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NUTRITIONAL-PHYSIOLOGICAL PROPERTIES OF CITRUS FRUIT PEELS AND SEEDS

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Introduction

There is a growing interest in the food industry and in preventive health care in the development of natural antioxidants from plant materials. Consumption of a diet rich in antioxidant active polyphenol compounds has been linked with beneficial health impacts.

Citrus fruit peels and seeds are byproducts of the juice extraction and are an interesting source of polyphenol compounds which are well known for their bioactive and antioxidant properties.

The objective of this study was to quantify the total polyphenol compounds and to evaluate the antioxidant properties of extracts from peels and seeds lemon, orange and grapefruit.
Materials and Methods

• Dried and finely grounded peels and seeds of the citrus fruits lemon (citrus limonum), orange (citrus sinensis) and grapefruit (citrus paradisi) were extracted individually with 70% ethanol at 60 °C.

• The obtained citrus fruit extracts were analyzed for their content of total polyphenols according to the Folin-Ciocalteu method.

• The radical scavenging capacity of the pomace extracts was evaluated by the DPPH radical scavenging method in terms of their Efficient Concentration EC50 (mg antioxidant / mg DPPH*) representing the amount of antioxidant necessary to decrease the initial DPPH* (2,2-diphenyl-1-picrylhydrazyl) concentration by 50 %. Low EC50–values are indicating high radical scavenging activity.
Results and Discussion

• Generally, higher amount of total polyphenols (mg/g) could be observed in the citrus fruit peels (lemon: 66,9; orange: 35,5; grapefruit: 32,5) compared to the seed extracts (lemon: 22,3; grapefruit: 16,6; orange: 12,9).

• Remarkably, there was a tendency to higher radical scavenging activity (EC50) in the citrus fruit seeds (lemon: 12,3; grapefruit: 16,9; orange: 23,1) than in the peels (grapefruit: 18,7; lemon: 29,2; orange: 33,6) which might be referred to the different composition of individual polyphenol compounds in the citrus fruit varieties.

• In comparison, lemon seeds and grapefruit peels showed the best antioxidant properties.
Total polyphenols in citrus fruit peels and seeds extracts

<table>
<thead>
<tr>
<th>Fruit Type</th>
<th>Polyphenols (mg/g)</th>
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<tbody>
<tr>
<td>Lemon peels</td>
<td>Highest</td>
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<tr>
<td>Orange peels</td>
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<tr>
<td>Grapefruit peels</td>
<td></td>
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<tr>
<td>Lemon seeds</td>
<td>Low</td>
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<tr>
<td>Grapefruit seeds</td>
<td></td>
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<td>Orange seeds</td>
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Antioxidant and free radical scavenging capacity of citrus fruit peels and seeds extracts
Conclusion

• The results indicate that ethanol extracts from citrus fruit peels and seeds contain significant amounts of polyphenol substances and have remarkable antioxidant and radical scavenging properties.

• An application as potent natural antioxidant additive for food products and as dietary supplement seems to be worth considering, particularly in consideration of their beneficial impact to physiological degenerative processes, and would be helpful in maintaining and promoting health.