HOS 5711 Section 5243 Phytochemicals in Food & Health

Format: Lecture 3 credits
Schedule: MTWRF, Period 6 (3:30 pm to 4:45 pm).
Location: Fifield Hall Room 2316.
Pre-requisite: BCH 4024 or equivalent or instructor consent.

Course Description:
This applied biotechnology course will examine the nature and properties of phytochemicals in fruits and vegetables including their taxonomic distribution, potential roles in human disease prevention/health promotion, biosynthesis and degradation, enzymes, genes and case studies of select plant breeding or metabolic engineering efforts.

Course Objectives:
At the completion of this course, the students are expected to be able to (a) describe major groups of phytochemicals and their chemical, physical and biological properties, (b) to design plant breeding and genetic engineering strategies to overproduce specific phytochemicals in plants and other organisms, and (c) to interpret and evaluate research on health promoting phytochemicals.

Instructor: Dr. Bala Rathinasabapathi (Dr. Saba)
Room 2247 Building Fifield Hall
Phone 352-273-4847
E-mail brath@ufl.edu
Office Hours: By appointment

Resources:
There is no required textbook for this course. The following are suggested as general guides:


https://play.google.com/store/books/details/Bob_B_Buchanan_Biochemistry_and_Molecular_Biology?id=9YAZCgAAQBAJ for $93.59)

Campbell, TC and Campbell II, TM.. 2006. The China Study: The most comprehensive study of nutrition ever conducted and the startling implications for diet, weight loss and long-term health. Benbella Books, Dallas, TX.

**Reading List** This tentative reading list of review articles and will be updated during the course:

**Overview Articles**


**Ascorbic acid:**


**Glucosinolates:**


**Carotenoids:**


Flavonoids and phenolics:


Alkaloids:


Amino acids and proteins:

Internet Homepage for the Course  Linked from http://www.hos.ufl.edu/sabaweb/

Course Outline:

Nature and properties, distribution, biosynthesis and genetics of pathways for the selected phytochemicals will be discussed. The course will be during a 6-week period each week centering on a theme. The last week is for student presentations.

*Week 1: Methods used to study connections between phytochemicals and health.*
- **07-02-18** Mon  Introduction
- **07-03-18** Tue  Methodologies of phytochemistry, genetics & biochemistry.
- **07-04-18** Wed  Independence Day – No class
- **07-05-18** Thu  Total antioxidant activity assays
- **07-06-18** Fri  Animal models

*Week 2: Sugars and organic acids.*
- **07-09-18** Mon  No class
- **07-10-18** Tue  Sugars & Soluble fibers
- **07-11-18** Wed  Ascorbic acid
- **07-12-18** Thu  Other organic acids
- **07-13-18** Fri  Amino acids

*Week 3: Flavonoids and phenolics.*
- **07-16-18** Mon  Flavonoids and Isoflavonoids
- **07-17-18** Tue  Anthocyanins
- **07-18-18** Wed  Condensed tannins
- **07-19-18** Thu  Green Tea polyphenolics
- **07-20-18** Fri  Exam 1

*Week 4: Carotenoids, Terpenoids and Glucosinolate.*
- **07-23-18** Mon  Fatty acids and oils
- **07-24-18** Tue  Carotenoids
- **07-25-18** Wed  Diterpenes & gibberellins
- **07-26-18** Thu  Triterpenoids and steroids
- **07-27-18** Fri  Glucosinalates

*Week 5: Proteins and Alkaloids*
- **07-30-18** Mon  Seed storage proteins
- **07-31-18** Tue  Seed storage proteins
- **08-01-18** Wed  Alkaloid biosynthesis I
- **08-02-18** Thu  Alkaloid biosynthesis II
- **08-03-18** Fri  Plant-animal interactions

*Week 6: Student presentations*
- **08-06-18** Mon  Student presentation
08-07-18   Tue   Student presentation
08-08-18   Wed   Student presentation
08-09-18   Thu   Student presentation
08-10-18   Fri   Student presentation

**Student Presentation:** Students are required to make a 30 minute presentation on their chosen research topic relevant to their written research proposal. Grading will be based on (a) communication of the main idea (b) explanation of the methods used, (c) critical analysis of the research plan and (d) clarity of delivery.

**Written Assignment:** Students should write a research proposal within 5 pages (double or single-spaced, including references) on any health promoting food phytochemical. The research could be on based on one or many of the following: (a) phytochemical surveys, (b) analytical methods, (c) evidence for health benefits, (d) elucidation of biosynthesis or catabolism, (e) plant breeding to improve nutraceuticals and (f) metabolic engineering. Grading will be based on (a) a building a testable hypothesis from the literature, (b) choosing and describing the appropriate methods that could be used for testing the hypothesis, (c) a discussion on the expected results and their significance and (d) clarity in writing.

**Course Evaluation**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance &amp; participation</td>
<td>50</td>
</tr>
<tr>
<td>Written assignment</td>
<td>50</td>
</tr>
<tr>
<td>Classroom presentation</td>
<td>50</td>
</tr>
<tr>
<td>Tests</td>
<td>50</td>
</tr>
<tr>
<td>TOTAL</td>
<td>200</td>
</tr>
</tbody>
</table>

Letter grades for the course will be assigned according to the chart below:

- 90-100 = A; 87-89 = A-; 84-86 = B+; 80-83 = B; 77-79 = B-; 74-76 = C+;
- 70-73 = C; 67-69 = C-; 64-66 = D+; 60-63 = D; 57-59 = D-; 56-below = E.

**Course Policies and Procedures**

1. **Attendance:** Attendance at the lectures and active participation in classroom discussions are required (50 points out of 200 total). Two absences will be tolerated, if prior written notification is given to the instructor.

2. **Homework Policy:** The assignment should be returned to the instructor by 5 p.m. on the specific date announced and late submissions will receive zero points. Classroom presentations should be completed by the specific date announced.

3. **Honor Code:** By registering for classes, all students agree to abide by and follow the University of Florida Student Honor Code (Rule 6C1-4.017). Visit: [http://regulations.ufl.edu/chapter4/4017.pdf](http://regulations.ufl.edu/chapter4/4017.pdf) to read the Student Honor Code.
Honor code violations in this course will not be tolerated, and may result in the assignment of a failing grade.

4. **UF Counseling Services:**
   Counseling & Wellness Center, 301 Peabody Hall, 392-1575, personal and career counseling. [http://www.counseling.ufl.edu](http://www.counseling.ufl.edu)
   Student Health Care Center, 392-1161, personal counseling. [http://shcc.ufl.edu](http://shcc.ufl.edu)
   Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling. [http://www.crc.ufl.edu](http://www.crc.ufl.edu)

5. **Software Use:** Everyone is required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages/criminal penalties for the violator.

6. **Electronic Device Policy:** The use by students of cellular phones, messaging devices and other electronic devices during lectures is prohibited. In class, the students are asked to put the phones and messaging devices on silent mode and turn off other devices.

7. **Students with Disabilities Act.** The Dean of Students Office coordinates the needed accommodations of students with disabilities. To register contact: Dean of Students Office, 202 Peabody Hall, 392-7066, [www.dso.ufl.edu](http://www.dso.ufl.edu)