US006620452B1

(12) **United States Patent**
Haddad et al.

(10) **Patent No.: US 6,620,452 B1**
(45) **Date of Patent: Sep. 16, 2003**

(54) **FOOD ADDITIVES HAVING ENLARGED CONCENTRATION OF PHENOLICS EXTRACTED FROM FRUITS AND VEGETABLES AND PROCESS OF OBTAINING THE SAME**

(75) Inventors: **William F. Haddad**, Santa Clarita, CA (US); **Kenneth B. Shure**, Santa Monica, CA (US); **Zhong Liu**, Temple City, CA (US)

(73) Assignee: **American Fruit and Flavors**, Pacoima, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/080,033**

(22) Filed: **Feb. 21, 2002**

Related U.S. Application Data

(63) Continuation-in-part of application No. 09/566,211, filed on May 5, 2000, now Pat. No. 6,509,054.

(51) **Int. Cl.**[7] **A23L 1/212**; A23L 1/222

(52) **U.S. Cl.** **426/590**; 426/478; 426/479; 426/599; 426/615; 426/648; 426/655

(58) **Field of Search** 426/599, 590, 426/615, 648, 655, 478, 479

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,083,104 A	*	3/1963	Celmer	426/599
4,156,662 A		5/1979	Wilson et al.	
4,698,360 A		10/1987	Masquelier	
5,141,611 A	*	8/1992	Ford	426/330.3
5,354,429 A		10/1994	Duncan et al.	
5,932,623 A		8/1999	Tanabe et al.	
5,989,557 A		11/1999	Bombardelli et al.	
6,086,910 A	*	7/2000	Howard et al.	424/442
6,298,859 B1	*	10/2001	Kierulff et al.	131/297
2001/0001676 A1	*	5/2001	O'Reilly	426/330

OTHER PUBLICATIONS

Pearson, et al., "Apple Juice Inhibits Human Low Density Lipoprotein Oxidation", in Life Sciences 1999, vol. 64, No. 21, pp 1913–1920.

VINOX (Grape Seed Extract) Technical Publication I by Polyphenolics, Inc.

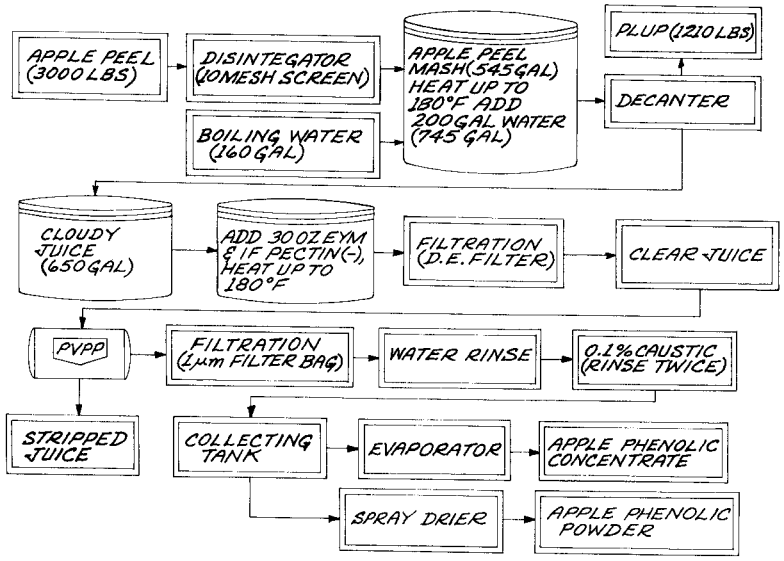
* cited by examiner

Primary Examiner—Helen Pratt
(74) *Attorney, Agent, or Firm*—Gabor L. Szekeres

(57) **ABSTRACT**

Plant phenolics are extracted from macerated fruits and vegetables, particularly from apple peels and apple cores, by agitating the macerated fruit material with hot water of sufficiently high temperature to deactivate naturally present polyphenol oxidase enzyme. The aqueous extract of plant phenolics is separated from the bulk of solid fruit material by physical means, such as filtration. The aqueous extract is treated with pectinase enzyme to remove substantially all pectin, where after the pectinase enzyme is deactivated by heat. The plant phenolics are adsorbed from the depectinized aqueous extract by treatment with solid polyvinylpolypyrrolidone (PVPP) adsorbent, and the plant phenolics are eluted from the adsorbent by treatment with a nutritionally acceptable base, such as sodium hydroxide. The resulting aqueous solution of plant phenolics is concentrated or spray-dried and the resulting concentrated liquid or solid products are used as food supplements, and as additives to beverages and other food items, to provide the beverage or food item with a quantity of plant phenolics which is at least comparable to and which may exceed the plant phenolic contents of natural apple juice.

11 Claims, 1 Drawing Sheet



US006509054B1

(12) **United States Patent**
Haddad et al.

(10) **Patent No.: US 6,509,054 B1**
(45) **Date of Patent: Jan. 21, 2003**

(54) **FOOD ADDITIVES HAVING ENLARGED CONCENTRATION OF PHENOLICS EXTRACTED FROM FRUITS, AND PROCESS OF OBTAINING THE SAME**

(75) Inventors: **William F. Haddad**, Santa Clarita, CA (US); **Vinod Kutty**, Glendale, CA (US); **Kenneth B. Shure**, Santa Monica, CA (US)

(73) Assignee: **American Fruits and Flavors**, Pacoima, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/566,211**

(22) Filed: **May 5, 2000**

(51) **Int. Cl.**[7] **A23L 1/221**
(52) **U.S. Cl.** **426/615**; 426/478; 426/590
(58) **Field of Search** 426/590, 478, 426/615

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,156,662 A	*	5/1979	Wilson et al.	426/533
4,698,360 A		10/1987	Masquelier	
5,354,429 A	*	10/1994	Duncan et al.	203/59
5,932,623 A	*	8/1999	Tanabe et al.	426/428
5,989,557 A	*	11/1999	Bombardelli et al.	426/478

OTHER PUBLICATIONS

Pearson, et al., "Apple Juice Inhibits Human Low Density Lipoprotein Oxidation", in Life Sciences 1999, vol. 64, No. 21, pp 1913–1920.

Vinox (Grape Seed Extract) Technical Publication I by Polyphenolics, Inc.

* cited by examiner

Primary Examiner—Helen Pratt
(74) *Attorney, Agent, or Firm*—Gabor L. Szekeres

(57) **ABSTRACT**

Plant phenolics are extracted from macerated fruits and vegetables, particularly from apple peels and apple cores, by agitating the macerated fruit material with an organic solvent that is acceptable in the food processing industry. After extraction and removal of the bulk of the solid fruit material the solvent is concentrated by distillation to provide a crude concentrate. Undissolved solids are separated from the crude concentrate the liquid portion of which is mixed with a carrier and spray dried to provide a solid concentrate of plant phenolics. Solids which had been removed from the crude concentrate are agitated with water to provide, after filtration, a clear aqueous concentrate of plant phenolics. The solid and liquid concentrates obtained in this manner are used as food supplements, and as additives to beverages and other food items, to provide the beverage or food item with a quantity of plant phenolics which is at least comparable to and which may exceed the plant phenolic contents of natural apple juice.

18 Claims, 2 Drawing Sheets