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# The Chemical Reactions Involved in Wool Discolouration

Produced for the CRC for Premium Quality Wool undergraduate program by;  
Dr. Brad Crook, The University of New England.



# Yellow discolouration can result from:

- decomposition of fibre keratin
  - exposure to UV light (sunlight)
  - heating
  - high pH (alkaline conditions)
- non-fibre components of the fleece
  - chemical reactivity of suint components
  - by-products of microbial activity



also **microbe-specific** pigments (incl. red, blue, green, brown) occurring in stained bands

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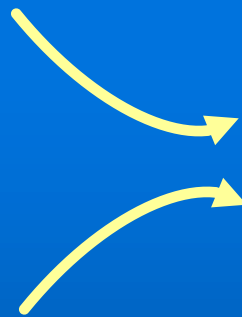


# Chemical reactions: 1. Maillard reaction

- “Browning” phenomenon involving certain amino acids and carbohydrates

glyceraldehyde

orange brown  
(medium)



**white Merino wool**



glycolaldehyde

yellow-brown  
(medium)

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# Maillard reaction

- Suint consists principally of potassium salts of various carboxylic acids
- Some of these compounds are involved in microbial metabolism
- Simple carbohydrates (e.g. glycolaldehyde) are derived
- Reactivity with amino acids in “yolk” and skin debris to produce yellow discolouration
- Wool fibres absorb discolouration, to give unscourable colour

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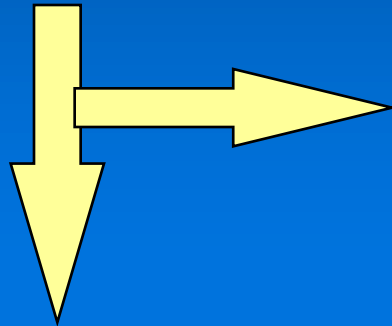
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# Chemical reactions:

## 2. Formation of carbonates

salts of carboxylic acids



formation of bicarbonates  
and carbonates

glycolaldehyde



generate alkaline conditions,  
facilitating decomposition of  
keratin and discolouration

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# Chemical reactions:

## 3. Deamination of amino acids

- Microbes may degrade skin and “yolk” proteins to amino acids, producing ammonia (involved with discolouration of stored wool)
- Potassium may act as a catalyst in this breakdown
- Potassium may aid the speed of absorption of yellow pigments associated with discolouration

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