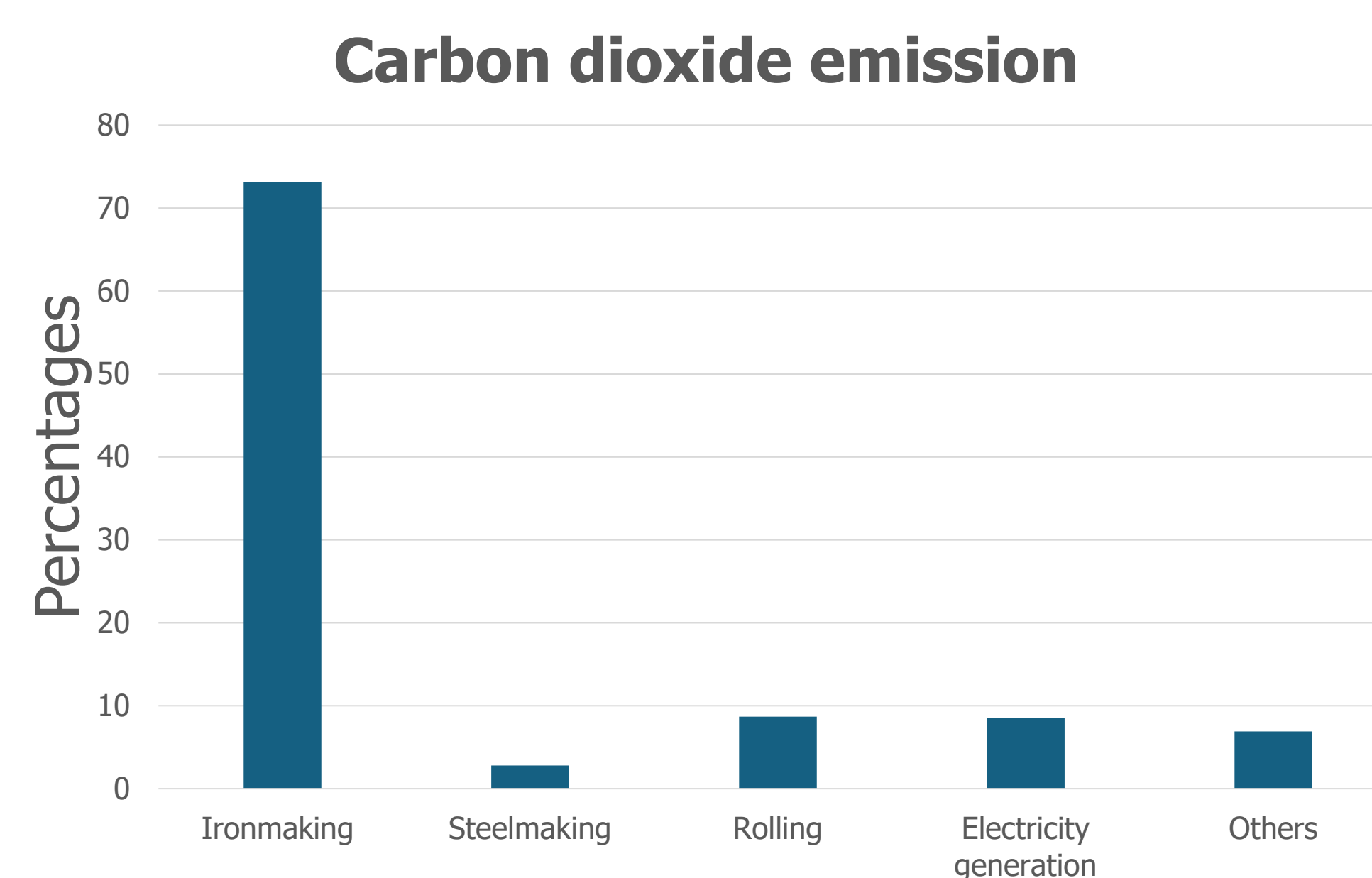
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