Comparison of two substrate protection approaches to applying the calcium handling for improving the resistance of collagen proteolysis

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Abstract

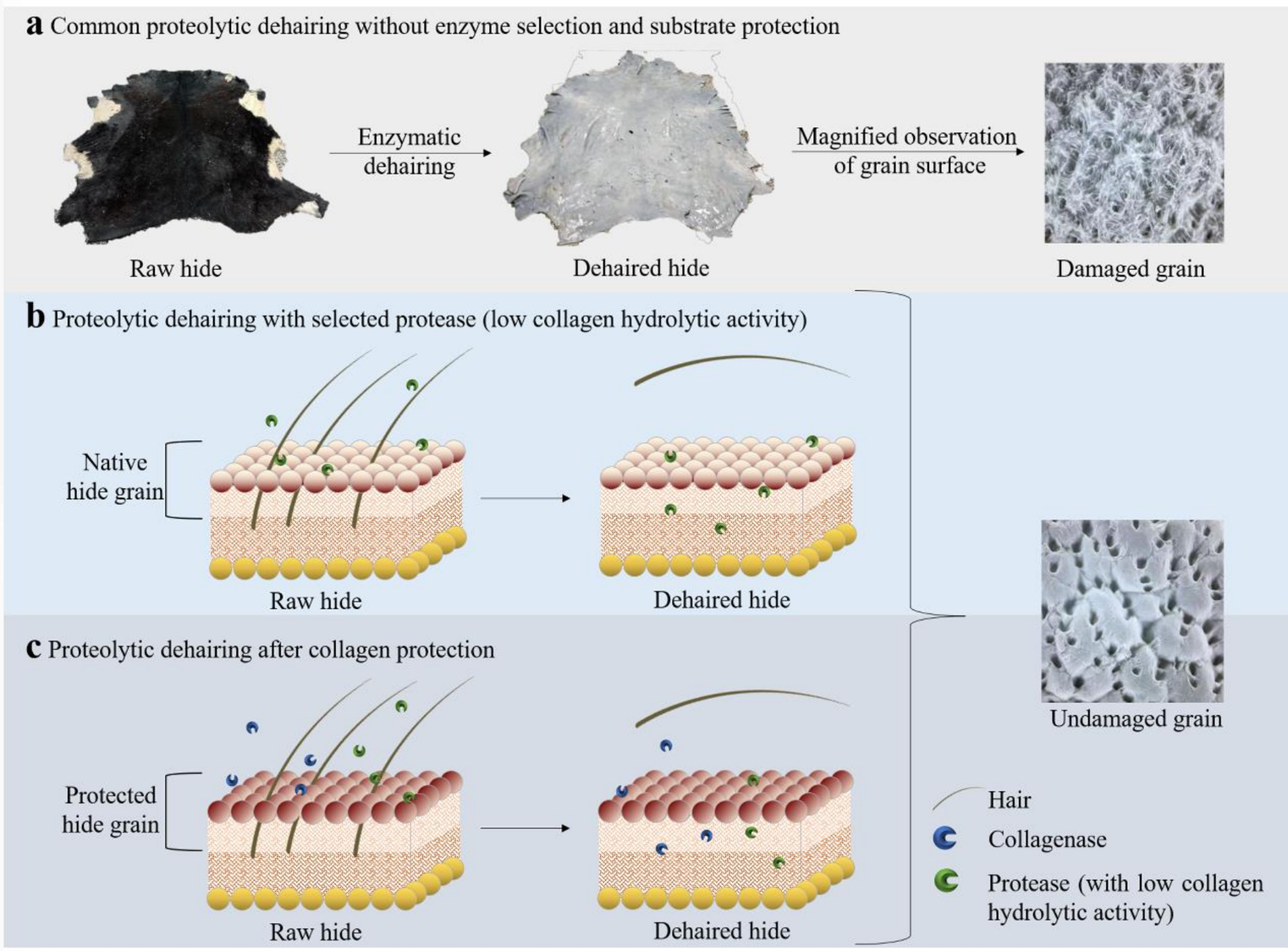
Enzymatic dehairing has reached processive advancement with potentially replacing the traditional hair removal due to increasing pressure from environmental demand. Two methods for protecting the hide grain during enzymatic dehairing processing were chosen, utilizing

