



REPUBLIC OF KENYA



KENYA INDUSTRIAL RESEARCH AND DEVELOPMENT INSTITUTE

ENZYMATIC DEGRADATION OF TANNERY HAIR WASTE

BY

DR. ARTHUR ONYUKA

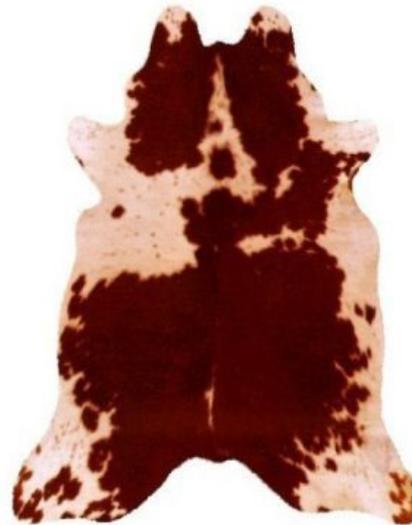
1st WORKSHOP ON ECO-TANNING PROCESSES IN KENYA AND THE EAST AFRICAN REGION.

NAIROBI

17TH – 19TH AUGUST 2023

INTRODUCTION

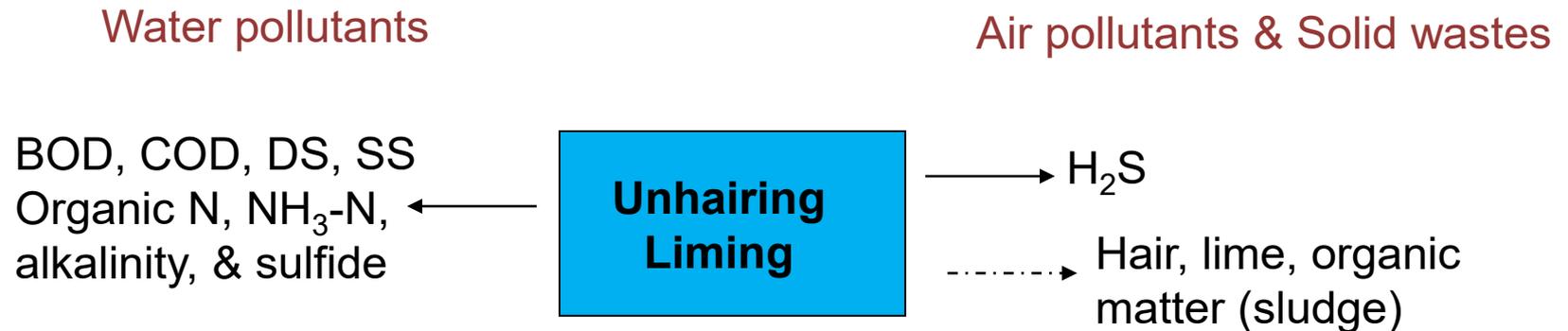
- ❖ Leather sector plays an important role in the livestock industry.
- ❖ Contributes to economic growth.
- ❖ Employment creation
- ❖ Supports livelihoods



INTRODUCTION

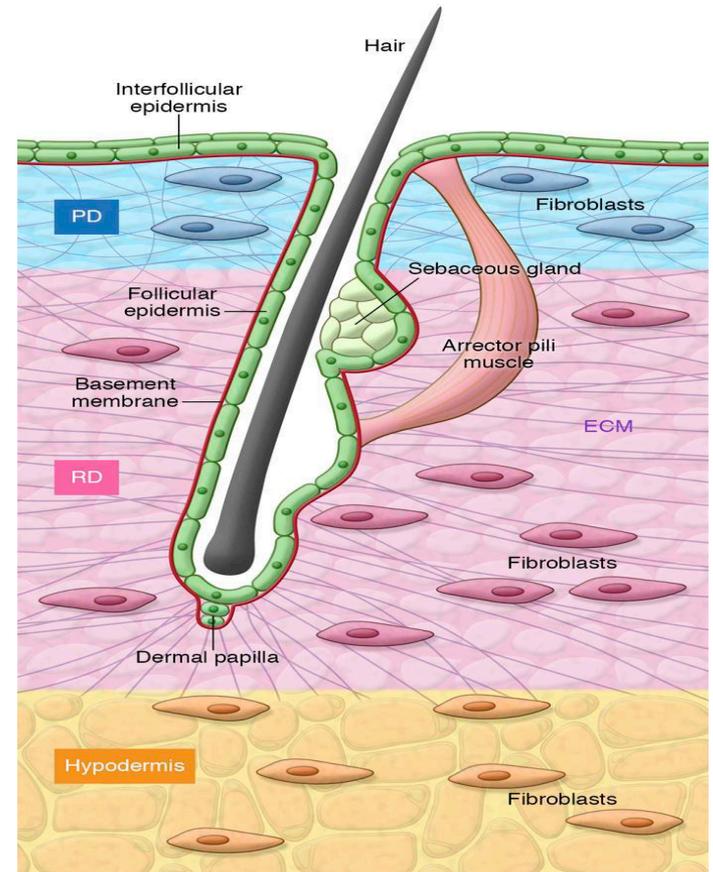
- ❖ Leather making process produces substantial amount of liquid and solid wastes.

ENVIRONMENTAL IMPLICATIONS



HAIR-SAVE HAIR RECOVERY TECHNOLOGIES

- ❖ Industrial hair-save unhairing
 - Immunization: Sirolime/Blair- hair.
 - Painting
 - Enzyme-assist chemical unhairing.
 - Enzyme unhairing
 - **Dispase** (basement attack)
 - **Keratinase** (danger of epidermal damage)
- ❖ Approx. 5 – 10% of hair recovered.



