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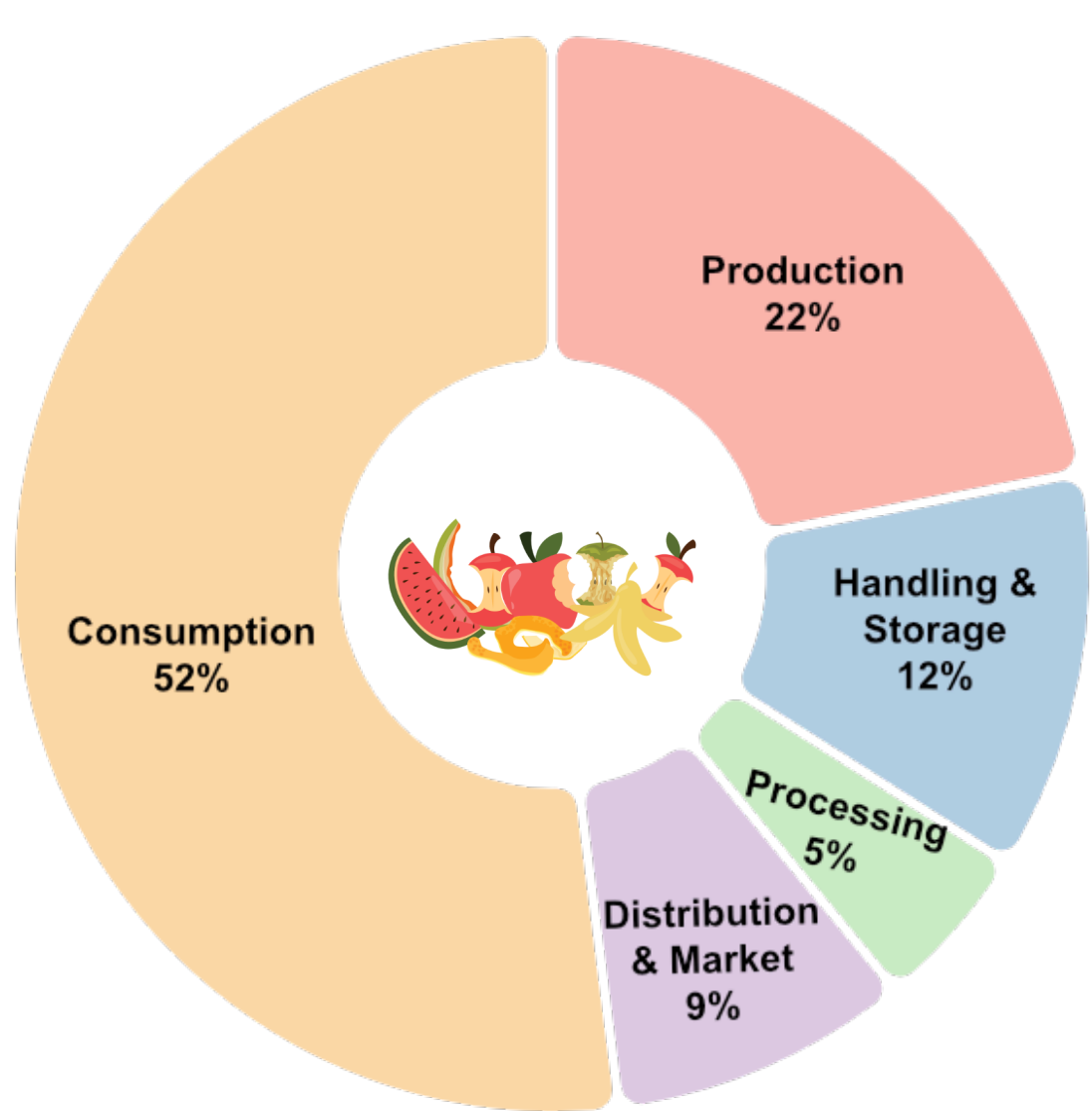
Valorization of fruit waste for the production of bioactive compounds

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Fruit waste

Global losses: 22 million tons (2019)



