

BIOPLASTICS AND BIOMATERIALS FROM WOOL AND FEATHER RESIDUES

Dr. Borja Fernández-d'Arlas

Project developed at Institute of Advance Materials (INAMAT) at Jeronimo de Ayanz Center from the *Universidad Pública de Navarra* (UPNA) at Pamplona, Spain



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Obra Social "la Caixa"



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Bioplásticos

Excipientes farmacéuticos

Apósitos

Membranas porosas

Química coloidal

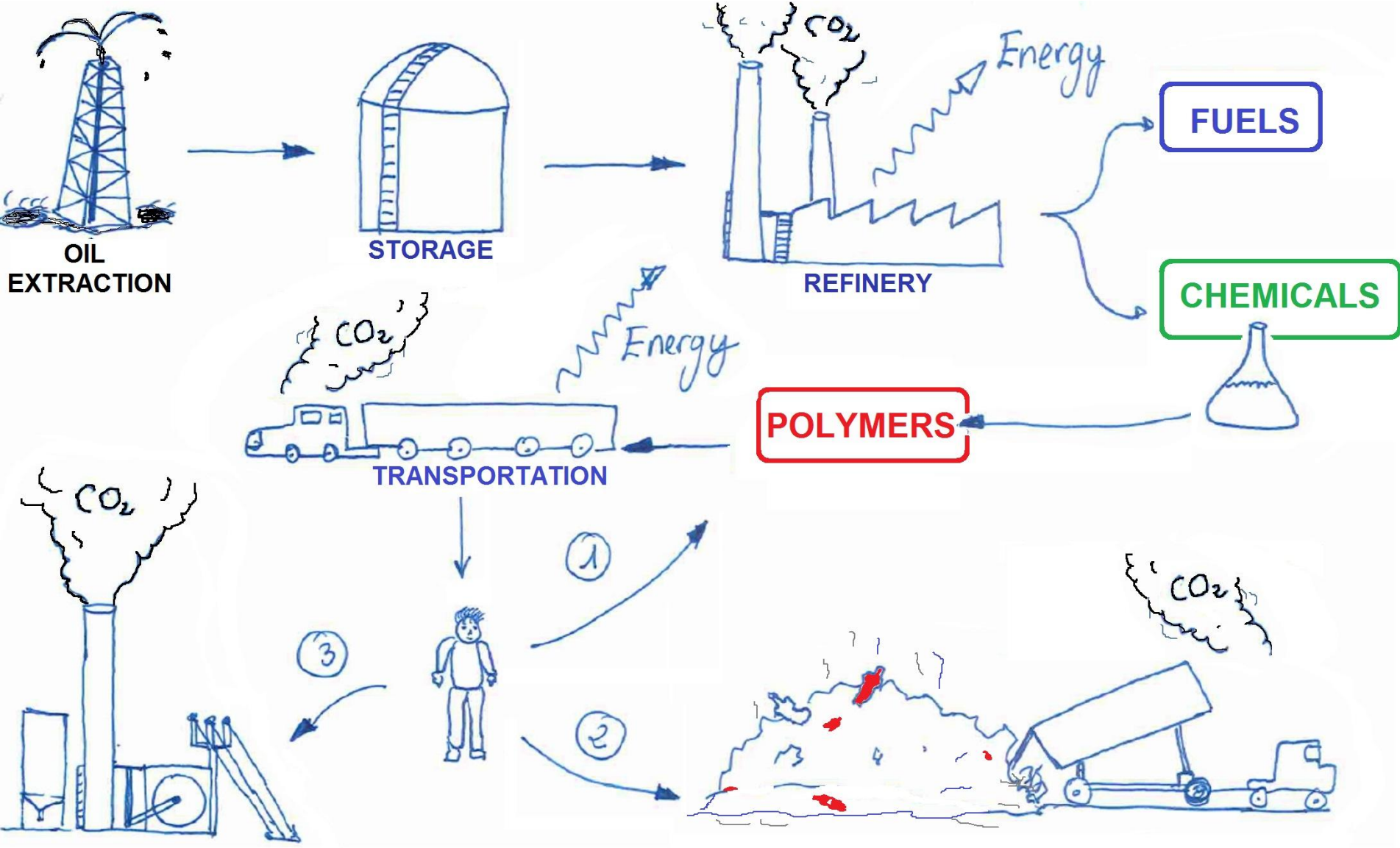


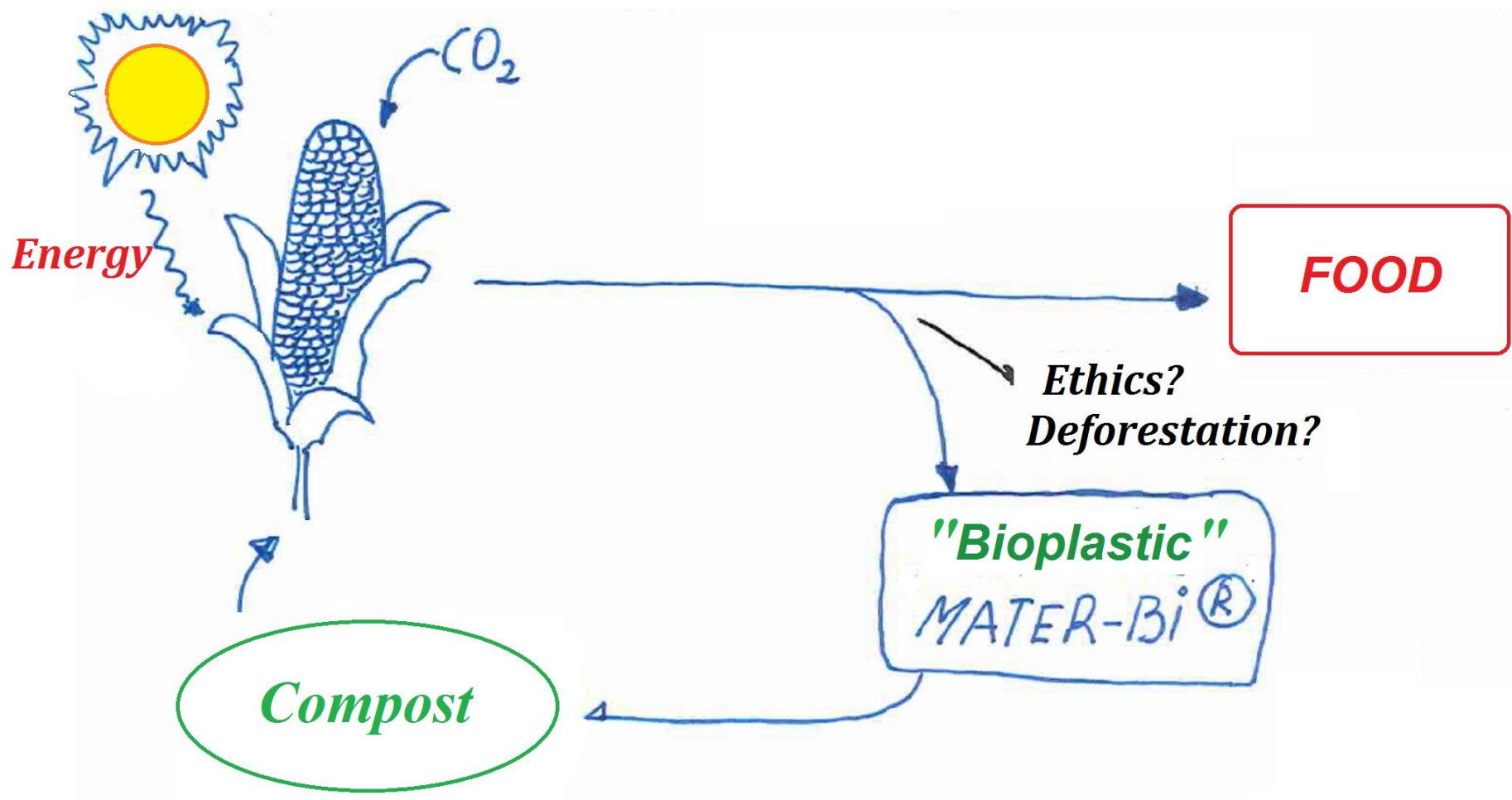
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Dr. Química-Ciencia de Materiales

