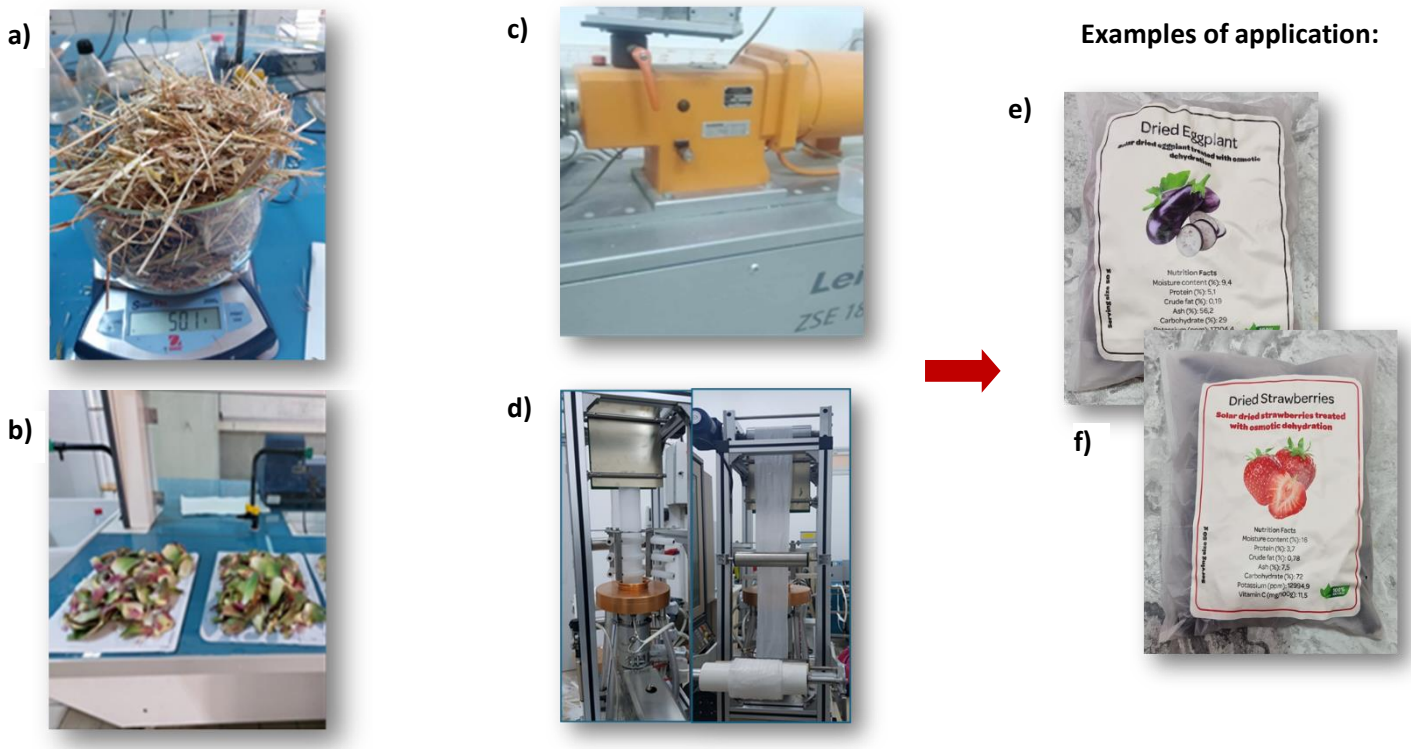


PRACTICE ABSTRACT n° 53

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Bio-based packaging: wheat straw fibres cellulose nanocrystals-based film

- A bio-based material from local agricultural waste such as **wheat straw fibres (WSFs) (a)** and **artichoke by-products (b)** was developed as a sustainable food packaging solution.
- The **cellulose nanocrystals (CNCs)** were obtained from **WSFs** using a **chemical process**, while the antioxidant extract was obtained by **maceration** of **artichoke by-products** in methanol.
- The bio-based material was produced using **PBAT (polybutylene adipate terephthalate)** and **TPS (thermoplastic starch)** with **CNCs** and **antioxidant extract** by blown extrusion.



Operative procedure protocol to produce the **bio-based nanocomposite film**:

1) preparation of a “master-batch” by a **twin-screw extrusion (c)** process:

- 5% TPS
- 58% PBAT + 3% PBAT grafted maleic anhydride
- 4% **CNCs** from wheat straw fibres and 10 mL **antioxidant extract** from artichoke by-products

2) production of a thin film by **blown extrusion (d)** from the “master-batch” at 110 °C.

- The film was used for the packaging of **mild-dried fruits and vegetables**, such as eggplants and strawberries (**e, f**).

