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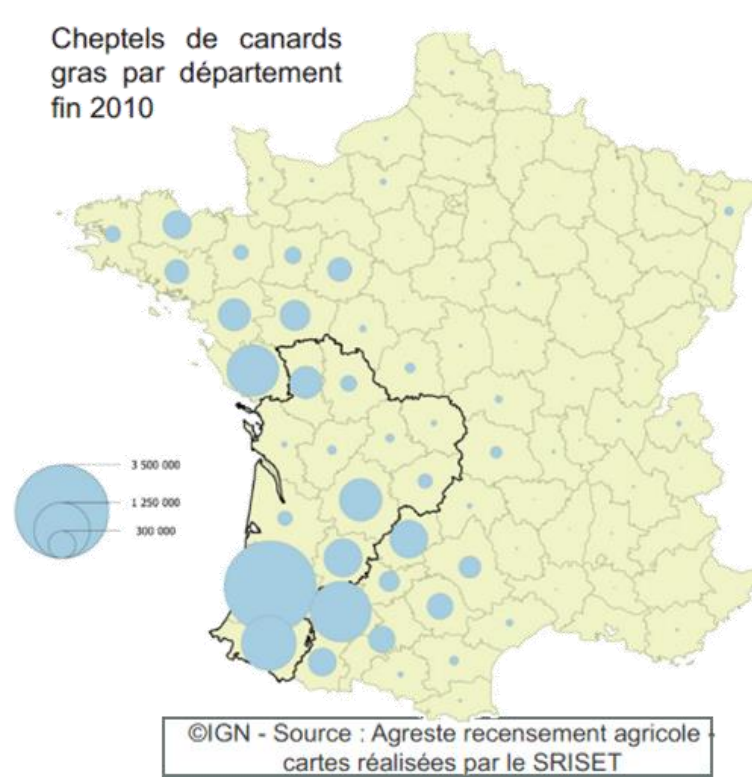
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GREEN KERATIN EXTRACTION FROM DUCK FEATHERS USING A DEEP EUTECTIC SOLVENT

Sandra Alvarez ^{a*}, Eduardo Robles ^a

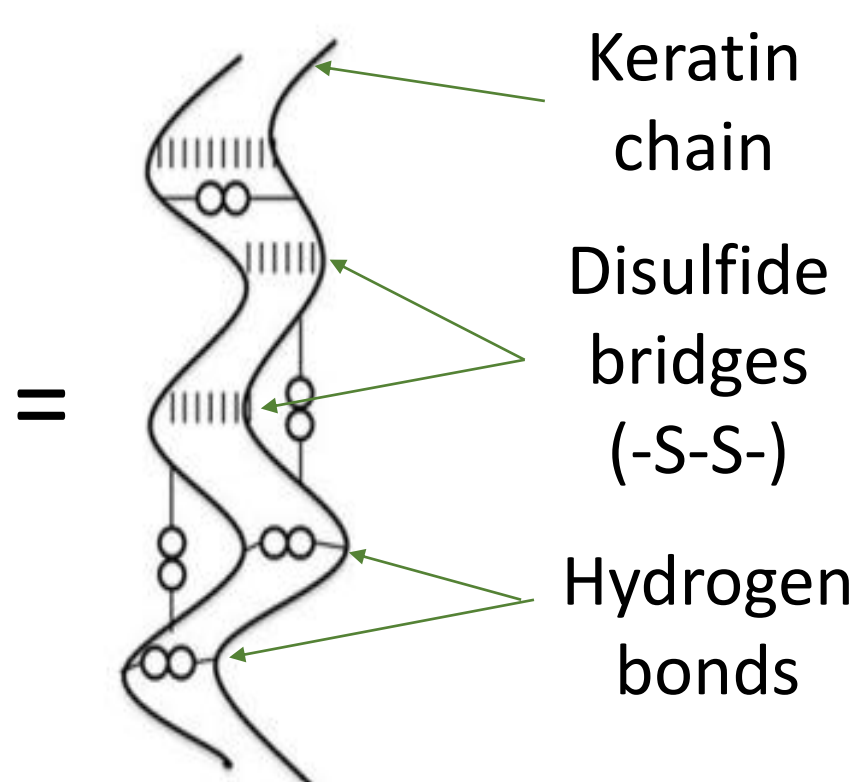
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BACKGROUND



In the South West of France, thousand of tons of duck feathers are produced by the food industry each year.

