Psychoactive Plants Described in a Brazilian Literary Work and their Chemical Compounds

Rafaela Denise Otsuka[1], João Henrique Ghilardi Lago[2], Lucia Rossi[3], José Carlos Fernandes Galduróz[1] and Eliana Rodrigues[1,*]

[1]*Departamento de Psicobiologia-Universidade Federal de São Paulo, São Paulo, Brazil;* [2]*Departamento de Ciências Exatas e da Terra-Universidade Federal de São Paulo, Diadema-SP, Brazil;* [3]*Instituto de Botânica do Estado de São Paulo, São Paulo, Brazil*

Abstract: Ethnopharmacological research investigates the plants and other medicinal and toxic substances utilized by different traditional populations. One approach in this field is a literature search of the available publications on medicinal plants. The purpose of the current study was to select plants with psychoactive effects described in a Brazilian literary work written by Pio Correa in 1926. Those mentioned plants were classified in accordance with their indications for use as stimulants and depressors of the central nervous system. For the phytochemical study herein, we researched these species via a database search, and all the obtained information was compiled into a new database to analyze possible correlations between the chemical compounds and the psychoactive categories. Of the 813 plants searched in the literary work, 104 presented chemical data in the scientific periodicals consulted. Seventy-five of them belong to the stimulant category, while 31 are depressors and two of them belong to both categories. Phenols and flavonoids were the main compounds observed in plants of both categories, though at different frequencies. Monoterpenes (29.9%) and sesquiterpenes (28.6%) were also observed in plants from the stimulant category, while 25.8% of plants from the depressor category were comprised of carotenoids and 22.6% of steroids. The main specific compounds were identified as ferulic acid, α-pinene, limonene, α-humulene and kaempferol among the stimulant plants. Otherwise, in depressor plants were characterized caffeic acid, kaempferol, quercetin, β-carotene, physalins and withanolides as specific compounds. The association between ethnopharmacological and chemotaxonomic data, as presented in this study, could support plant selection in further investigations by research groups whose studies focus on psychoactive plants as potential therapeutics.

Keywords: Database, ethnopharmacology, medicinal plants, psychoactive plants, phytochemistry.

1. INTRODUCTION

Ethnopharmacology can be defined as the interdisciplinary scientific exploration of biologically active agents traditionally employed or observed by man [1]. Its objectives are to rescue and document an important cultural heritage as well as evaluate the agents employed [2]. One common approach in this field is a literature search using several published genetic resources. This approach aims to rescue the use of plants described in the literature that have not been investigated in pharmacological and phytochemical studies.

Therefore, bibliographical surveys may represent the first step of a scientific research process. According to Kate and Laird [3], bibliographic surveys are a useful source to guide pharmacological studies in the development of new drugs and are utilized by 80% of pharmaceutical laboratories.

The application of new bioinformatics database systems about herbal texts holds great promise for identifying novel bioactive compounds for pharmacotherapy [4]. Some International Databases, such as Natural Products Alert (http://w-ww.napralert.org/Default.aspx), provide information about pharmacological activities, ethnopharmacological data, che-mical compounds and data from tests on animals and hum-ans for thousand of species from all over the world.

Phytochemistry can contribute to the synthesis of new drugs with therapeutic properties [5]. Nature provides enormous potential for the discovery of new bioactive compounds; at least a million different compounds could be isolated [6].

The World Health Organization defines psychoactive substances as those that, when taken in or administered into one's system, affect mental processes [7]. Thus, psychoactive plants are those ingested in a simple form or as a complex preparation to affect the mind or alter the state of consciousness [8]. According to Chaloult [9], it is possible to classify psychoactive drugs as: depressors, which decrease the activity of the central nervous system, such as alcohol, hypnotics and anxiolytics; stimulants, which increase this activity, such as amphetamines and cocaine; and disturbants, which disrupt this activity, such as hallucinogens and anticholinergics.

Ethnopharmacological surveys of psychoactive substances, such as those developed by Schultes [10] and Rodrigues and Carlini [11,12], are important tools, as they may

*Address correspondence to this author at the Department of Psychobiology, Universidade Federal de São Paulo - Rua Napoleão de Barros, 925 Ed. Ciências Biomédicas (1º Andar), CEP 04024-002 São Paulo, Brazil;
Tel: +55 11 21490155; Fax: +55 11 50842793;
E-mail: 68.eliana@gmail.com

1871-5249/10 $55.00+.00 © 2010 Bentham Science Publishers Ltd.

indicate potential bioactive substances for researchers engaged in the development of medicines for psychiatry.

