

OAT HUSK ASHES AS SUPPLEMENTARY CEMENTITIOUS MATERIAL

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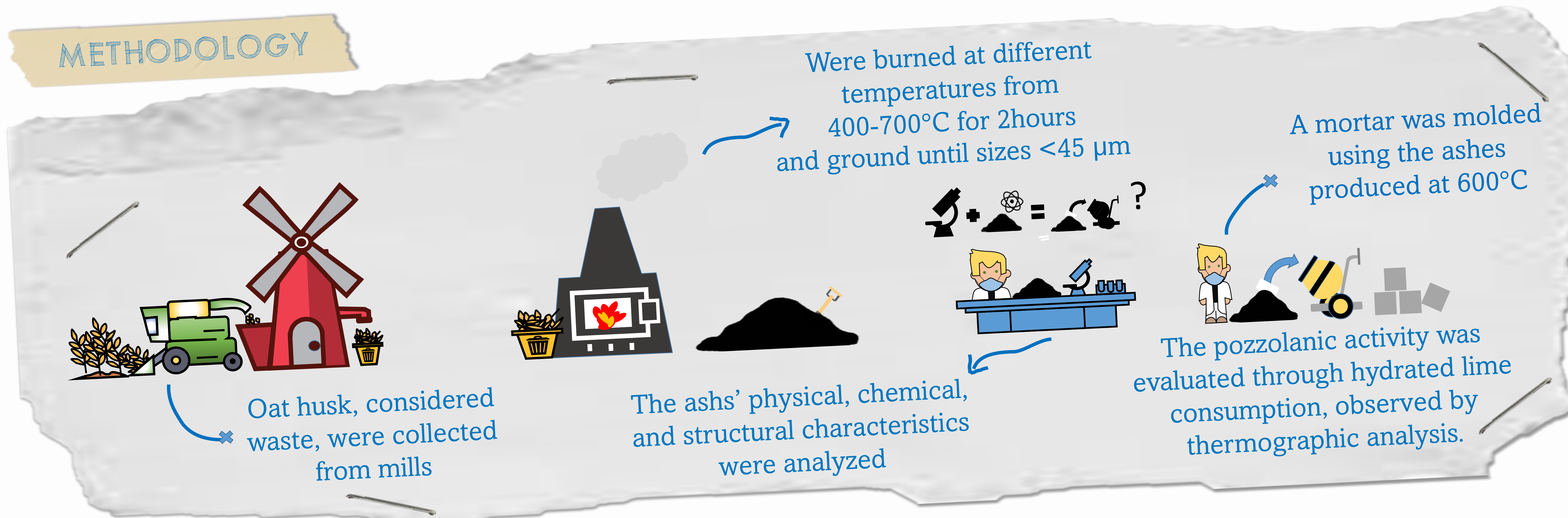
INTRODUCTION

Supplementary cementitious materials (SCMs) are recognized and utilized to minimize cement use; however, several waste sources now employed for partial cement replacement are under threat for changes in industrial production methods and local availability[1]. As a result, alternative materials like agricultural residues are being investigated as SCMs, particularly for their pozzolanic potential as a source of amorphous silica [2]. In this work, the pozzolanic potential of oat husk ashes is investigated.

OBJECTIVES

To present the characterization results and assess the pozzolanic activity of generated ashes that present the most favorable properties for the occurrence of pozzolanic reactions.