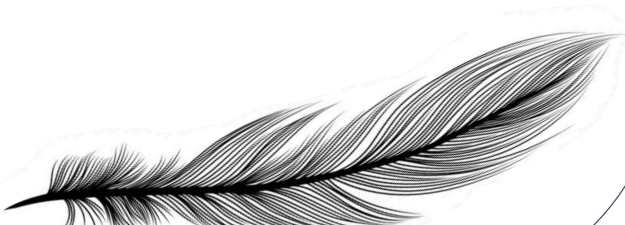
These feathers represent an environmental and health risk because of their disposal in landfill sites or their incineration. However, a feather is composed of keratin : insoluble cysteine-rich protein. It's high stability is ensured by intramolecular / intermolecular disulfide bonds and hydrogen bonds. The main extraction methods employed are environmentally harmful and the demand to develop more eco-friendly processes is increasing. This work consists of determining an extraction process using a deep eutectic solvent and determining the influence of the extraction parameters on the yield and properties of the regenerated keratin.



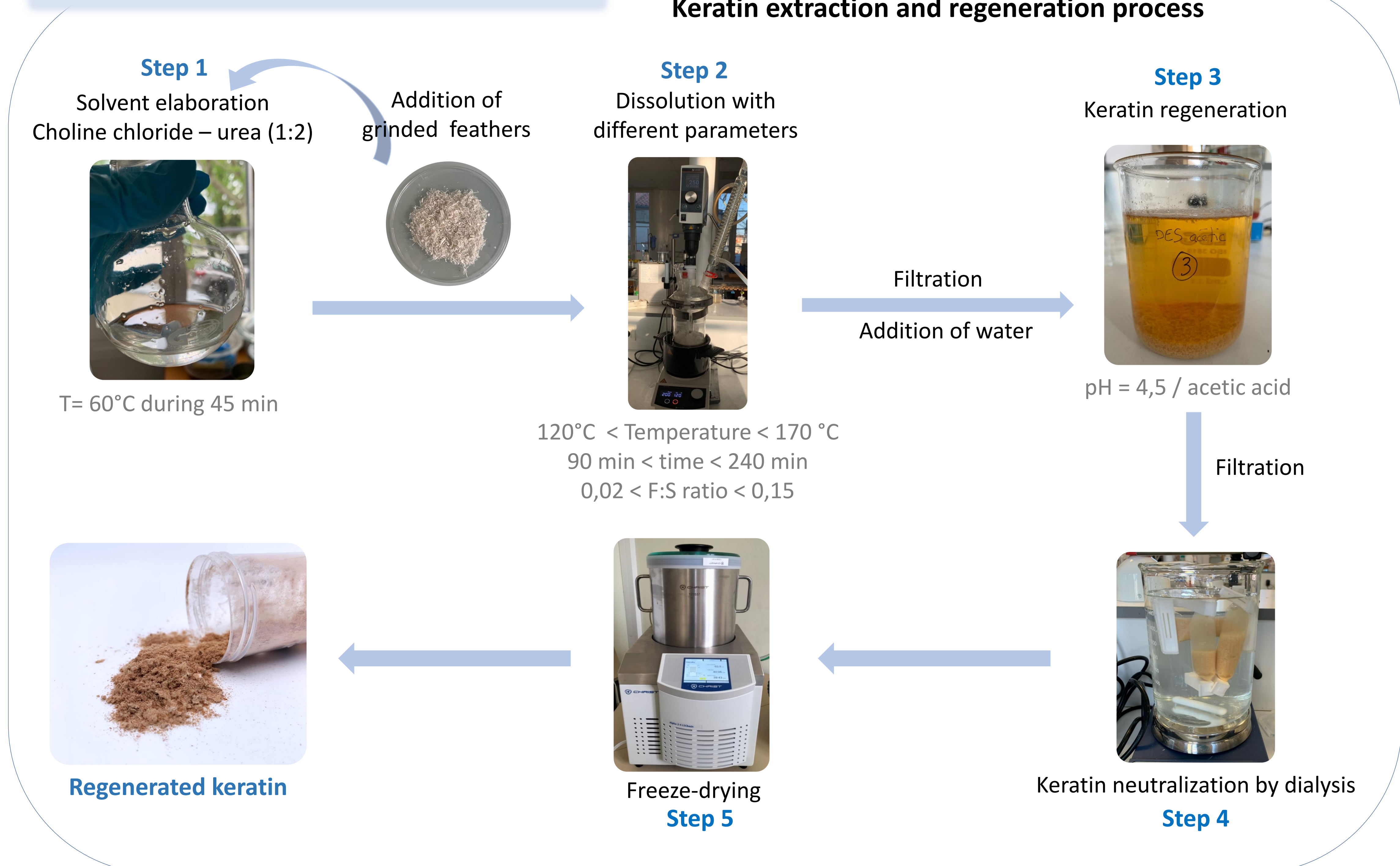
Feather = 90 % keratin

DISCUSSION

- A minimum of 130°C is required for the extraction, increasing the temperature above 140°C reduces the overall yield. **The shorter the dissolution time, the higher the yield.** Keratin degradation is therefore minimized.
- **The optimum feather : solvent (F:S) ratio is 0.1.** The limit results from the viscosity of the solution.
- Best thermal properties for lowest extraction temperature : major degradation from 240°C and highest remaining mass value. **Thermal properties decrease overall with increasing temperature.**
- Similar chemical composition for each temperature with all the **characteristic protein bands evident.**
- ✓ **Use of non-toxic products for keratin environmentally-friendly extraction process has been optimized.**