According to De Smet [13], scientific studies on psychoactive drugs may have an impact on medicine, provide new pharmacological tools for neurochemical research, and may result in the discovery of synthetic substances with potentially therapeutic properties. Adams *et al.* [14] add that several traditional remedies provide promising components with potential as therapeutics for neurodegenerative disorders, such as Alzheimer's disease.

Therefore, a database with information on the ethnopharmacological uses of psychoactive plants and their chemical compounds can support research groups that focus on these plants as potential therapeutics.

The purpose of the current study was to read the botanical compendia of Pio Correa ("Dicionário das Plantas Úteis do Brasil e das Exóticas Cultivadas") and: a) select plants with psychoactive effects; b) correlate their chemical groups found in current scientific literature with the ethnopharmacological use described in Pio Correa; and c) create and compile a database with that information.

2. METHODOLOGY

2.1. Botanical Compendia

Manuel Pio Correa (1874-1934), a Portuguese naturalist, came to Brazil, where he developed his literary work "Dicionário das Plantas Úteis do Brasil e das Exóticas Cultivadas". The work consists of six volumes containing approximately 10,000 species, wherein the author describes plants collected during his expeditions via the following characterizations: scientific and vernacular names, synonyms, botanical description, geographic distribution, medicinal use, and, in some cases, photos and illustrations.

After the publication of the first two volumes in 1926 and 1931, respectively, the author passed away, and the subsequent four volumes (published in 1952, 1969, 1974 and 1978) were written by Dr. Leonam de Azeredo Penna using data collected by Pio Correa. This work is a reference for Brazilian flora studies [15] and researchers in the medicinal plant field.

These six volumes were read and reviewed, and plants indicated as psychoactives were listed. Afterward, according to the use described for each plant component, they were categorized as stimulants (↑) or depressors (↓), based on the Chaloult [9].

2.2. Update of Scientific Names

It was necessary to update the plant scientific names because this literary work belongs to the 20th century. Thus, both specialized books and the following databases were consulted: Tropicos (Missouri Botanical Gardens - http://www.tropicos.org/), IPNI (International Plant Names Index - http://www.ipni.org/), Flora del Conosur (Instituto de Botánica Darwinion - http://www.darwin.edu.ar/Proyectos/ FloraArgentina/FA.asp), Kew (Royal Botanical Gardens - http://apps.kew.org/herbcat/gotoHomePage.do), Solanaceae Source (Natural History Museum - http://www.nhm.ac.uk/-research-curation/research/projects/solanaceaesource/) and Flora Brasiliensis (http://flora.cria.org.br/checklist).

2.3. Phytochemical Survey

To analyze possible correlations between the chemical compounds and the psychoactive plant categories indicated by Pio Correa, a survey was conducted in the Scifinder - Advanced Article Search - ACS Publications database (http://pubs.acs.org/wls/journals/query/subscriberSearch.html). We focused this search on any phytochemical studies developed for these plants. The survey was made using the updated scientific names of plants from January 2000 to January 2008.

Finally, all data were compiled into a database to perform the desired correlation.

3. RESULTS

3.1. Plants and their Psychoactive Categories

Of the 813 psychoactive plants searched in the literary work, there were chemical data in the scientific periodicals consulted for 104 of them. Of the 104 plants, 75 of them belong to stimulant category, while 31 are depressors and 2 of them belong to both categories. The exotic plants were highlighted with asterisk on Table **1**, the remaining are natives to Brazilian flora.

The uses most cited for the 31 depressor plants are as a narcotic, for calming effects and as a beverage compound. The 75 stimulant plants are used mainly as tonics, stimulants, excitants and aphrodisiacs.

The stimulant plants belong to 40 taxonomical families. The most cited were: Asteraceae (8 species), Lamiaceae (6) and Fabaceae s.l. (5). The depressors belong to 21 families, with Solanaceae being the most observed (6 species).