- **Calcium ions (alkaline conditions)**
- **Calcium phosphate**

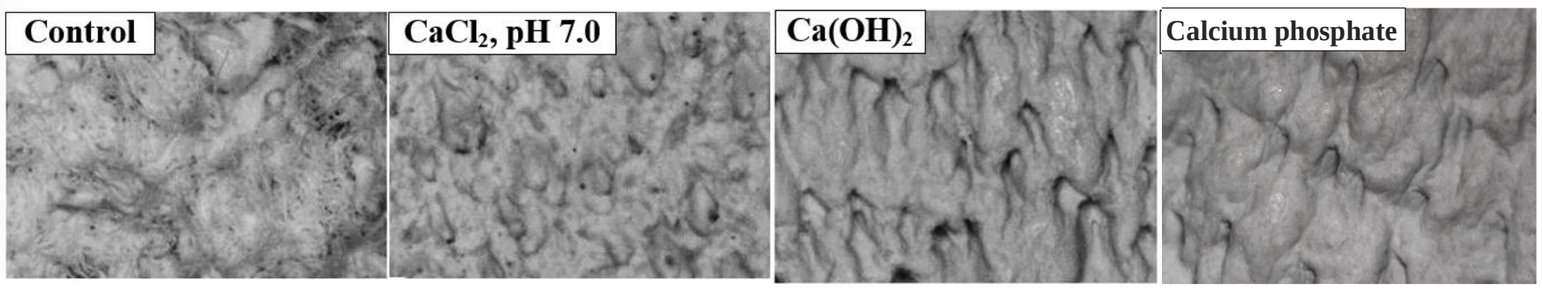
Material and Methods

Four adjacent hide samples (50×20 cm, numbered **a**, **b**, **c**, **d**) were cut from the center of a cattle hide back. Before pretreatment, the soaking step was conducted according to the conventional process. Then, 0.3% of $CaCl_2$ (group **b**, **d**) and $Ca(OH)_2$ (group **c**) were added separately based on the raw hide weight to treat these pieces of hide. Among these experiments, group **a** was the control group, and after 30 min, $NaH_2PO_4 \cdot 2H_2O$ was added to group **d**.

Introduction

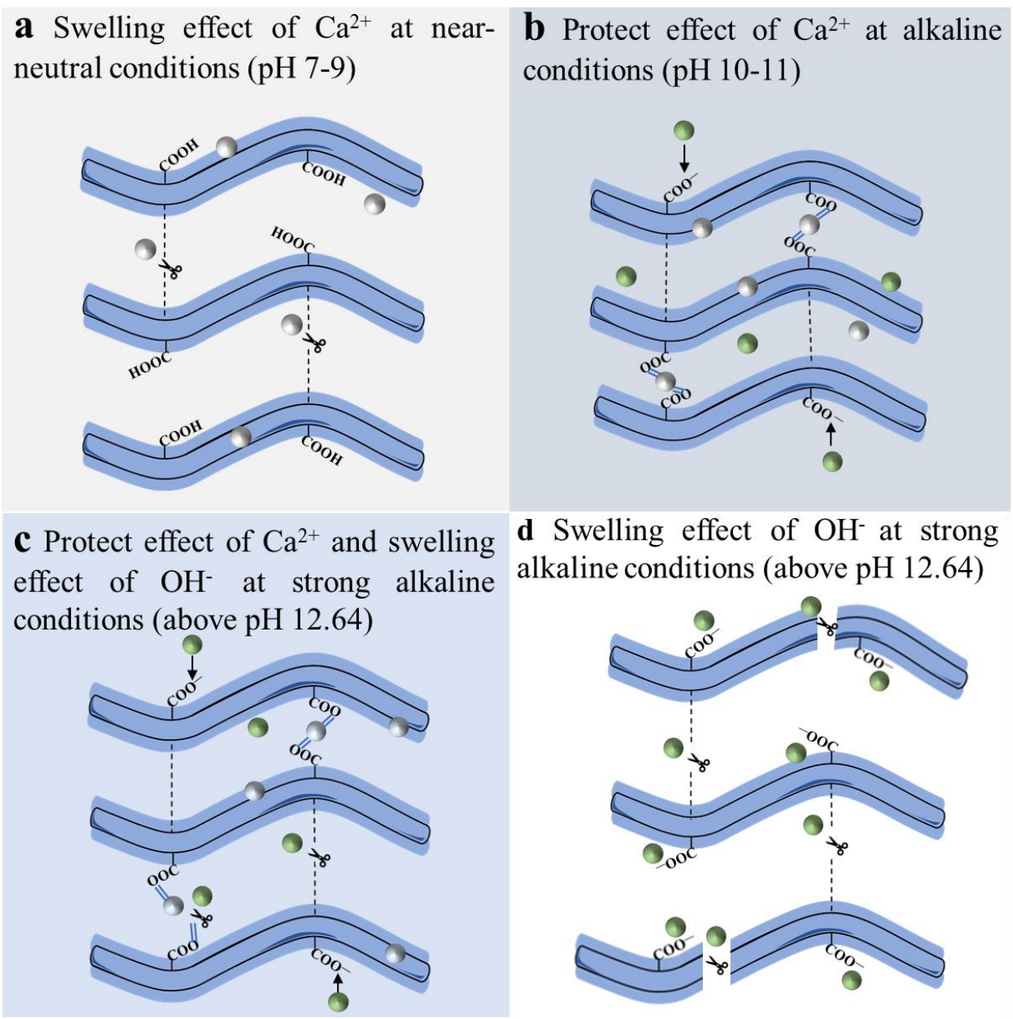


Results and Discussion



The grain surface of hide treated with different methods

The mechanism of calcium ions on collagen fibers



Conclusion

- Pretreating animal hide with a solution containing calcium ions or calcium phosphate can improve the protease resistance of hide grain, making the hide grain well-protected
- Calcium ions handling under alkaline conditions have a better protection effect than that of calcium salts
- These methods provide an effective way to establish safer enzymatic unhairing technologies based on substrate protection

Reference

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