MATERIALS & METHODS



RESULTS

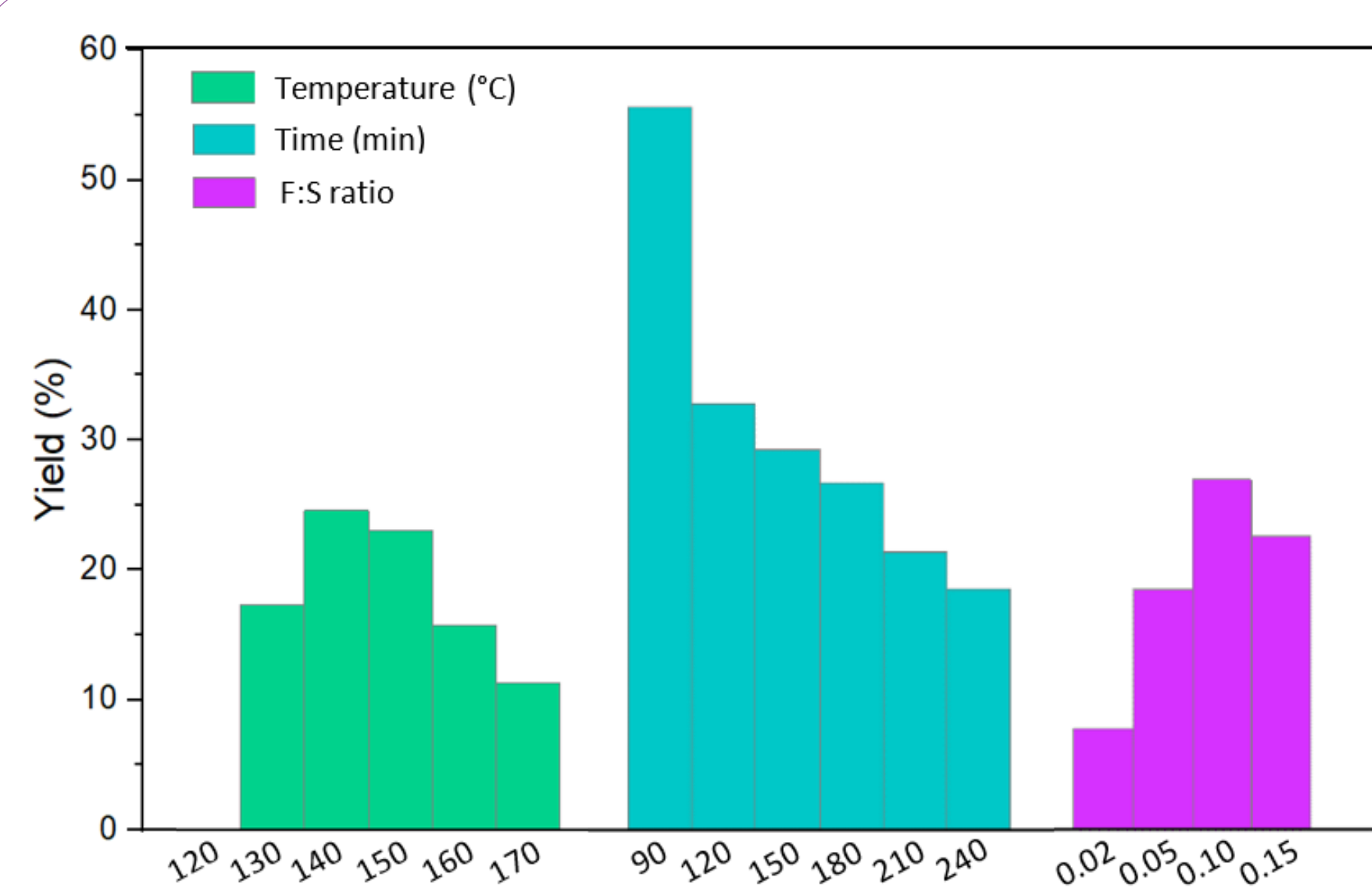


Figure 1. Yield as a function of temperature and extraction time, as well