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INAMAT, Pamplona, Spain





The bad quality of certain wools (Fig. 1 and 2) have rendered them useless in certain parts of Spain and the World. In addition, feathers from chicken consumption are disposed in large quantities, causing accumulation in dumpfields (Fig. 2).



Fig. 1 Large quantities of "lacha" sheep wool being stored without any outcome in Vizcaya region in Spain.

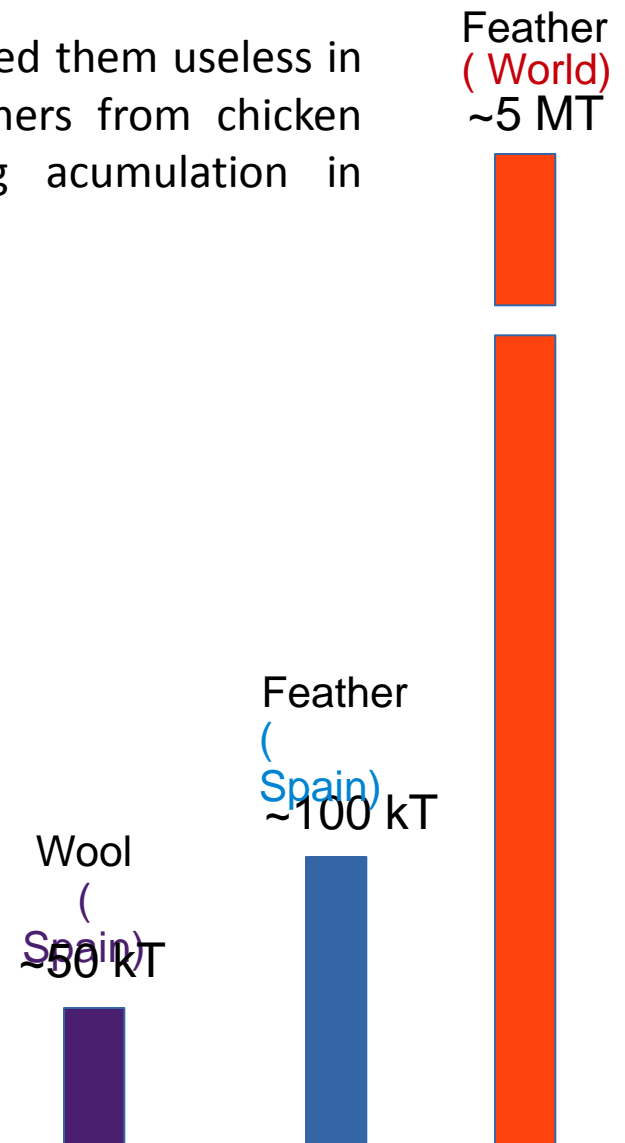
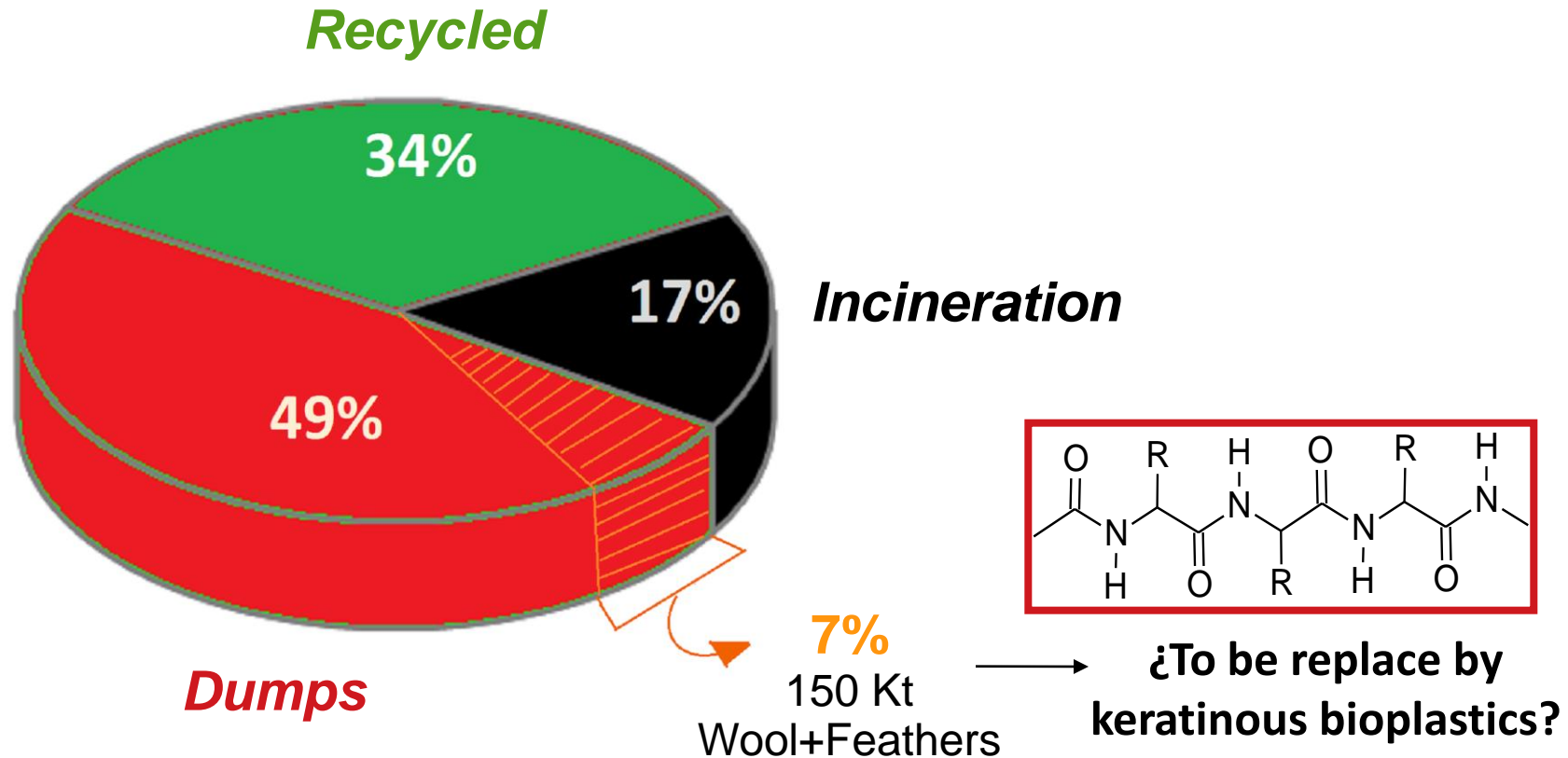
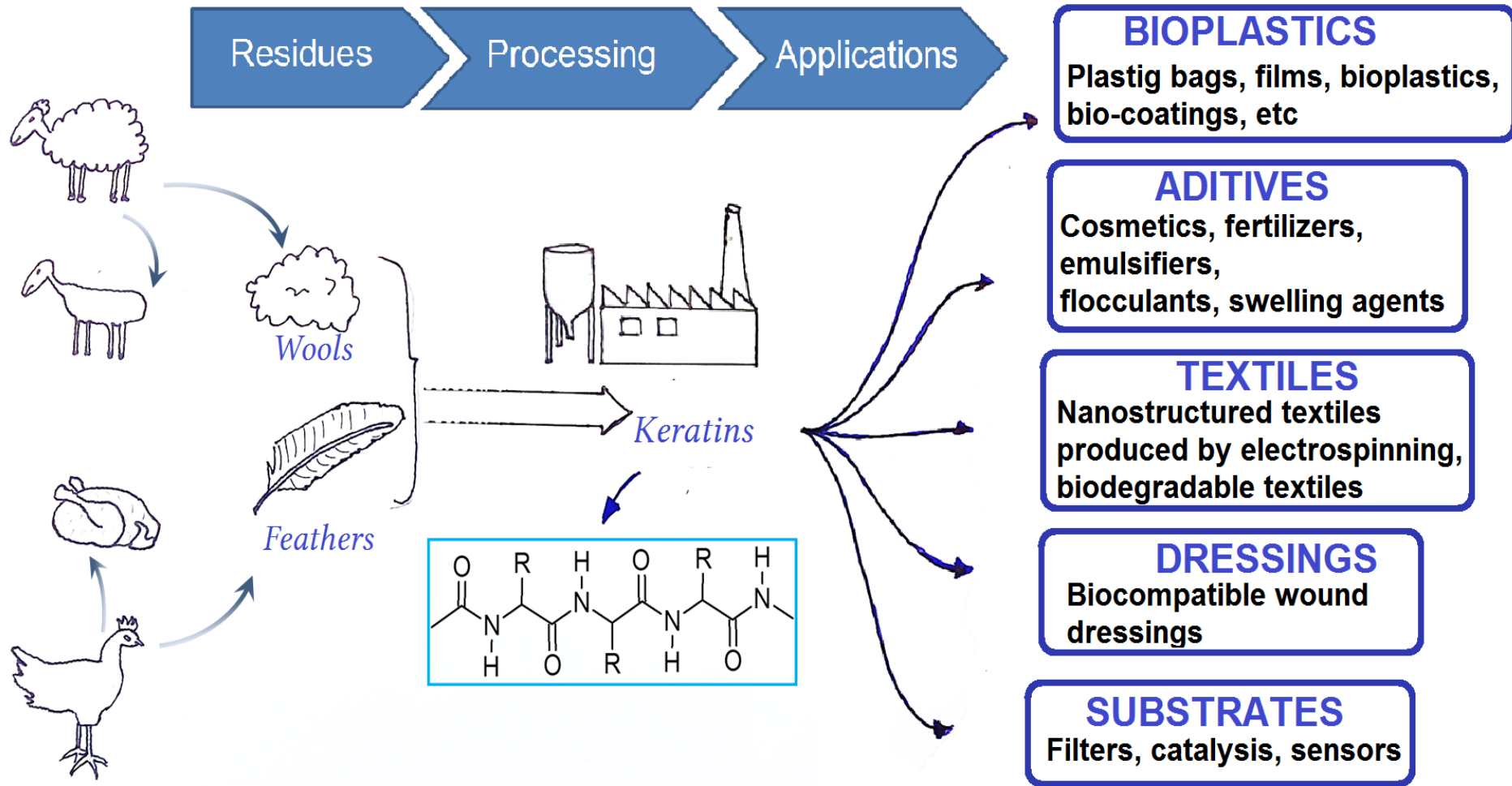


