

FROM ELCHE DATES (*Phoenix dactylifera* L.) TO HIGH-VALUE FUNCTIONAL INGREDIENTS AND INNOVATIVE FOOD PRODUCTS: A CIRCULAR BIOECONOMY APPROACH

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BACKGROUND

Fresh Elche dates, particularly the local 'Confitera' cultivar, are an undervalued and underexploited agri-food resource.

- The Elche palm grove represents a major agricultural and cultural heritage resource.
- Current industrial utilization is reported at only 0.02%.
- The project applies circular bioeconomy principles to transform local dates and their by-products into high-value ingredients and products.

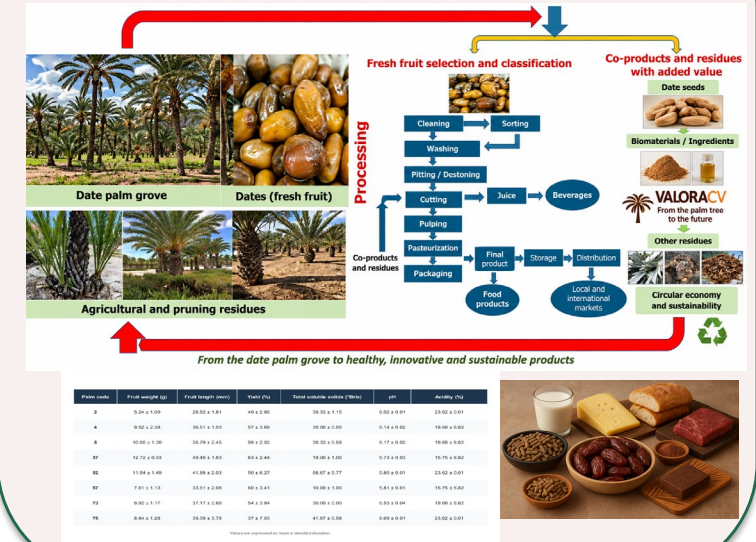
OBJECTIVE

To develop a multidisciplinary strategy for sustainable valorization of fresh Elche dates through: (i) Cultivar characterization and selection; (ii) Digital phenotyping and computer vision; (iii) Sustainable processing of fruit and by-products; (iv) Development of functional ingredients and (v) incorporation into innovative food products and other value chains.

MATERIALS & METHODS

1. Characterization of local date palms and fruits (90/3000).
2. Objective phenotyping using controlled digital imaging and CIELAB colour analysis.
3. Identification of promising commercial cultivars and maturation stages.
4. Sustainable processing to obtain juice, paste, flour and ingredients from flesh and seeds.
5. Evaluation of technological, biological and sensory functionality.
6. Application in foods and non-food value chains.

RESULTS & DISCUSSION



CONCLUSION: A circular strategy linking local agricultural heritage, digital characterization, functional ingredients and innovative food applications can increase the value and sustainability of Elche date resources.

KEY RESULTS: A wide diversity of local date phenotypes and soluble-solids concentrations was identified.

Fresh Elche dates showed technological and functional potential, including antioxidant and antimicrobial activities.

Date-derived ingredients supported dietary-fiber enrichment, sensory improvement and fermentation-related applications.

Date ingredients were incorporated into hybrid meat products, fermented sausages, healthy snacks and other functional foods.

Additional valorization routes included compost, cosmetic applications, construction materials and substrates for mushroom cultivation.



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