as the feather:solvent ratio (F:S).

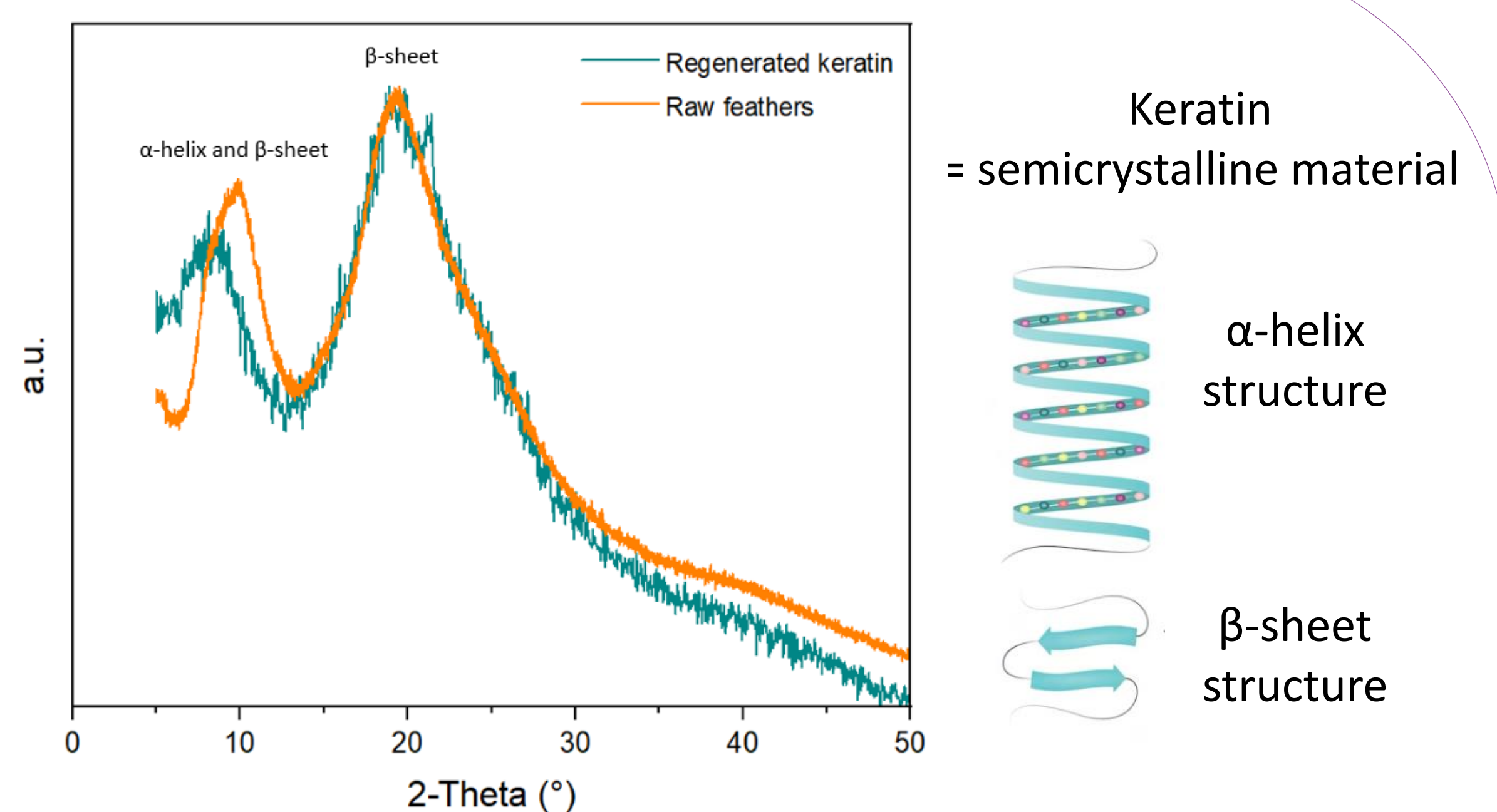


Figure 2. X-ray diffraction (XRD) patterns of regenerated keratin.