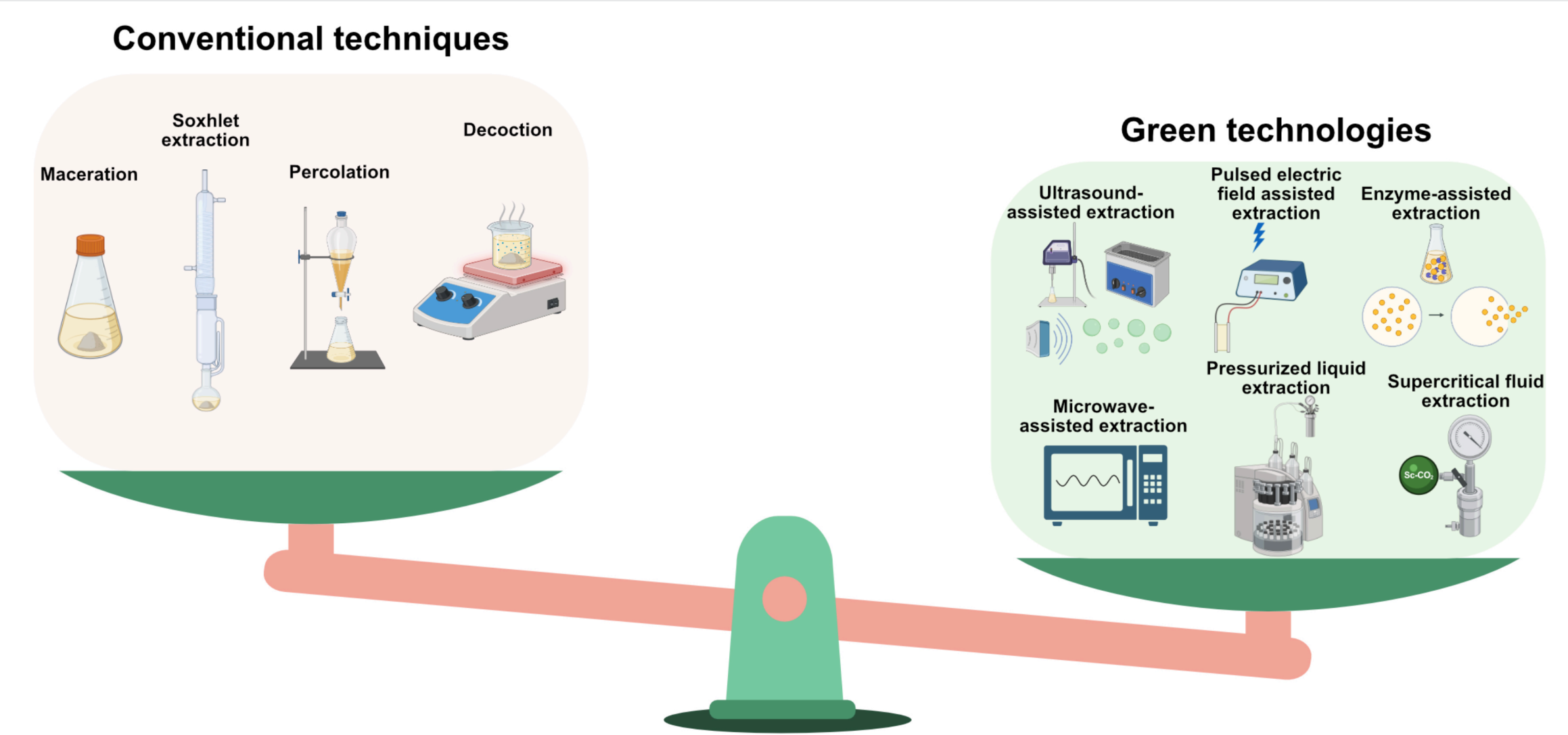
Percentage of fruit and vegetable loss across the European supply chain (FAO, 2011).

Fruit production and processing result in considerable waste production with an adverse effect on both the environment and the economy of society.



To address this issue, it is crucial to minimize fruit waste and develop effective waste management strategies to support sustainable development goals.