3.2. Chemical Groups x Psychoactive Categories

These analyses were based on the correlation between plant components cited in the periodicals and the ones cited in Pio Correa, as it is well known that the chemical composition of a plant may vary with its parts.

Phenols are found in both categories. Among the stimulants, we also observed monoterpenes (29.9%), sesquiterpenes (28.6%) and flavonoids (23.4%). Additionally, 35.5% of depressors are flavonoids, followed by carotenoids (25.8%) and steroids (22.6%) Fig. (**1**).

In stimulant plants, the specific main compounds were identified as ferulic acid, α-pinene, limonene, α-humulene and kaempferol. Among the depressor plants, phenols were observed mainly because the presence of caffeic acid, kaempferol and quercetin as well as β-carotene, physalins, and withanolides.

3.3. Chemical Groups x Families

Among the families most cited in the present study, 55.6% of the Asteraceae plants were comprised mainly of sesquiterpenes, followed by phenols (44.4%), monoterpenes and flavonoids (33.3% each). The Fabaceae s.l. plants were comprised of 66.7% flavonoids, while the remaining 33.3% were phenols, diterpenes and carotenoid derivatives. The

Table 1. 104 Species Cited as Psychoactive in the Pio Correa's Literary Work, and their Current Chemical Data (* Exotic Species, ↑ Stimulant, ↓ Depressor)

Specie	Plant Uses Cited in Pio Correa (Places or Populations)	Psychoactive Category	Plant's Part / Chemical Compounds Cited in Scientific Periodicals
Anacardiaceae			
Anacardium occidentale L.	Tonic-excitant	↑	Fruit / phenols, acids, alcohols, esters, phenylpropanoids, monoterpenes, ketones and aldehydes and steroids (16-19)
Cotinus coggygria Scop.*	Tonic	↑	bark / phenols and flavonoids (20)
Pistacia lentiscus L.*	Tonic, for excitant fumigation	↑	resin / monoterpenes, sesquiterpenes, alcohols and esters (21)
Annonaceae			
Asimina triloba (L.) Dunal*	for making liqueur, alkaloid which response is identical to the morphine, anesthetic with powerful sedative action	↓	fruit / acetogenines (22-23)
Rollinia mucosa (Jacq.) Baill.*	narcotic	↓	leaf / acetogenines (24-25)
Apiaceae			
Anethum graveolens L.*	hypnotic, for making liqueur	↓	in natura and seed / monoterpenes, sesquiterpenes, phenolic compounds and flavonoids (26-29)
Apium graveolens L.*	excitant	↑	carotenoid (30)
Coriandrum sativum L.*	stimulant	↑	fruit / aldehydes, monoterpenes, phenylpropanoids and sesquiterpenes (31-33)
	to counteract hysteria	↓	seed / carotenoids and steroids (34)
Daucus carota L.*	tonic nerves	↑	root and leaf / monoterpenes, sesquiterpenes, phenylpropanoids, aldehydes, ketones, carotenoids, alcohols and phenols (35-41)
			seed / acids, aldehydes, sesquiterpenes and phenylpropanoid (42)
			juice and fermented beverage / anthocyanins (43-44)
			aerial parts / monoterpenes, sesquiterpenes and phenylpropanoids (45)
Foeniculum vulgare Mill.*	stimulant	↑	aerial parts / monoterpenes, phenylpropanoids, phenols and fatty acids (46-52)
	distilled provides excitant oil		seed / monoterpenes, phenylpropanoid, phenols and esters (53-55)
Apocynaceae			
Catharanthus roseus (L.) G. Don	stupefacient with action on certain brain and spinal cord cellular departments	↓	whole plant / alkaloids (56-57)
Nerium oleander L.*	tonic poison	↑	whole plant / cardiac glycosides, triterpenes, steroids and sesquiterpenes (58-63)
Aquifoliaceae			
Ilex paraguariensis A. St.-Hil.	stimulant tonic, activates or excites the appetite, general stimulant of all functions, specially the intelligence and motility	↑	leaf / phenols, alkaloid, diterpene, steroids, flavonoids and fatty acids (64-69)

(Table 1) contd….