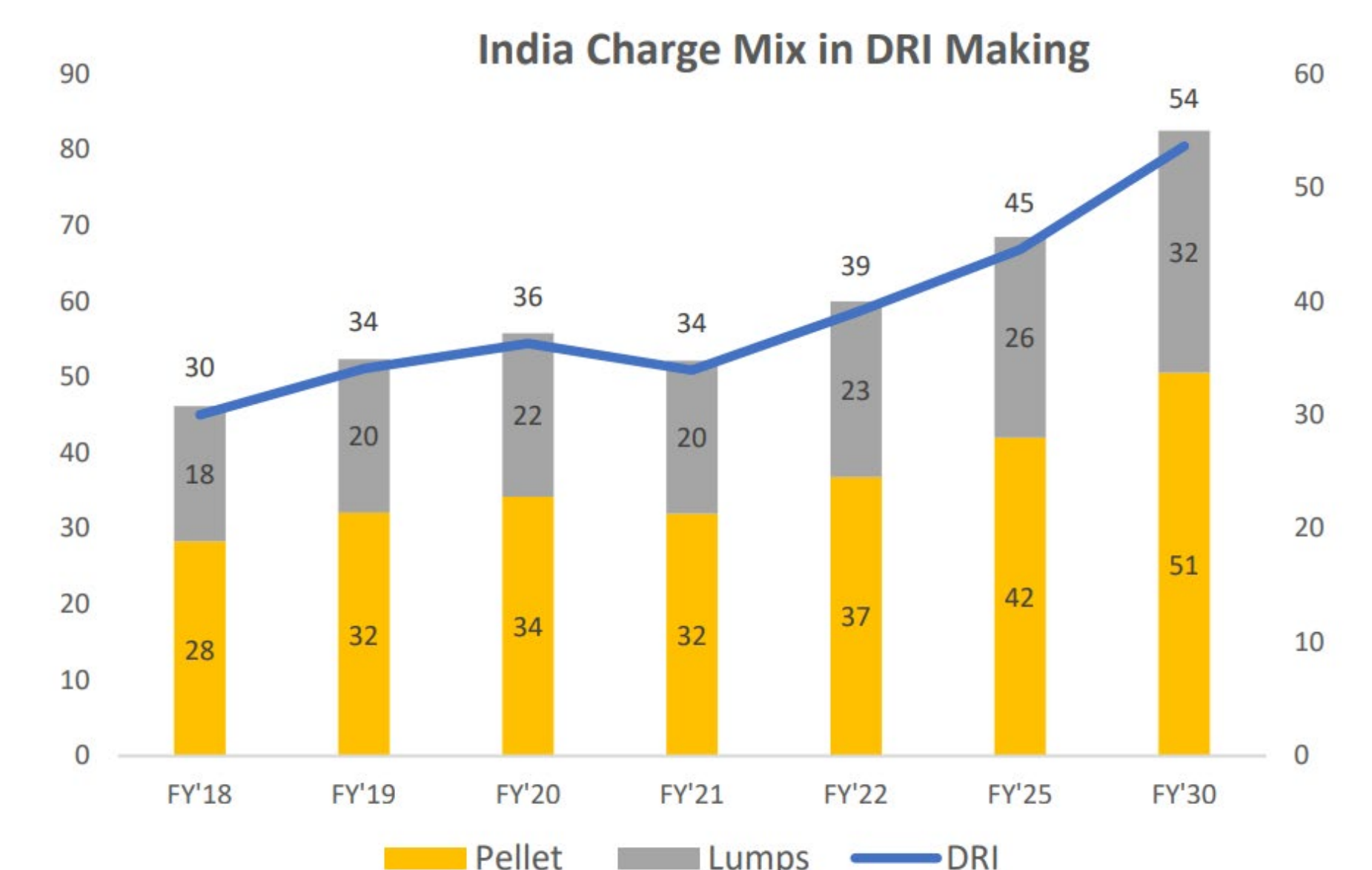
1 INTRODUCTION