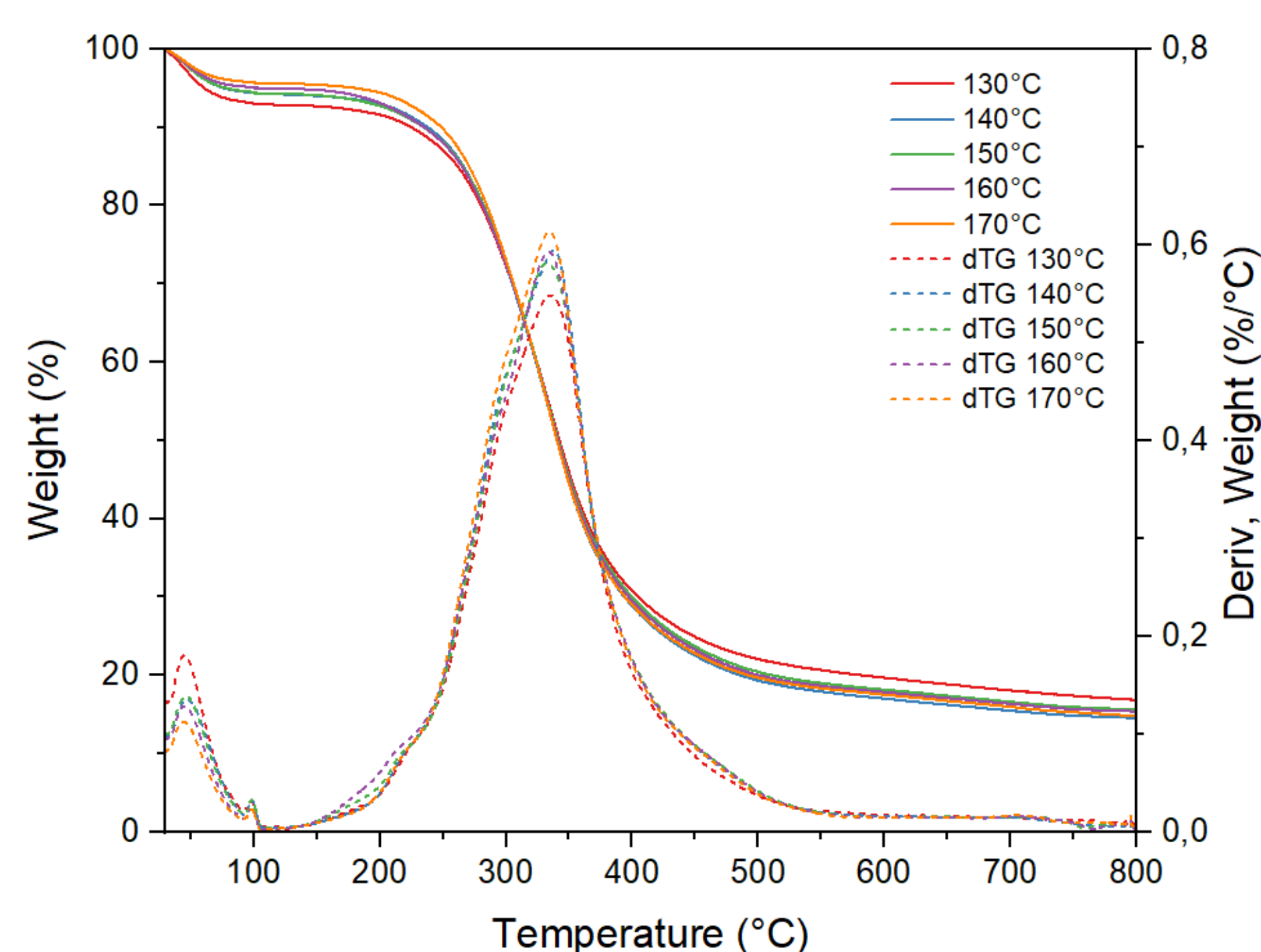


Figure 3. Thermogravimetric analyses (TGA) of regenerated keratin depending on the extraction temperature.

