

SECOND
EDITION

The Food Chemistry Laboratory

*A Manual for Experimental Foods,
Dietetics, and Food Scientists*



Connie M. Weaver and James R. Daniel

 CRC PRESS

TABLE OF CONTENTS

1. Literature Search	1
Abstracts and Indexes	1
Journals	1
Advances and Reviews	1
General	2
Internet Sources of Information	2
2. Evaluation of Foods	5
Color	5
Texture	6
Flavor	6
3. Objective Methods	9
4. Sensory Methods	11
Developing Forms for Sensory Tests	12
5. Laboratory Notebook	15
Format	15
Sample Tables as Reported in the <i>Journal of Food Science</i>	16
Graphs from the <i>Journal of Food Science</i>	18
6. Style Guide for Research Papers	21
Mission of IFT Scientific Journals	21
General Editorial Policies	21
Journal Sections	23
Manuscript Requirements	24
Reference Format	26
Editorial Review and Processing	27
Instructions for Submitting a Manuscript	28
Presubmission Checklist	29
7. Individual Project	31
Research Proposal	31
Oral Presentation	31
Written Presentation	32
Scorecard for Grade	34
8. Laboratory: Sensory Evaluation of Foods	35
Experiment 1: Threshold Concentrations of the Primary Tastes	35
Experiment 2: Effect of Temperature on Taste	35
Experiment 3: Perception of Phenylthiocarbamide (PTC)	36
Experiment 4: Comparison of Sweetness of Sugars	36
Experiment 5: Identification of Samples	37

Experiment 6A: Difference Testing	38
Experiment 6B: Descriptive Tests	39
Experiment 6C: Affective Tests.....	39
Experiment 7: Adaptation of Receptors	40
9. Laboratory: Objective Evaluation of Foods	41
Texture.....	41
10. Laboratory: Physical Properties of Foods	43
Water Activity	43
Viscosity.....	43
Specific Gravity	44
Experiment 1: Water Activity.....	44
Experiment 2: Viscosity	46
Experiment 3: Specific Gravity and Refractive Index.....	46
11. Laboratory: Dispersion of Matter	49
Experiment 1: Solutions.....	49
Experiment 2: Emulsions	51
Experiment 3: Foaming Properties of Proteins.....	53
12. Laboratory: Lipids	55
Experiment 1: Odors and Physical State of Lipids and Fatty Acids	55
Experiment 2: Solubility, Specific Gravity, and Refractive Index.....	56
Experiment 3: Water-Absorbing Capacity.....	57
Experiment 4: Plasticity of Fats	57
Experiment 5: Fat Bloom in Chocolate.....	58
Experiment 6: Oxidative Rancidity.....	59
13. Laboratory: Amino Acids, Proteins, and Maillard Browning	61
Experiment 1: Maillard Reaction	61
Experiment 2: Qualitative Test for Protein	62
Experiment 3: Quantitative Determination of Protein in Foods by the Biuret Method	64
Experiment 4: Effect of Heat on Proteins	65
Experiment 5: Coagulation of Proteins	66
Experiment 6: Effect of pH on Hydration of Meat Proteins	67
Experiment 7: Spun Fiber Production.....	68
Experiment 8: Effects of the Enzyme Rennin on Milk Protein	68
14. Laboratory: Gelatin	71
Experiment 1: Effects of Variations in Gelatin Concentration, pH, Sucrose Concentration, and Presence of a Proteolytic Enzyme on Gelatin Gel Strength	71
Experiment 2: Effect of <i>In Situ</i> Enzymes on Gelatin Gel Strength.....	73
15. Laboratory: Carbohydrates	75
Experiment 1: Fehling's Test for Reducing Sugars.....	75
Experiment 2: Microscopic Appearance of Starch	76
Experiment 3: Starch Gels	77
Experiment 4: Viscosity Curves of Starch Pastes.....	78

16. Laboratory: Flour Mixtures	81
Experiment 1: Gluten Balls	81
Experiment 2: Sugar Cookies	82
Experiment 3: Chocolate Cakes	84
17. Laboratory: Pigments	87
Experiment 1: Color Reactions of Myoglobin	87
Experiment 2: The Effects of Heat and pH on Plant Pigments	88
Experiment 3: Separation of Pigments in a Green, Leafy Vegetable	90
Experiment 4: Enzymatic Browning	92
Experiment 5: Peroxidase Assay to Determine Adequacy of Blanching	93
Experiment 6: Measurement of Color of Oranges	94
18. Laboratory: Pectin	97
Experiment 1: Histochemical Localization of Pectic Substances	97
Experiment 2: Pectin Gels	98
19. Laboratory: Synthesized Carbohydrate Food Gums	103
Experiment 1: Dispersibility and Thermogelation of Cellulose Gums	103
Experiment 2: Alginate Gels	105
20. Equipment Guide	107
Brookfield Viscometer (Analog and Digital)	107
Compensating Polar Planimeter	109
Consistometer (Bostwick)	110
Hunter Colorimeter	111
Hydrometer	112
Instron Materials Tester	114
Jelmeter	115
Linespread Apparatus	116
Penetrometer or Compressometer	117
pH Meter	118
Reflectance Meter (Photovolt)	120
Refractometer (Abbe)	121
Seed Volume Apparatus	123
Shear Press	124
Shortometer	125
Specific Gravity of Solids	126
Spectrophotometer	126
Stable Micro Systems Texture Analyzer	127
Vernier Caliper	129
Visco/Amylo/GRAPH	130
Water Activity System	131
Appendix	133
Index	135