Specie	Plant Uses Cited in Pio Correa (Places or Populations)	Psychoactive Category	Plant's Part / Chemical Compounds Cited in Scientific Periodicals
Araliaceae			
Panax quinquefolius L.*	recover energy from fatigue and excessive love pleasure, increases the organic excitability, stimulant and tonic	↑	root / saponins (70-73)
Asclepiadaceae			
Asclepias curassavica L.	macerate induce convulsion	↑	stem / triterpenes and steroids (74)
Asteraceae			
Acanthospermum hispidum DC.	tonic	↑	flower and leaf / sesquiterpenes (75)
Artemisia dracunculus L.	stimulant	↑	leaf / aliphatics, monoterpenes, sesquiterpenes, diterpenes and phenylpropanoids and coumarins (76-78)
Artemisia vulgaris L.*	tonic and excitant	↑	root and leaf / monoterpenes, sesquiterpenes, esters and acids (79)
Baccharis dracunculifolia DC.	tonic	↑	stem and leaf / sesquiterpenes, phenols and flavonoids (80-83)
Cichorium intybus L.*	tonic	↑	aerial parts / phenols, flavonoids, phenylpropanoids and sesquiterpenes (84-86)
Lactuca sativa L.*	oil anaphrodisiac	↓	seed / phenols and carotenoids (87)
Tagetes erecta L.*	stimulant	↑	flower / carotenoids (88-90)
	to calm down	↓	resin / carotenoids (91)
Tanacetum vulgare L.*	tonic and stimulant	↑	leaves and flowers / monoterpenes (92-93)
Taraxacum officinale F.H. Wigg.	tonic	↑	leaf / phenols, flavonoids and anthocyanins (94)
Bixaceae			
Bixa orellana L.	powder is aphrodisiac (aborigines)	↑	seed / alcohols, acids, aldehydes, hydrocarbons, sesquiterpenes, monoterpenes, ketones, carotenoids and anthocyanins (95-97)
Brassicaceae			
Eruca vesicaria subsp. *sativa* (Mill.) Thell*	excitant	↑	leaf / aliphatics, flavonoids and glucosinolates (98-100)
Nasturtium officinale R. Br.*	stimulant	↑	whole plant / glucosinolates and carotenoids (101-103)
Bromeliaceae			
Ananas comosus (L.) Merr.	fermented juice recovers energy (Chacriabas and Machacaris tribes)	↑	fruit / esters (104)
Buxaceae			
Buxus sempervirens L.*	alkaloid identical to strychnine, aphrodisiac (ancient Romans)	↑	leaf / sulfur compounds (105)
Cactaceae			
Opuntia ficus-indica (L.) Mill.*	fermented produces alcohol	↓	fruit / betalains, phenols, flavonoids and carotenoids (106-110)

(Table 1) contd….

Specie	Plant Uses Cited in Pio Correa (Places or Populations)	Psychoactive Category	Plant's Part / Chemical Compounds Cited in Scientific Periodicals
Canellaceae			
Cinnamodendron axillare Endl. ex Walp.	tonic and excitant	↑	bark / alkaloid (111)
Cannabaceae			
Humulus lupulus L.*	used in pillows to overcome insomnia (rural population from Europe)	↓	inflorescence / aldehydes, acids, esters, hydrocarbons, monoterpenes, sesquiterpenes, ketones, anthocyanidins, phenols, flavonoids, tannins, steroids, fatty acids and stilbenes (112-125)
Caprifoliaceae			
Sambucus nigra L.*	for making wine	↓	fruit / anthocyanins and anthocyanidins (126)
Caryophyllaceae			
Dianthus caryophyllus L.*	excitant, to prepare tonic syrup	↑	flower / anthocyanins (127)
Dianthus superbus L.*	stimulant	↑	petal / cyclic peptides (128)
Chenopodiaceae			
Chenopodium quinoa Willd.*	for making beer	↓	seed / saponins (129-134)
Clusiaceae			
Mammea americana L.	fermented produces wine and drunkenness	↓	fruit / carotenoids (135)
Cupressaceae			
Juniperus communis L.*	for making juniper liquor (England, Scotland and the Nordic countries)	↓	fruit / monoterpenes, sesquiterpenes and flavonoids (136-137)
Cyperaceae			
Cyperus longus L.	tonic	↑	rhizome / monoterpenes, sesquiterpenes and alcohols (138)
Cyperus rotundus L.*	stimulant	↑	rhizome / alkaloids (139)
Ericaceae			
Vaccinium myrtillus L.*	for making alcohol beverage	↓	fruit / iridoids and anthocyanins (140-142)
Fabaceae			
Arachis hypogaea L.*	nervous system excitant (low action), possibly aphrodisiac	↑	seed / fatty acids, stilbenes and flavonoids (143-145)
Caesalpinia bonduc (L.) Roxb.	tonic	↑	seed / diterpenes (146)
Caesalpinia pulcherrima (L.) Sw.*	tonic	↑	root / diterpenes (147)
	excitant		leaf / diterpenes (148)
Ceratonia siliqua L.*	fermented produces strong drink and liqueur, for making alcohol	↓	fruit / phenols, tannins and flavonoids (149)
Glycine max (L.) Merr.*	to increase physical resistance	↑	seed / esters, aldehyde, anthocyanins, carotenoids and flavonoids (150-160)
Phaseolus vulgaris L.	conserved holds B vitamin which is nervous system tonic and appetite stimulant	↑	seed / tannins, flavonoids, anthocyanins, phenols and carotenoids (161-174)

