

Contents

1 Research as Process	1
The Major Professor	5
Research as Process	7
References.....	9

Part I Unit Operations of Research

2 Idea Generation.....	13
Creativity.....	13
Sociology of Science.....	17
Welcome to Academe	19
Idea Generation.....	19
Answer to Fig. 2.3.....	22
Answer to Fig. 2.5	22
References.....	22
3 Problem Definition	25
Types of Research	29
Defining the Problem	30
Hypothesis Development	31
References.....	32
4 Critical Evaluation of Literature.....	33
Reviewing the Literature.....	33
Reading an Article	36
Critical Evaluation of Literature	39
References.....	42
5 Method Selection.....	43
Selection of Appropriate Methodology	43
Laboratory Adaptation and Research Plan Development	45
References.....	48

6	Experimental Design	49
	Statistical Methods.....	49
	Common Statistical Terms.....	50
	Common Statistical Techniques.....	52
	Answers to Questions Raised in Table 6.1.....	53
	References.....	53
7	Data Collection	55
	Data Collection Forms.....	56
	The Laboratory Notebook.....	59
	A note on Qualitative Data.....	61
	References.....	62
8	Processing and Analysis	63
	Precautions.....	66
	Answers to Questions Raised in Fig. 8.1.....	68
	Answers to Questions Raised in Table 8.3.....	68
	References.....	68
9	Knowledge Dissemination	69
	Preparation.....	69
	Writing Process (An Alternative Approach).....	72
	The Review Process.....	76
	References.....	77

Part II Maturation of a Scientist

10	The Scientific Meeting	81
	Meeting Activities.....	83
	Meeting Planning.....	85
	Scientific Presentations.....	87
	Reference.....	88
11	Critical Thinking	89
	Important Terms.....	90
	Critical Thinking Processes.....	90
	Cultivating Critical-Thinking Skills.....	91
	Critical Thinking for the Food Scientist.....	92
	Limits of Critical Thinking.....	93
	References.....	94
12	Science and Philosophy	95
	Forms of Reasoning.....	98
	Thought Styles.....	99
	Examples of Paradigm Shifts in Food Science.....	99
	References.....	100
13	Ethics in Science	103
	Data.....	103
	Ideas.....	104

Presentations and Manuscripts.....	105
On the Job	105
Some Hypothetical Ethical Challenges.....	106
References.....	109
14 Finding and Managing the Literature	111
Organizing the Literature.....	111
Understanding the Research Landscape	113
Reviewing the Literature.....	114
Finding the Literature: Where?.....	115
Finding the Literature: How?.....	117
Unique Database Features.....	118
Catalogs.....	118
Social Media: New Aids for Research	119
Reference	120
15 Planning	121
Planning for the Oral Exam and Defense	121
Project Planning	123
Interdisciplinary Research Planning	124
Career Planning.....	128
Life Planning.....	129
References.....	130
16 Grantsmanship	133
Grant Writing.....	133
Grant Review Process	137
The Way Things Are.....	138
Managing a Grant	140
References.....	141
17 Laboratory Setup and Management	143
Setting up a Laboratory.....	143
Managing the Laboratory.....	146
References.....	148
18 Career Development	149
Seeking a Job	149
The Interview	152
Developing a Career.....	154
Academic Careers	155
Government Careers	155
Careers in Industry.....	158
Other Opportunities	158
References.....	162
Index.....	163

Becoming a Food Scientist

To Graduate School and Beyond

Shewfelt, R.L.

2012, XI, 168 p. 49 illus., 22 illus. in color., Softcover

ISBN: 978-1-4614-3298-2