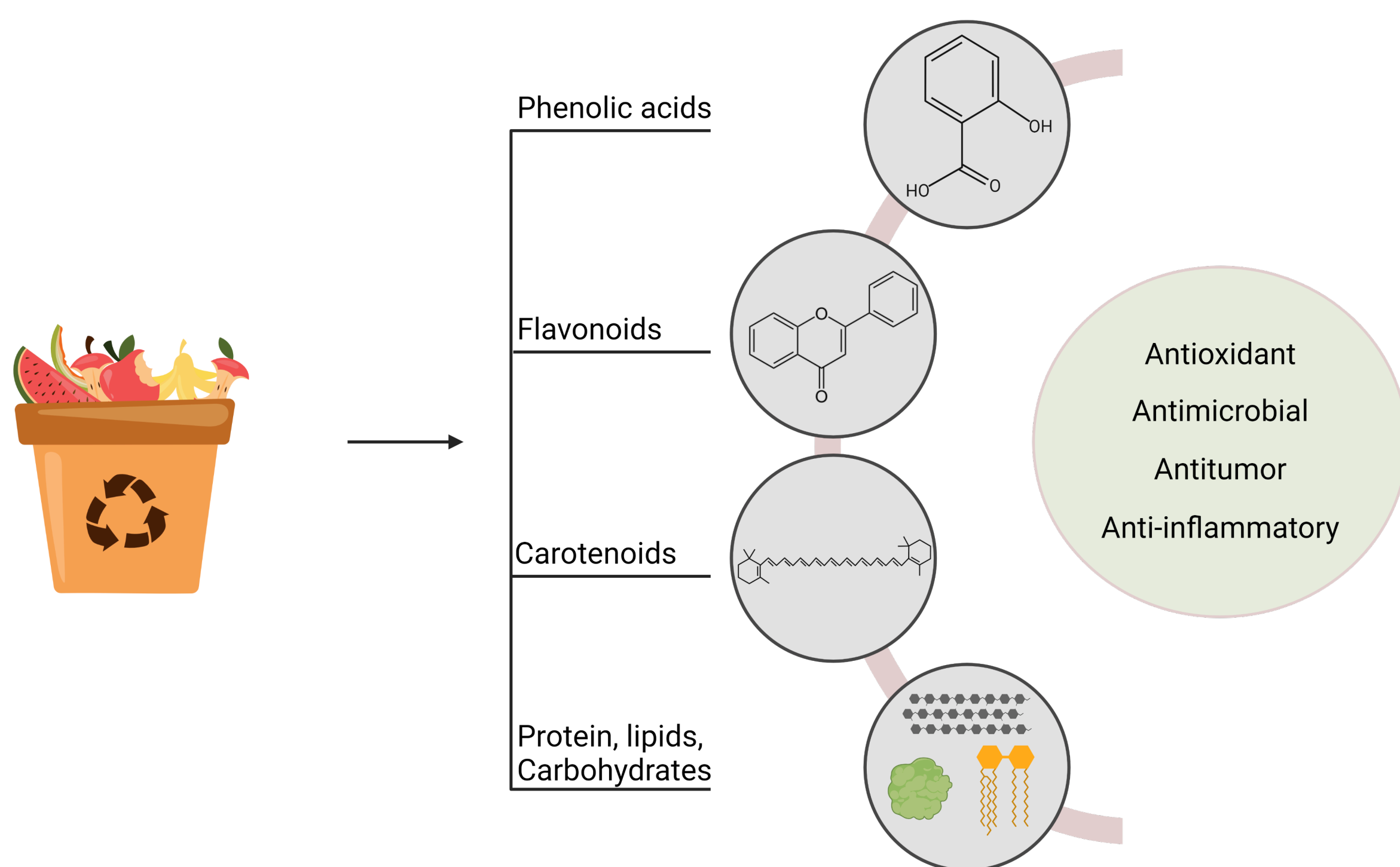
Extraction techniques



Besides conventional techniques, there are numerous available emerging green technologies for the recovery of bioactive compounds from fruit waste including ultrasound-assisted extraction, microwave-assisted extraction, pressurized liquid extraction, supercritical fluid extraction, pulsed electric field assisted extraction and enzyme-assisted extraction.

These technologies offer faster extraction times, higher selectivity, and higher efficiency, and use less solvent.

Bioactive compounds from fruit waste



Encapsulation technologies

Bioactive compounds are unstable and prone to degradation, necessitating protection during processing for uses in various applications.

Encapsulation ensures and regulates compound release, improving stability and bioavailability.

Stabilizing these compounds facilitates development of functional foods, additives, cosmetics, and nutritional products in various industries.

Encapsulation techniques	Carrier materials	Applications
Spray drying	Cyclodextrin	Functional foods
Freeze drying	Maltodextrin	Cosmetics
Emulsion-based methods	Cellulose	Nutritional products
Extrusion	Gum Arabic	
	Whey protein	

Conclusions

- ✓ The valorization of fruit waste contributes significantly to achieving sustainable development goals.
- ✓ The improvement of extraction techniques through the utilization of green technologies has a substantial impact on a sustainable biological process.
- ✓ The bioactive compounds extracted from fruit waste exhibit a range of properties, including antioxidant, antimicrobial, antitumor, and anti-inflammatory effects.
- ✓ Encapsulation techniques for extracted bioactive compounds present a promising alternative, especially within emerging markets for functional food additives.

References

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Acknowledgments

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