What You’re Peeling Away: The Comparison of Flavanoids in Orange & Lime Peels

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Introduction

When a person beings to eat a freshly picked orange usually, the first action done is to remove the peel, toss it in the trash, and take a bite out of the sweet soft center. But, could the majority of people be throwing away vital nutrients and antioxidants? Recent studies have shown that many important compounds that are extremely beneficial to human health, if consumed, are usually within the peel of citrus fruits. Among these beneficial compounds is the secondary metabolite flavonoids.

Flavonoids can be defined as plant pigments. They are basically the substances found in fruits and vegetables responsible for giving them the eye catching colors like yellow, orange, and red. In humans, flavonoids often act as antioxidants, preventing the damage of cell structures by neutralizing highly active oxygen containing molecules within cells, known as free radicals. Flavonoids help prevent and treat conditions like allergies, asthma, dermatitis, candida infection, cataracts, dizziness, diabetes, gout, hemorrhoids, hypertension, infections, insomnia, iritis, and ulcers. By throwing away the peel of citrus fruits people could possibly be throwing away a natural medicine that is literally on their fingertips.

Materials and Methods

Materials


Methods

1. Prepare a crude extract by taking peels of fruit and mixing it in a solution of ethanol and water, and letting it sit for over 24 hours.
2. Filter extract through filter paper.
3. Use a small portion of the crude extract with hexane in a separatory funnel to form a heterogeneous solution. The same process was done with the mixed peel extract and dichloromethane.
4. Having a crude extract, a dichloromethane extract, and a hexane extract a series of basic recognition tests were carried out with each extract test to the compound present in each.
5. Concentrate each extract using a rotavapor.
6. For an accurate result each extract was placed through a mass spectrometry, infrared and ultra violet ray analysis.

Abstract/Objectives

A comparative study done to identify the presence of flavonoids within orange and lime peels found in Costa Rica. In addition to this emphasis was put on the identification and comparison of the other secondary metabolites and compounds found within the peels such as, tannins, terpenes, steroids, coumarins, alkaloids, flavonoids, anthocyanins, and saponins. Using various extracts from orange and lime peels basic recognition tests were performed on each and other secondary metabolites and compounds were found within the peels.

Results/Analysis

For the lime extract the basic recognition test showed positive for metabolites: tannins, terpenes, steroids, flavonoids, anthraquinones, and anthocyanins. The orange extract showed negative results for alkaloids, coumarins, and saponins. The mass spectrometry for limes showed the presence of various forms of flavonoids, anthraquinones, coumarins, anthocyanins, and tannins. In limes the ultra violet ray analysis showed the presence of various forms of flavonoids. In limes the mass spectrometry showed the presence of forms of coumarins, flavonoids, and terpenes. In limes the ultra violet ray analysis showed the presence of various forms of flavonoids. More metabolites were identified within the time extract.

Conclusions

In conclusion we found that Lime peels hold more metabolites than orange peels. In orange peels we found tannins, terpenes, steroids, coumarins, alkaloids, flavonoids, anthocyanins, and saponins from the basic recognition test. We found these forms of terpenes from the mass spectrometry (3-Cyclohexene-1-methanol, 2, 2-Cyclohexen-1-one, 9,12,15-(Octadecatrienonic acid). Finally we found flavanoids and flavonoids in the test for flavanoids and other secondary compounds. However, in lime peels we found terpenes, steroids, flavonoids, anthraquinones, coumarins, anthocyanins, and saponins from the basic recognition test. In the mass spectum we found flavanoids, flavonoids (Floranthin 7-Hydroxyphenylflavone), anthocyanins, coumarins (7-Hydroxy-3-Methoxycoumarin) for limes and 7-Hydroxy-3-Methoxycoumarin for oranges. Using various extracts from orange and lime peels basic recognition tests were performed on each. These series of test clearly concluded that people are throwing away many critical metabolites that could potentially yield significant health benefits and possible natural remedies. People could be literally peeling and throwing away the peel of fruit of some of societies biggest health problems.

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