Hair anatomy

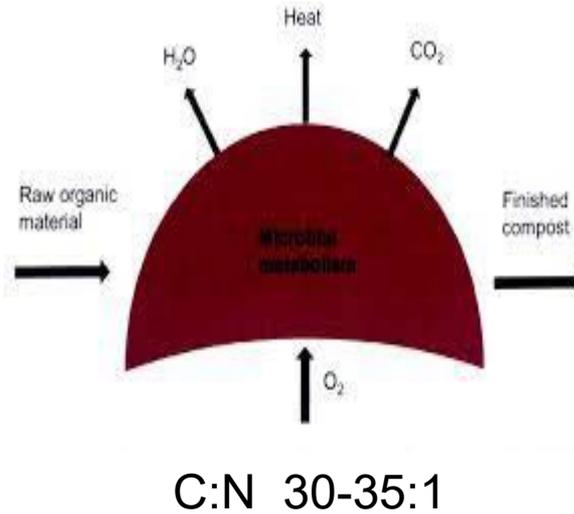
BENEFITS OF HAIR-SAVE HAIR RECOVERY

- ❖ Reduced environmental cost, i.e.;
 - Effluent treatment
 - Sludge disposal
- ❖ Reduced pollution to the environmental.
- ❖ Lower COD and BOD.
- ❖ Income from sale of recovered hair.

UTILIZATION OF RECOVERED HAIR

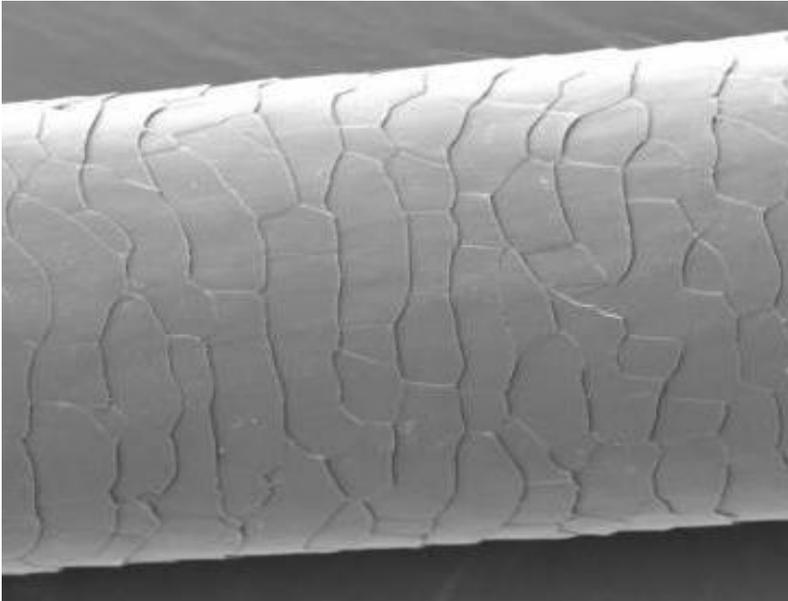


Hair contains 15% nitrogen

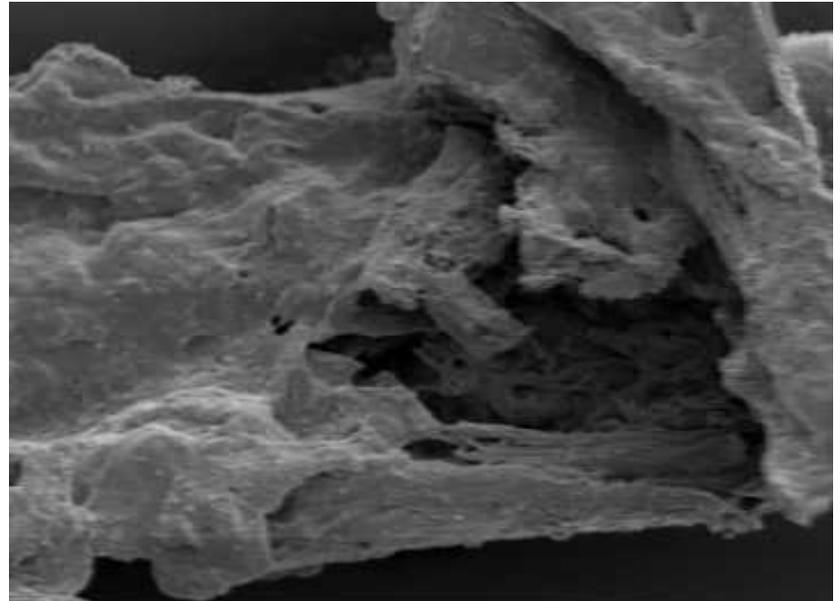


Agriculture & Landscaping

CHARACTERISTICS OF DEGRADED HAIR



SEM image of intact hair shaft (mag. x1.0K, 5.0kV).



SEM image of hair degraded by microbial keratinase (mag. X1.0K, 5.0kV)

WHY COMPOSTING

- ❖ Stabilised end product.
- ❖ Safe for the environment.
- ❖ Ability to utilize the bulk of hair waste.
- ❖ Inexpensive and adaptable within the tannery infrastructure.



REPUBLIC OF KENYA



KENYA INDUSTRIAL RESEARCH AND DEVELOPMENT INSTITUTE

THANK YOU

Contact: P.O. Box 30650 – 00100 Nairobi
onyukaarthur@gmail.com