METHODOLOGY

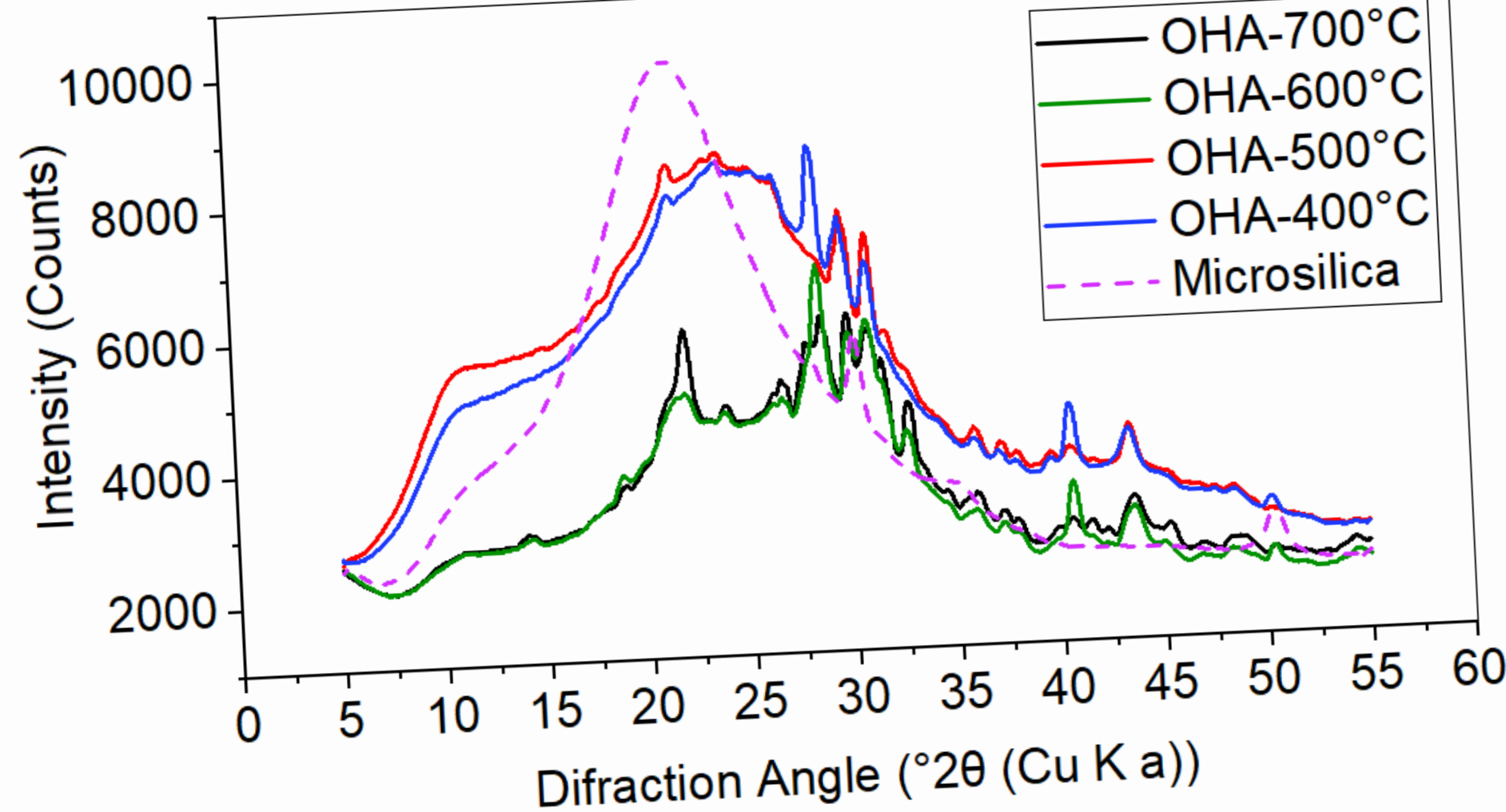


RESULTS

Lost On Ignitio Results and Chemical Composition (EDX)