Fig. 2 Volume of Wool and feather residues in Spain and the World.

In Spain (2016) about **2.151 kt** are generated annually. From them, **34% are being recycled**, **17% valorized energetically (burnt)** and about **49% disposed to the dumps**.





Large tradition of sheep cheese production in Spain, but with outcome problems for wool residues.



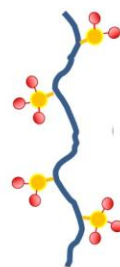
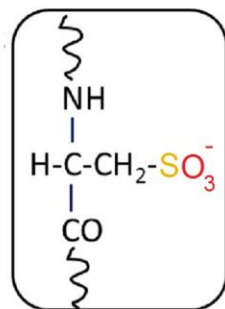
Example of Reconversion of these into Bioplastics for Circular Bioeconomy.



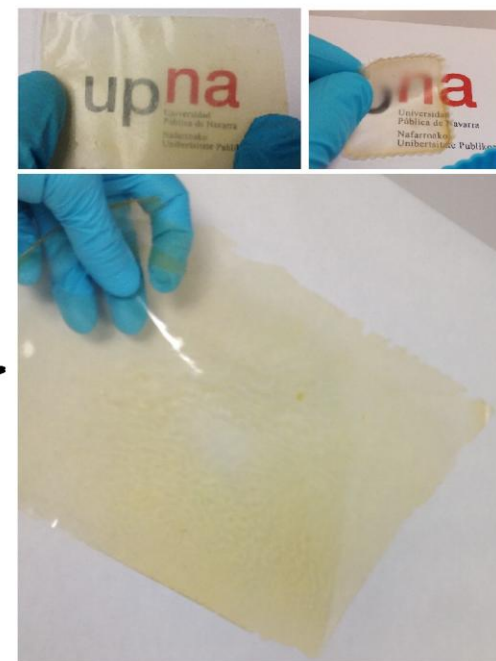
Lana de oveja lacha

(Wool from *lacha* sheep)

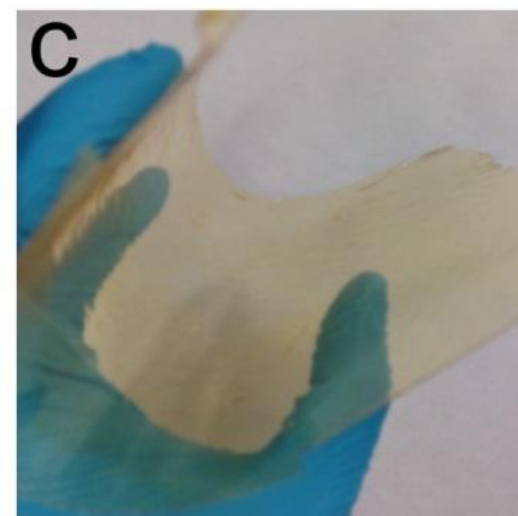
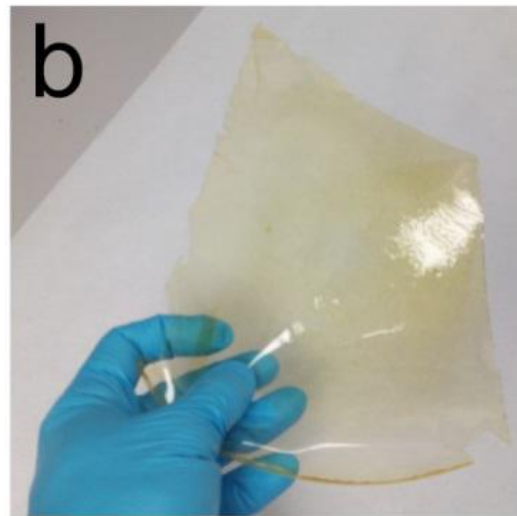
Extracción reactiva