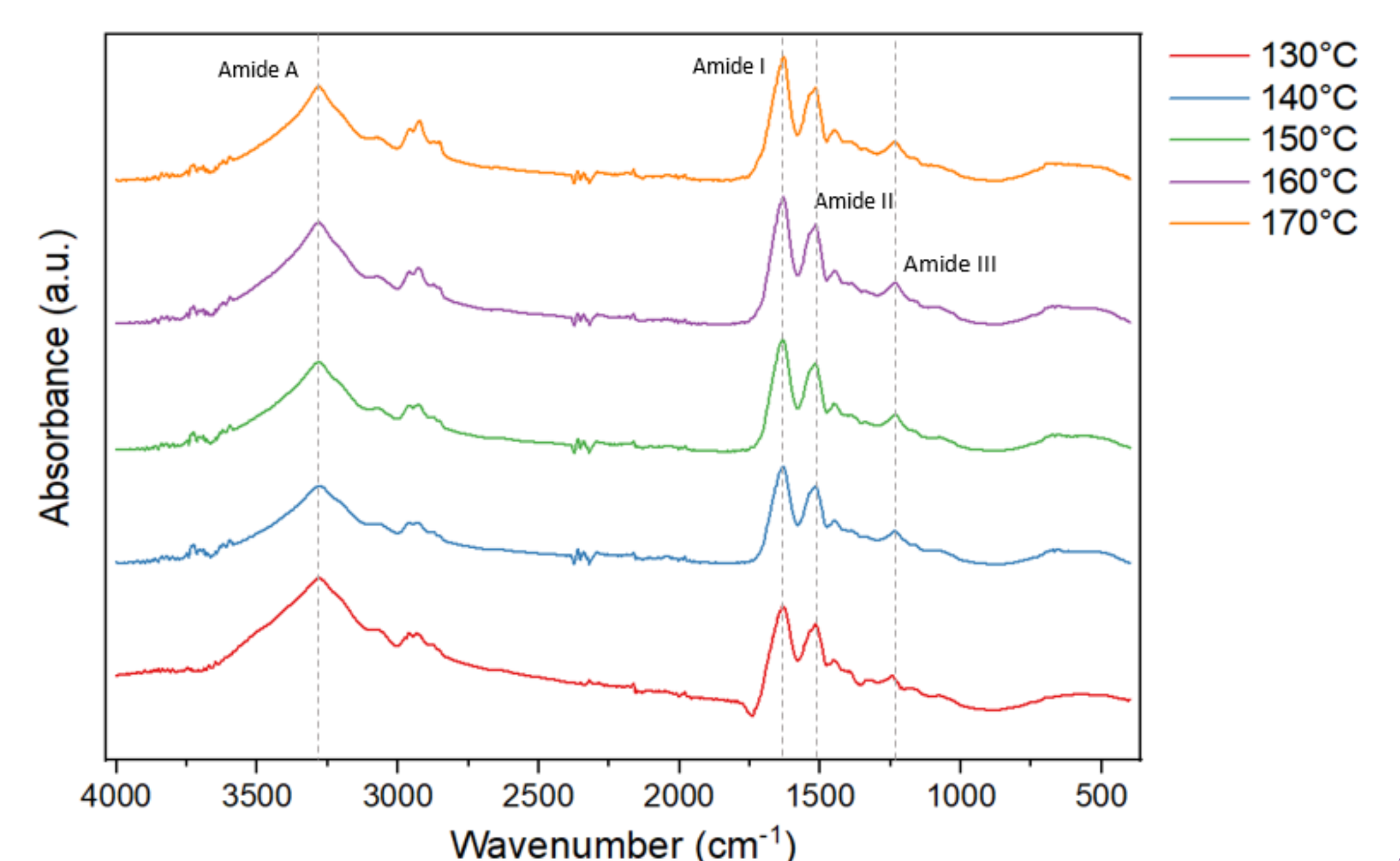


Figure 4. Fourier-transform infrared (FTIR) spectra of regenerated keratin depending on the extraction temperature.

ACKNOWLEDGMENTS

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