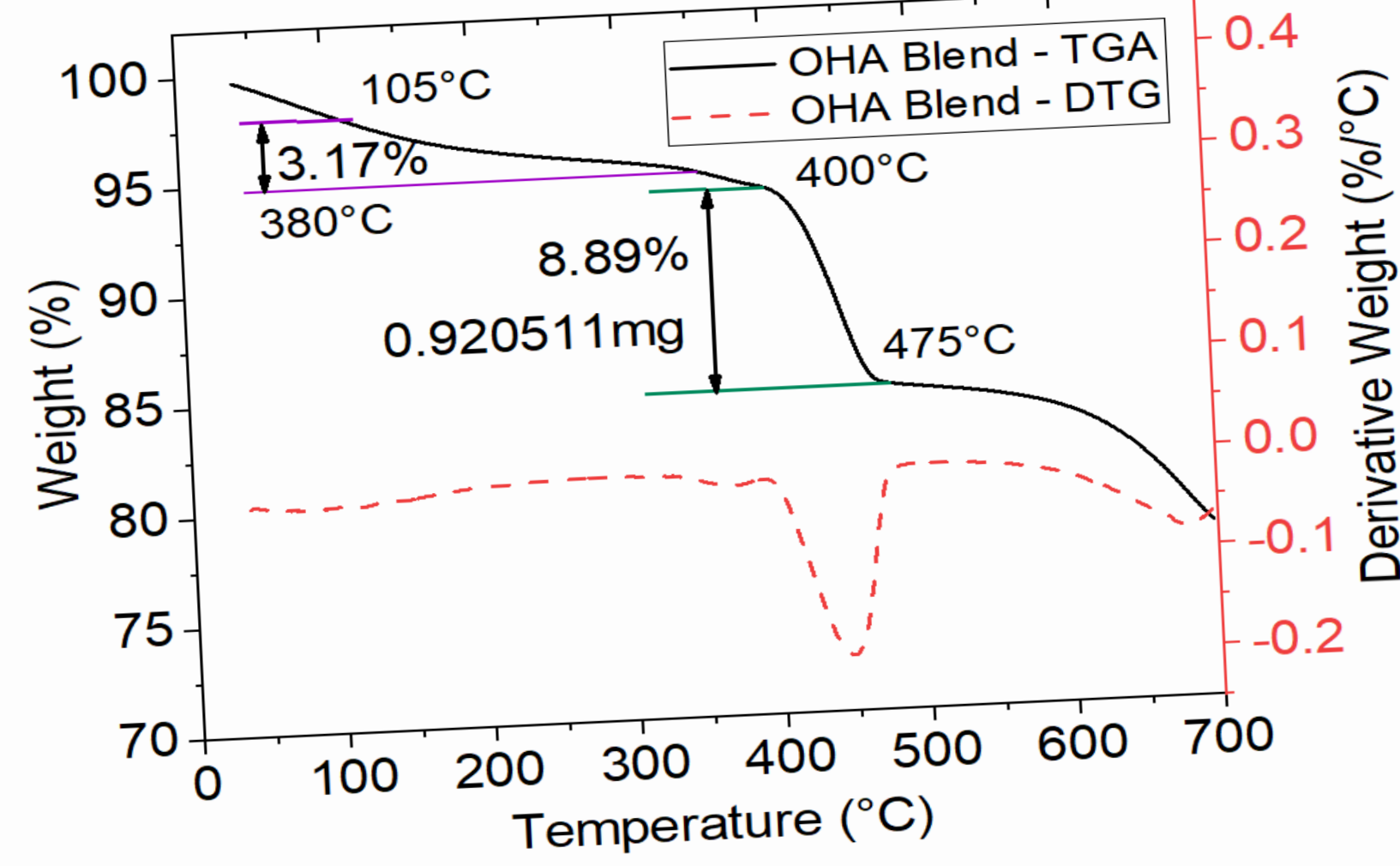
Component	0°C (raw) (%)	400°C (%)	500°C (%)	600°C (%)	700°C (%)
Ash Content	2	35.1	76.1	96.4	96.9
Carbon Content	98	64.9	23.9	3.6	3.1
Si	3.47	24.59	22.36	21.2	23.84
Al	0.59	0	0	0	0.64
Fe	0	0.03	0.21	0.42	0
K	0.97	13.65	16.15	16.91	15.17

Structural Composition - X-ray diffraction (XRD)



XRD analysis demonstrated a change in ashes' crystallinity between 500 and 600°C.

Mortar's Thermogravimetry Analysis (TGA)



The mass loss of 8.89% relative to Ca(OH)₂ represents consumption of 2.78 g in relation to the known initial amount.

CONCLUSIONS

Ash content increases with increasing temperature, suggesting that temperature is one factor acting to reduce organic matter.

Considering the ASTM C618-05 Standard [3], the material investigated is below the requirements for the chemical composition of SiO₂ + Al₂O₃ + Fe₂O₃ = 70% minimum of the constitution.

There is a significant rise in crystallinity of ashes generated between 500 and 600° C

Local oat husks in Ireland calcinated at 600° C can react minimally with calcium hydroxide forming calcium silicate hydrate.

ACKNOWLEDGEMENTS

The authors thank the AIT President's Doctoral Scholarship for research funding, the company Millstream Recycling Ltd. for providing the material used in this study, and the companies Applied Polymer Technologies – APT and the Center for Industrial Service & Design – CISD for sharing their equipment and performing some of the analyses.

REFERENCES