- Increase in steel production
- Depletion of high grade resources



- Decarbonisation of the ironmaking process



- Increased usage of pellets

2 METHODS

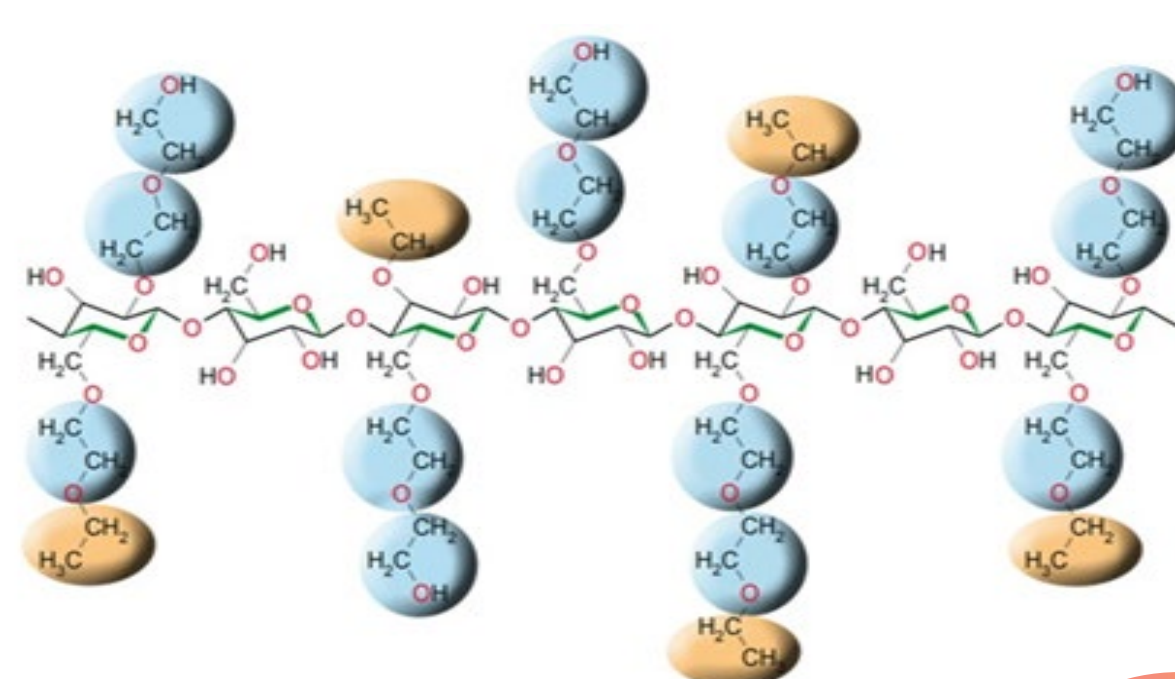
Chemical composition of the ores

Analyte	T-Fe	SiO ₂	CaO	Al ₂ O ₃	MgO	Mn	S	P	LOI
Limonite Ore	52.51	8.78	1.32	1.30	0.59	2.1	0.005	0.04	11.87
Limestone	1.34	7.10	45.70	1.19	4.22	0.31	0.17	0.01	39.96

