XII INTERNATIONAL SYMPOSIUM FOOD TECHNOLOGY

MURCIA Food 25

REVALORIZATION OF PEACH AND APRICOT BY-PRODUCTS THROUGH INNOVATIVE EXTRACTION TECHNOLOGIES: CHARACTERIZATION AND BIOACTIVITY ASSESSMENT.

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INTRODUCTION

Within the DEMOEXTRACT Project framework, this study explores innovative strategies for the sustainable revalorization of peach and apricot by-products. Green extraction technologies were applied to recover bioactive compounds such as polyphenols and flavonoids, which were characterized for their antioxidant and antimicrobial activities. Additionally, sugar-rich concentrates from the by-products were incorporated into insect-based bioconversion trials to assess their impact on growth performance and conversion efficiency. The results support the integration of circular bioeconomy principles by demonstrating the potential of fruit-processing waste for food, feed, and agronomic applications.

MATERIALS AND METHODS

Apricot by-product variety *búlida* and peach by-product variety *catherine* were processed. Then, both extract were characterized to evaluate their food and feed potential by measuring their antioxidant and antimicrobial activity. Additionally, these extracts were also included in a bioconversion experiment with *Tenebrio molitor* larvae. Different diets based on apricot and peach by-products were screened against a control diet (wheat) and a diet based on horticultural residues. The approximate number of larvae per box was 100-150 larvae. The trials lasted until the first pupal stages appeared. The main parameter measured was Average Daily Gain (ADG), which is used to evaluate the growth rate of an animal over a given period. Additionally, organic carbon and residues analysis were monitored as a control parameter to evaluate their agronomic applications.

Picture 1. Peach and apricot extraction process.

Table 1. Composition of peach and apricot extracts

	Peach extract	Apricot extract
Total Sugars (g/100g)[1]	44,2	47,5
Protein, (g/100G)[2]	2,2	4,1
Energy Value (kcal/100g)[3]	222	261

Table 2. Antioxidant activity of peach and apricot extracts

	Peach extract	Apricot extract
FRAP (mg eq Trolox/g)[4]	8.65 ± 0.68	8.61 ± 0.04
DPPH (mg eq Trolox/g)[5]	14.38 ± 0.95	7.87 ± 0.69
TEAC (mg eq Trolox/g)[6]	24.58 ± 0.87	5.38 ± 0.12

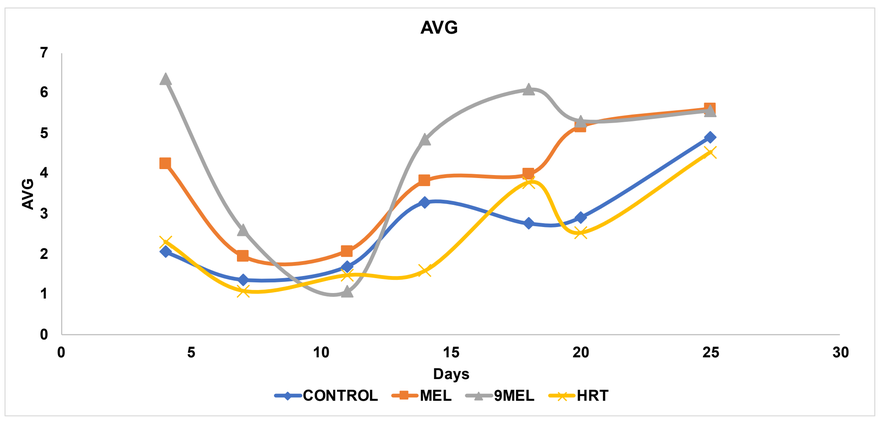
Table 3. Antimicrobial activity of peach and apricots extracts[7]

	Peach extract, mm	Apricot extract, mm
S. enterica	9.63 ± 0.53	10.00 ± 0.71
B. thermosphacta	15.13 ± 0.18	11.25 ± 0.35
L. monocytogenes	14.63 ± 0.53	5.38 ± 0.12
E. coli	6.23 ± 0.16	-
Fusarium spp	10.25 ± 0.35	-
P. expansum	8.25 ± 0.58	-
Z. bailii	-	-
Lb. fermentum	-	-
Lb. plantarum	-	-
Lb. alimentarius	-	-

Picture 2. Larvae growth with different diets: a) Control, b) MEL, c) 9MEL and d) HRT.

RESULTS AND COCLUSIONS

- A green extraction process was developed for the revalorization of peach and apricot by-products.
- The peach extract showed a higher antioxidant capacity than apricot, particularly in DPPH (14.38 vs. 7.87 mg Trolox eq/g) and TEAC (24.58 vs. 5.38 mg Trolox eq/g) assays, indicating stronger radical scavenging activity. Although FRAP values were similar, overall results highlight peach as the more potent antioxidant source.
- In antimicrobial tests, peach extract exhibited broader and stronger activity, effectively inhibiting both Gram-negative (S. enterica, E. coli) and Gram-positive (L. monocytogenes, B. thermosphacta) bacteria, as well as fungal pathogens (Fusarium spp., P. expansum). Apricot extract showed limited activity, with no effect on E. coli or fungi.
- The use of peach extract proved to be an effective strategy to positively and successfully increase larval weight. However, it is essential to carefully control the inclusion rates, as an excess could lead to contamination of the feed with potentially undesirable active ingredients.
- Both frass and larvae fractions obtained from bioconversion processes, can be used as organic fertilizer in agronomic contexts (containing more than 20 and 40% in insect and frass, respectively). These fractions can bring significant benefits such as improving soil health, increasing crop yields and helping to reduce reliance on traditional chemical inputs.



Picture 3. Average Daily Gain (ADG) calculated in the different targeted diets.

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