HOS 5711 Section 4A94 Phytochemicals in Food & Health
Class Number 17611

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:


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:

(1) Methods, ROS, Antioxidant Hypothesis


(2) Sugars, fibers and organic acids


(3) Flavonoids, anthocyanins and polyphenolics


(4) Fats, Oils and Carotenoids


(5) Alkaloids


(6) Seed storage proteins


(7) Glucosinolates

Internet Homepage for the Course See Canvas

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.**
07-06-20 Mon Introductions, Syllabus & Phytochemistry resources
07-07-20 Tue Introduction to a variety of food plants & health promotion
07-08-20 Wed ROS and Antioxidant hypothesis
07-09-20 Thu Total antioxidant activity assays
07-10-20 Fri Methods to study phytochemicals and health promotion

**Week 2: Sugars, soluble fibers and organic acids**
07-13-20 Mon Sugars
07-14-20 Tue Soluble fibers
07-15-20 Wed Ascorbic acid
07-16-20 Thu Other organic acids
07-17-20 Fri Amino acids
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<tr>
<th>Week 3: Flavonoids, anthocyanins and polyphenolics</th>
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<tbody>
<tr>
<td>07-20-20 Mon Flavonoid biosynthesis</td>
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<td>07-21-20 Tue Anthocyanins</td>
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<td>07-22-20 Wed Condensed tannins</td>
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<td>07-23-20 Thu Tea polyphenolics</td>
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<td>07-24-20 Fri Discussions of specific papers</td>
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<th>Week 4: Fats and oils, Carotenoids.</th>
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<tr>
<td>07-27-20 Mon Seed oils</td>
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<td>07-28-20 Tue Carotenoids</td>
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<td>07-29-20 Wed Terpenoids</td>
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<td>07-30-20 Thu Glucosinalates</td>
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<td>07-31-20 Fri Discussion of specific papers</td>
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<th>Week 5: Alkaloids and Seed storage proteins.</th>
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<tr>
<td>08-03-20 Mon Alkaloids – Capsaicinoids</td>
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<td>08-04-20 Tue Alkaloids – Caffeine</td>
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<td>08-05-20 Wed Essential amino acids</td>
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<td>08-06-20 Thu Seed storage proteins</td>
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<td>08-07-20 Fri Plant-Animal interactions. Written proposals are due by 5 pm.</td>
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<th>Week 6: Student Presentations.</th>
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<td>08-10-20 Mon Student Presentation</td>
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<td>08-11-20 Tue Student Presentation</td>
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<td>08-12-20 Wed Student Presentation</td>
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<td>08-13-20 Thu Student Presentation</td>
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<td>08-14-20 Fri Student Presentation</td>
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**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

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<th>Attendance &amp; participation</th>
<th>50 points</th>
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<td>Written assignment</td>
<td>75 points</td>
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<td>Student presentation</td>
<td>75 points</td>
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<td>TOTAL</td>
<td>200 points</td>
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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)