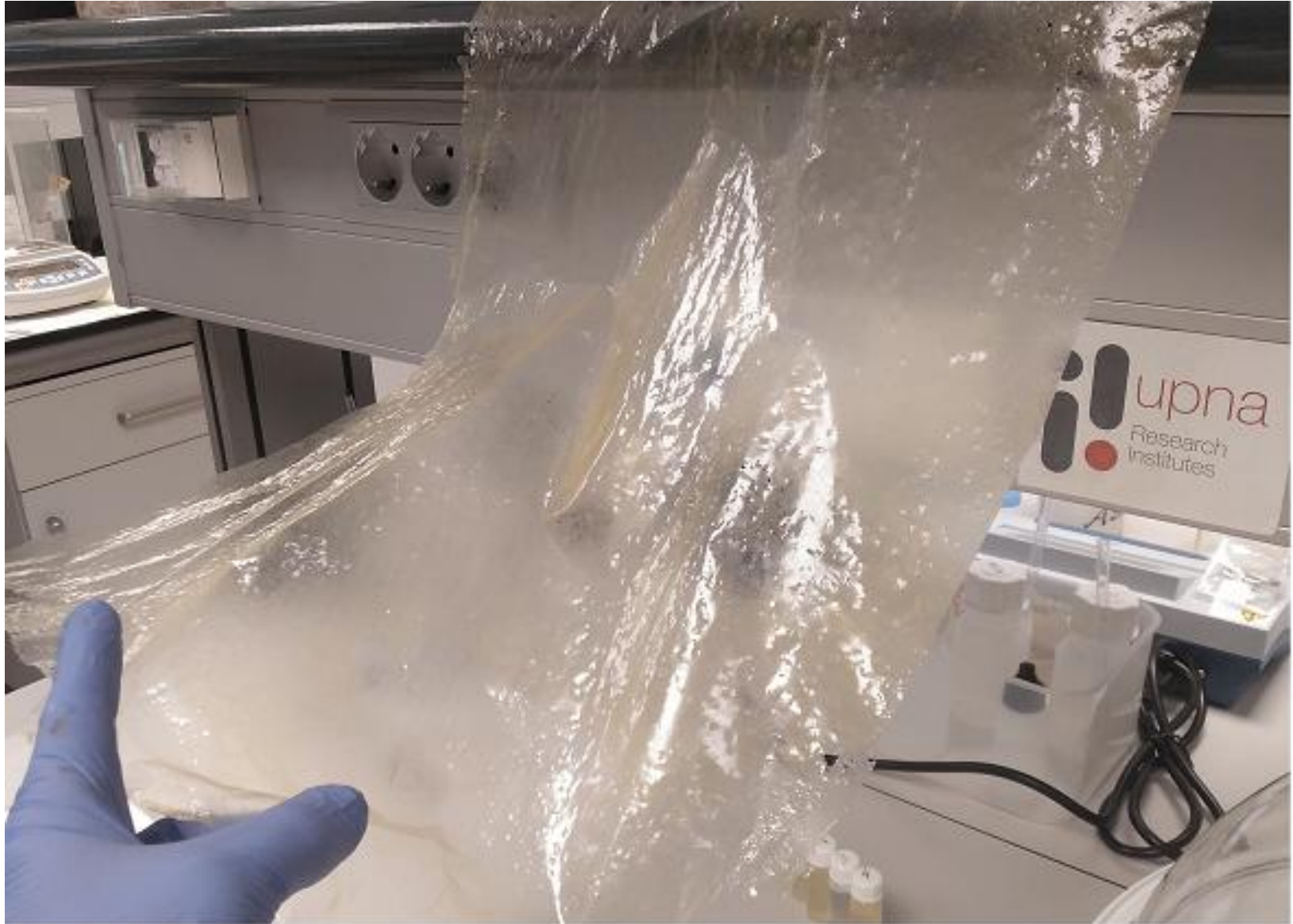
(SOLUBLE)



Bioplástico



Wool keratin biofilms. ¿Future plastics bags?

