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Automated Surface Texture Analysis For Forensic Discrimination of the Range of Bast Reinforcement Fibres

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Bast Fibres

- Natural fibres can be grown on land which is not fertile enough for food cultivation and removes heavy metals from the soil
- Similar specific modulus and strength to glass fibres
- Composites industry worth £60bn in 2019

Forensic Identification

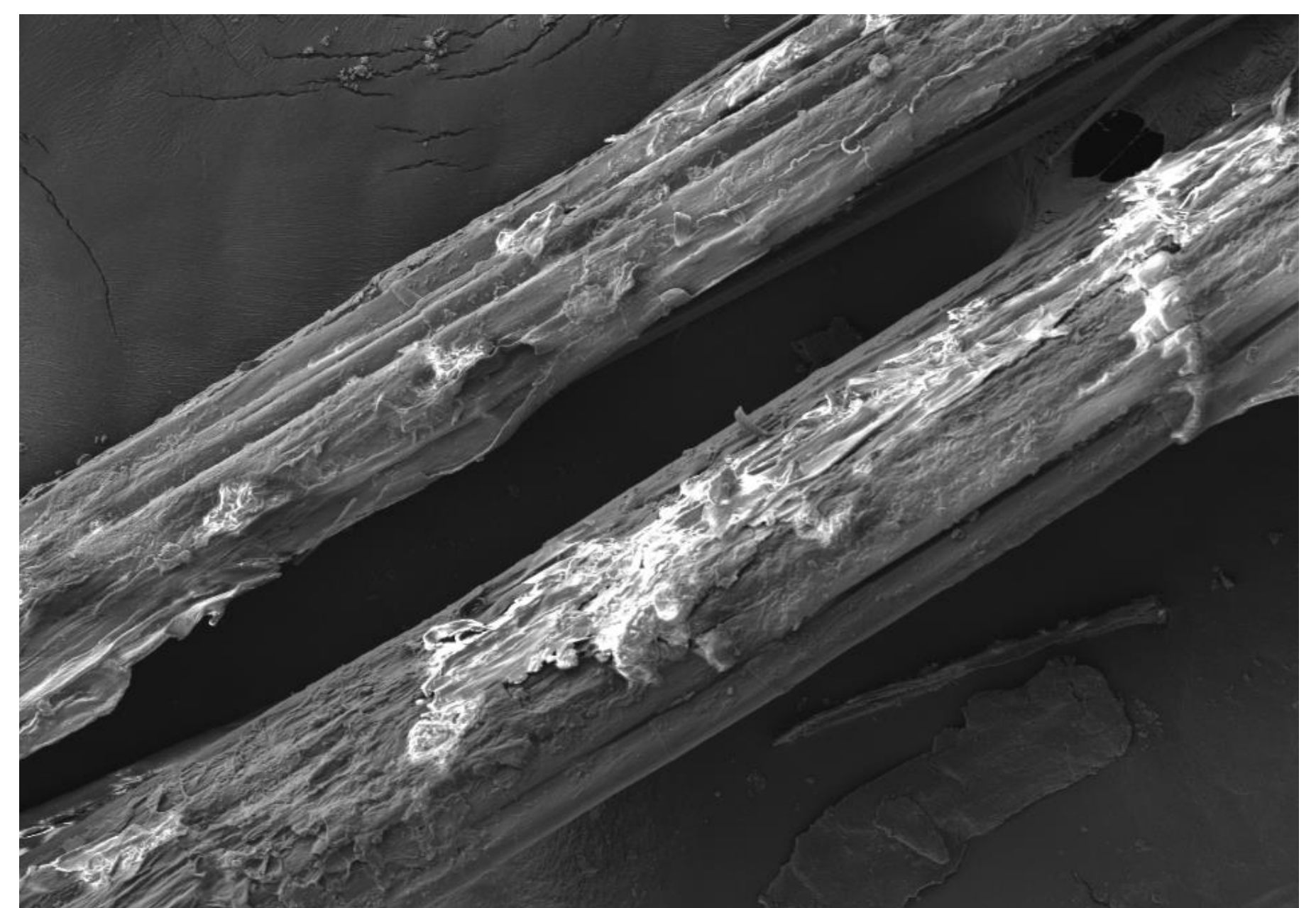
- Industry needs quality control procedures to prevent adulteration
- Current fibre identification methods include: Pyrolysis Gas Chromatography, DNA Profiling, SEM Analysis
- Automated SEM micrograph analysis using ImageJ

Methodology

- ImageJ (FracLac plug-in) produces a surface roughness value (Fractal Dimension)
- Micrographs collected from various backgrounds, treatments, processing, and testing methods
- Images thresholded and converted to binary for analysis

Results

- Quality of the available images limited the use of the fractal dimension to describe different fibre types
- Limitations of restricted access to laboratories made it impossible to obtain high quality images
- Scope to investigate the similarity of the surface textures of fibre types



Flax Fibre Micrograph (Sample 25)

Mean Fractal Dimension and Standard Deviation

