

## FLAVOR CHEMISTRY (16:400:501, 3 credits)

Instructor: Dr. Chi-Tang Ho

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**Time & Place:** Mondays 7:15 – 10:05 pm

**Prerequisite:** *One year of organic chemistry or equivalent.*

**Objectives:** This course is designed to provide students to understand the isolation, fractionation, and identification of the desirable and objectionable flavor constituents in food; biochemical pathways for the formation of plant derived aromas in fruits and vegetables; important chemical reactions such as Maillard reaction and lipid oxidation and their mechanisms for the formation of flavor components in food; methods for measuring flavor and flavor stability of food and food components; and industrial methods for the manufacture of process flavors.

**Outcomes:** After completing the course, one student are expected to

- (1) Understand various methods of sample preparation for the flavor analysis;
- (2) Understand the principles of gas chromatography, gas chromatography-olfactometry and mass spectrometry in flavor identification and measurement;
- (3) Understand the formation of aromas in fruits and vegetables such as aromas of tomato, onion, garlic, citrus, and others;
- (4) Understand the important of lipid biosynthesis in the formation of fruit and vegetable aromas
- (5) Understand the effects of heating and cooking methods on the formation of food aromas, particularly in meats baked goods and cereals;
- (6) Understand the control of Maillard reaction to produce different process flavors;
- (7) Understand the control of lipid oxidation to stabilize the flavor of food products.

**Assessment:** The outcome will be assessed by

- (1) One take-home exam;
- (2) Each student will ask to give a 15 minutes presentation on a flavor paper from a recent literature

### Schedule

Lecture 1: Introduction

Lecture 2: Flavor compounds

Lecture 3: Flavor analysis

Lecture 4: Biogenesis of flavors

Lecture 5: Biogenesis of flavors

Lecture 6: Lipid oxidation and flavors

Lecture 7: Thermal generation of flavors: Maillard reaction (I)

Lecture 8: Thermal generation of flavors: Maillard reaction (II)

Lecture 9: Thermal generation of flavors: Savory flavors

Lecture 10: Flavors from degradation of minor component of foods

Lecture 11: Stability of flavors

Lecture 12: Flavor application and interaction

Lecture 13: Student presentations, take home exam

Lecture 14: Student presentations