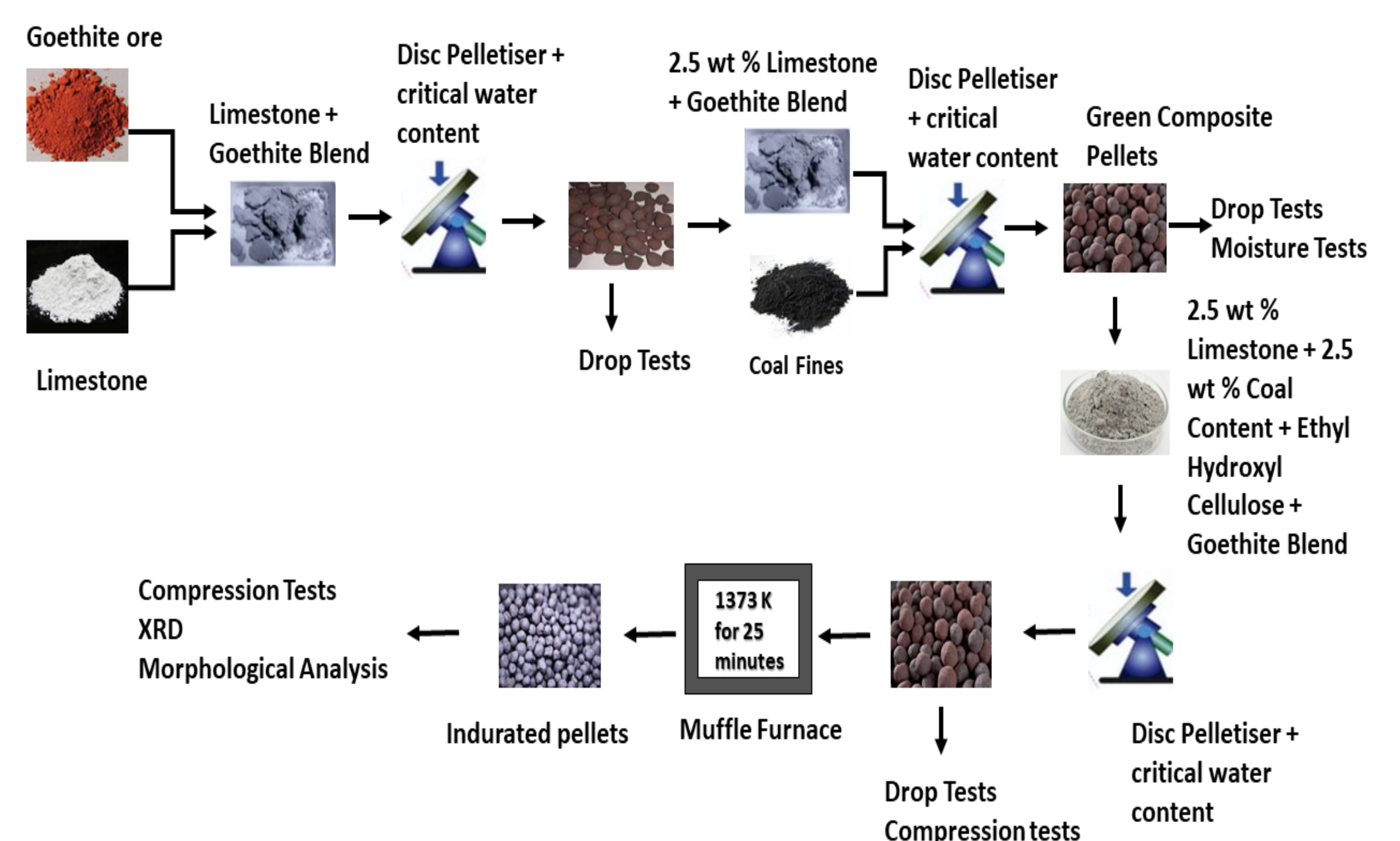
Proximate analysis of the coal

Fixed carbon	Volatile Matter	Ash Content	Moisture Content
64.28	24.12	10.40	1.20

Chemical structure of the binder

