

Contents

Foreword	V
-----------------------	----------

Preface	IX
----------------------	-----------

1 Imminent Changes in Packaging Materials	1
--------------------------------------------------------	----------

1.1 Packaging Foams	1
---------------------------	---

1.2 Pigments/Fillers	3
----------------------------	---

1.3 Per- and Polyfluoroalkyl Substances (PFAS)	4
------------------------------------------------------	---

1.4 Polyvinyl Chloride (PVC)	7
------------------------------------	---

1.5 Polyvinylidene Chloride (PVDC)	9
------------------------------------------	---

1.6 Polychlorotrifluoroethylene (PCTFE)	11
-----------------------------------------------	----

1.7 Oxo-Degradable Additives	12
------------------------------------	----

1.8 Degradable and Non-Degradable Polymer Blends	13
--------------------------------------------------------	----

1.9 Polyamides (Nylons)	14
-------------------------------	----

1.10 Coated Paper	15
-------------------------	----

1.11 Metallized Films	16
-----------------------------	----

1.12 Multi-Materials	17
----------------------------	----

1.13 Decision-Aid Table for Problematic Materials	20
---------------------------------------------------------	----

2 Making Decisions on Your Next Packaging Material	23
-----------------------------------------------------------------	-----------

2.1 Glass	23
-----------------	----

2.2 Metals	26
------------------	----

2.3 Paper and Paperboard	28
--------------------------------	----

2.4 Plastics	31
--------------------	----

2.5 Decision-Aid Table for Choosing Your Next Packaging Material	35
------------------------------------------------------------------------	----

3	The Do's and Don'ts in Packaging Design.	37
3.1	How to Ensure That Your New Package Complies with EU Packaging Directives, Plastics Pacts, and Upcoming EPR Laws.	37
3.2	The Do's of Recyclable or Compostable Packaging.	39
3.2.1	Recyclable Plastic Packaging	39
3.2.2	Recyclable Paper Packaging	40
3.2.3	How to Handle the Challenges of Recycled Content and Responsibly Sourced Biobased Content in New Packaging.	41
3.2.4	How to Meet the Target for 30% Responsibly Sourced Biobased Content	41
3.3	The Path Forward for Packaging Sustainability	43
3.4	The Debate on Compostable versus Biodegradable Plastics	46
3.5	Decision-Aid Table for Packaging Design	48
4	Future Directions for the Sustainable Packaging Sector – Trends and Challenges	51
4.1	Sustainable Packaging Trends	51
4.1.1	Design Trends.	51
4.1.2	Biobased and Biodegradable Materials	52
4.2	Recycling Trends	54
4.2.1	Mechanical Recycling	55
4.2.2	Chemical Recycling/Advanced Recycling	56
4.2.3	Some Major Trends in Plastic Recycling [70]	57
4.3	Trends in Flexible and Rigid Packaging	59
4.4	Summary Table of Packaging Trends.	63
5	Extended Producer Responsibility (EPR) Legislation for Packaging.	65
5.1	Packaging and Packaging Waste Laws in the European Union.	67
5.1.1	Overview.	68
5.1.2	EU Directive Amendment (2018/852).	69
5.1.3	How the U.S. and Other Parts of the World Can Benefit from EU Packaging Directives	71

6	Microplastics	73
6.1	Toxicity of Microplastics	74
6.2	Preventive Measures	75
	References and Recommended Readings	77
	Index	83