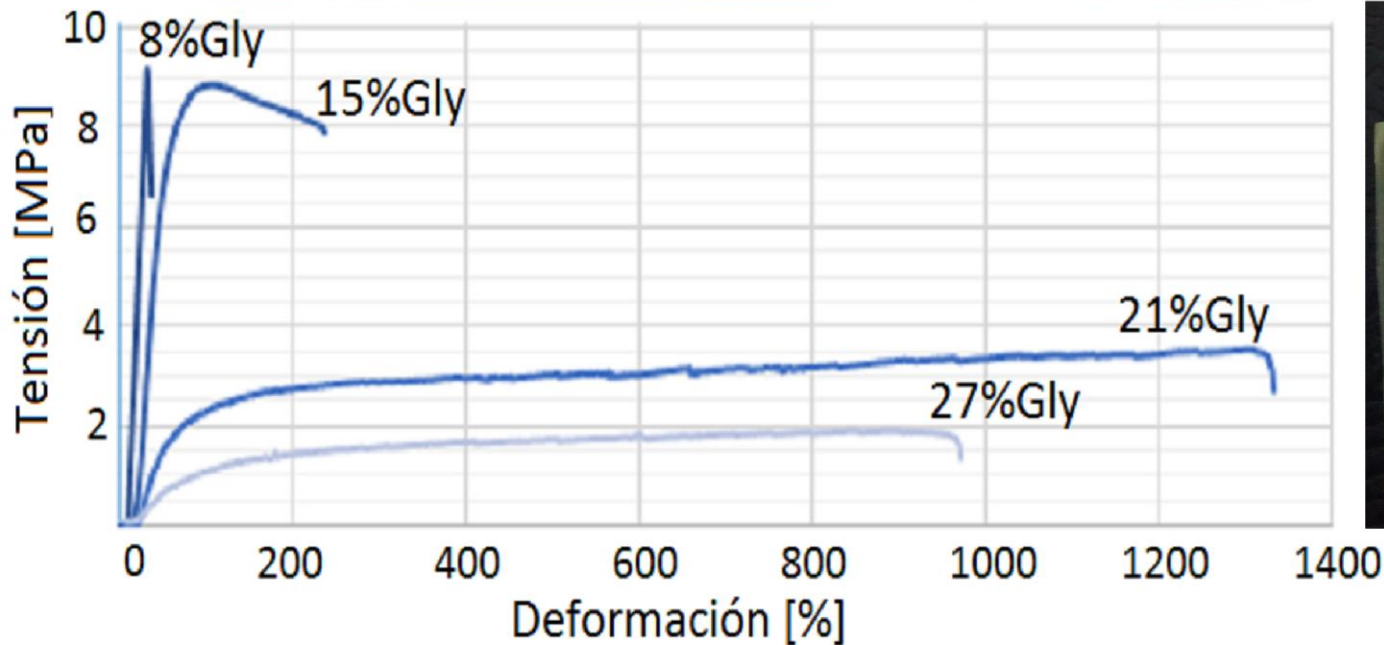
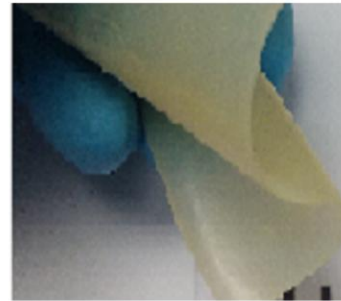


Wool keratin films with different degree of plasticizers

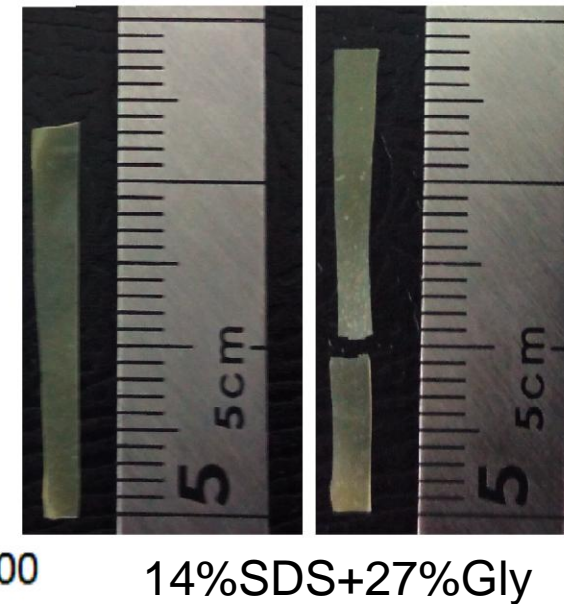
Transparency



Flexibility



Plasticity



14%SDS+27%Gly

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