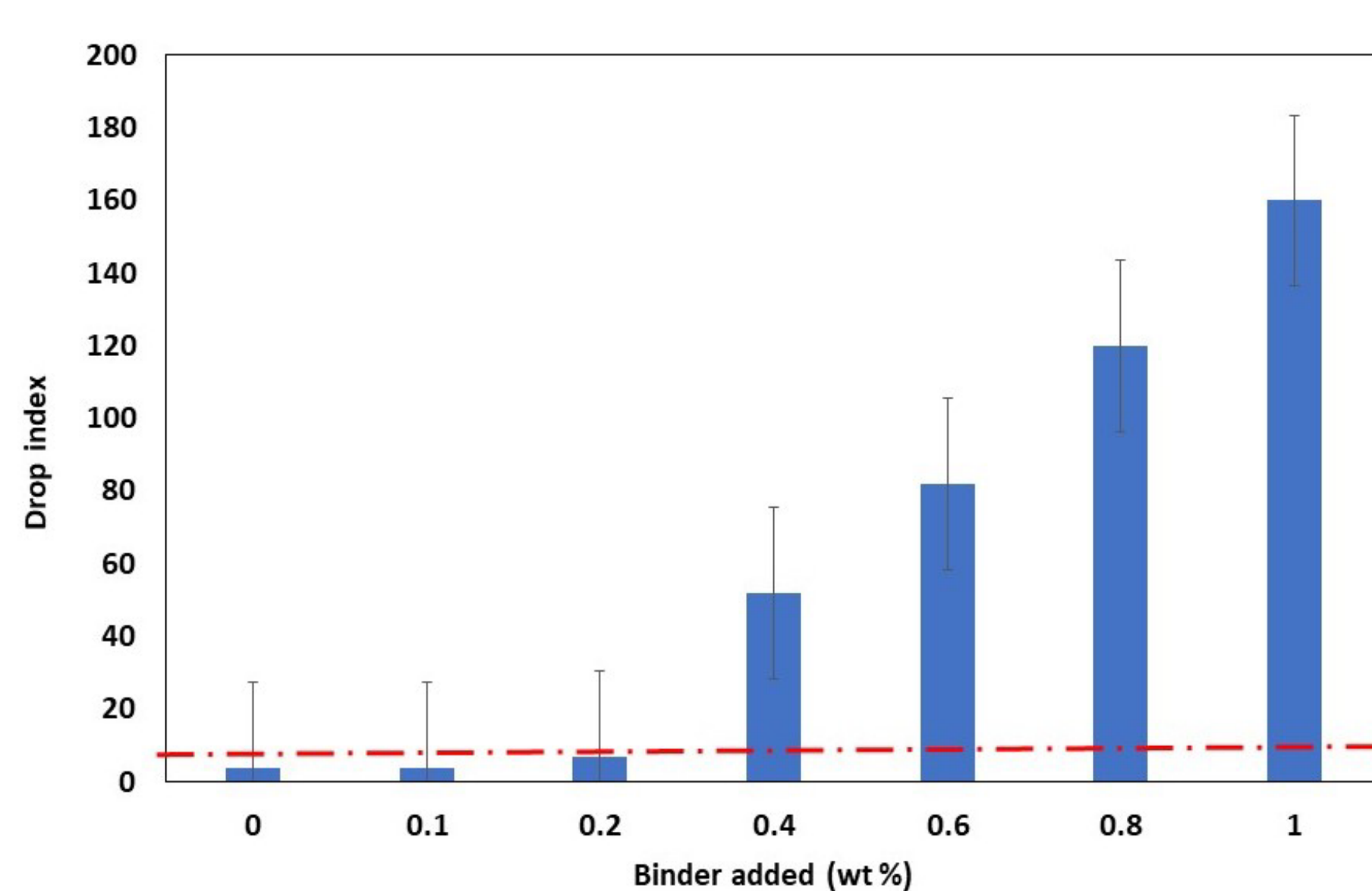


Pellet making procedure

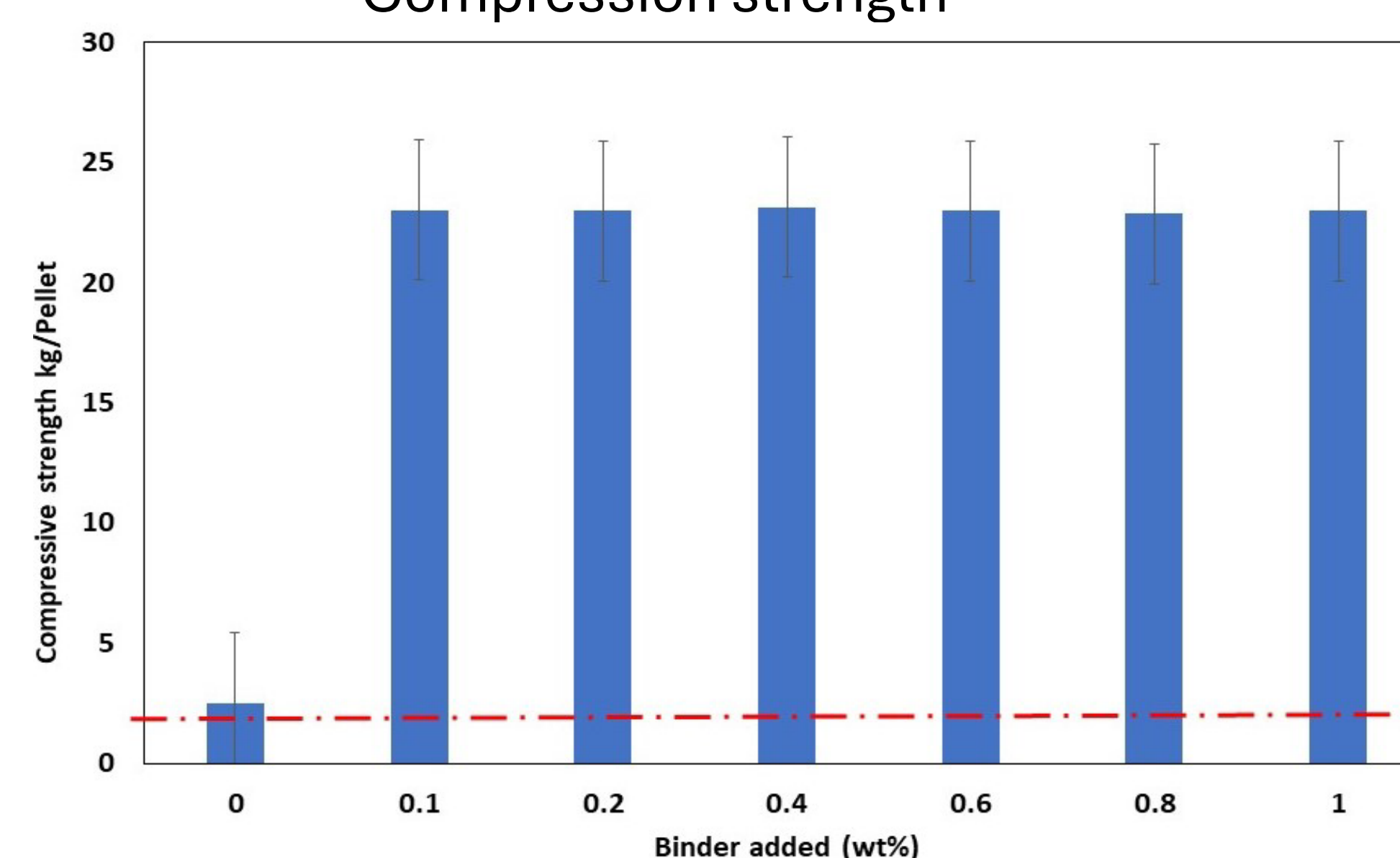


3 RESULTS AND DISCUSSION

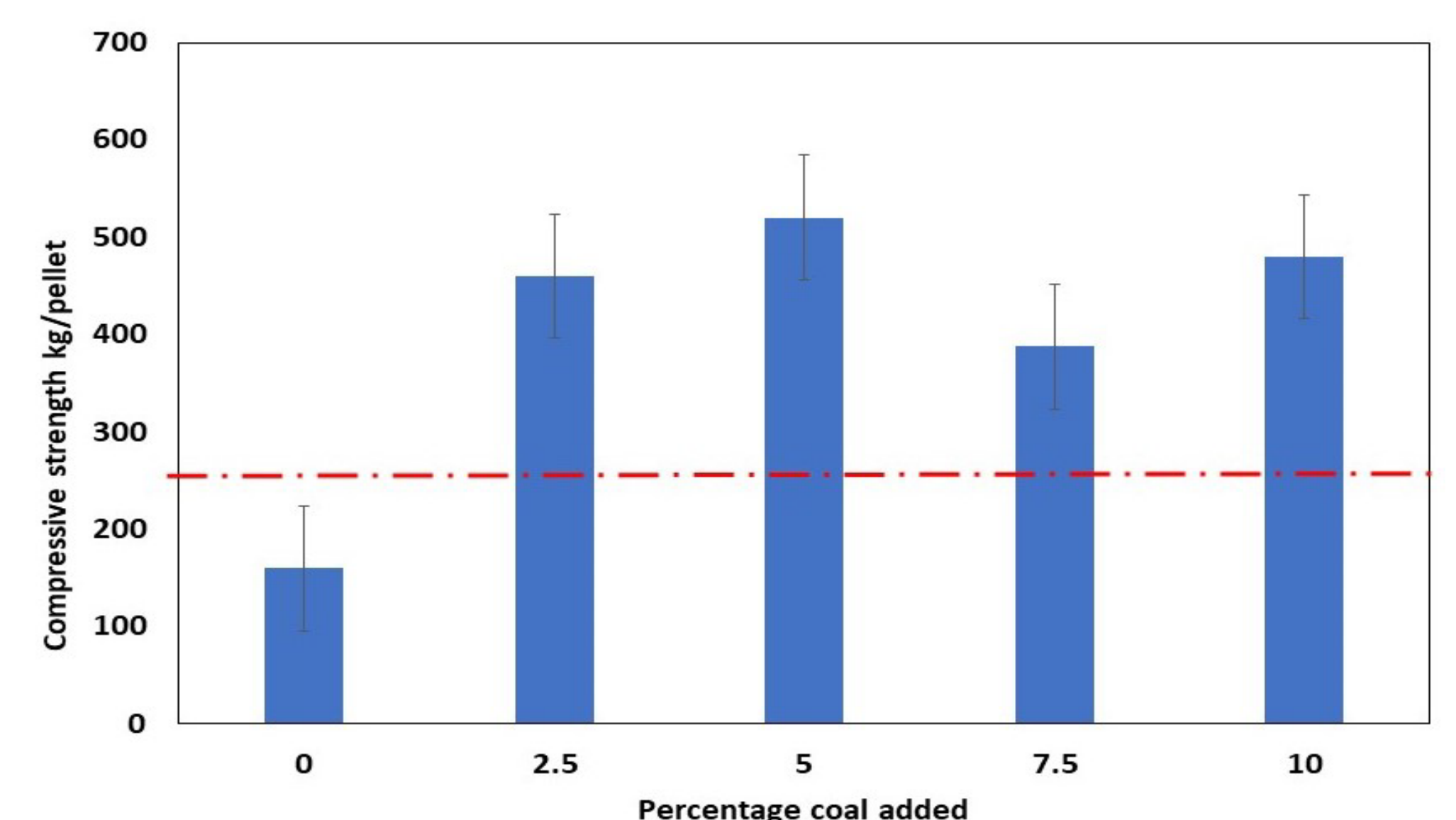
Drop index with increasing binder



Compression strength



Indurated strength



4 CONCLUSION

- An optimum amount of limestone of 2.5 wt%, 2.5 wt% coal, and 0.4 wt% ethyl hydroxyethyl cellulose improved both the green and indurated physical properties of the pellets.

REFERENCES

Chisahwira, T., Masuka, S. M., Maritsa, S. & Chiwandika, E. K., 2023. The use of Zimbabwean limonite-coal composite pellet as a sustainable feed for pig iron production. Perth, AusIMM .