(Table 1) contd….

Specie	Plant Uses Cited in Pio Correa (Places or Populations)	Psychoactive Category	Plant's Part / Chemical Compounds Cited in Scientific Periodicals
Gentianaceae			
Centaurium erythraea Rafn*	tonic	↑	aerial parts / xanthones and phenols (175-176)
Lamiaceae			
Lavandula angustifolia Mill.*	tonic and stimulant	↑	flower / monoterpenes (177)
Origanum majorana L.	used in baths have excitant power	↑	whole plant / carotenoids, diterpenes and triterpenes (178-179)
Rosmarinus officinalis L.*	stimulant oil	↑	seed / phenols (180)
	infusion useful against chlorosis		leaf / monoterpenes, diterpenes, phenols, flavonoids, triterpenes, phenylpropanoids, sesquiterpenes and hydrocarbons (181-187)
Salvia officinalis L.*	excitant, nervous system tonic and stimulant	↑	leaf, flower and stem / phenols, diterpenes, monoterpenes, sesquiterpenes, hydrocarbons and diterpene (188-191)
Satureja hortensis L.*	stimulant	↑	aerial parts / monoterpenes (192)
Thymus vulgaris L.*	stimulant	↑	leaf / phenols, flavonoids, monoterpenes, diterpenes and sesquiterpenes (54, 177,189,193)
Lauraceae			
Aniba canelilla (Kunth) Mez	overcomes nervous system weakness from any abuse	↑	bark / monoterpenes, aldehydes, phenylpropanoids and sesquiterpenes (194)
Laurus nobilis L.	tonic	↑	aerial parts / monoterpenes, phenylpropanoids, sesquiterpenes, carotenoids, phenols, flavonoids, ketones, aldehydes, esters, hydrocarbons, acids, alcohols and anthocyanins (53,195-202)
Liliaceae			
Aloe vera (L.) Burm. f.*	plant juice is useful against hypochondria	↑	leaf / carotenoids (203)
Asparagus officinalis L.*	aphrodisiac	↑	fruit / carotenoids and phenols (204-205)
Malvaceae			
Hibiscus sabdariffa L.*	tonic and aphrodisiac	↑	seed / phenols (206)
Meliaceae			
Melia azedarach L.*	for making whisky and wine	↓	fruit / limonoids (207-208)
Trichilia catigua A. Juss.	tonic	↑	bark / flavonoids (209)
Moraceae			
Morus alba L.*	distilled produces alcohol and wine	↓	fruit / alkaloids (210)
Musaceae			
Musa paradisiaca L.*	fermented produces strong liquor (Amazonian aborigines)	↓	fruit / phenols (211)
Myristicaceae			
Myristica fragrans Houtt.*	aromatic stimulant	↑	seed / aliphatics and phenylpropanoid (212-213)
Myrtaceae			
Eucalyptus globulus Labill.*	aphrodisiac	↑	leaf / monoterpenes and sesquiterpenes (214)

(Table 1) contd….

Specie	Plant Uses Cited in Pio Correa (Places or Populations)	Psychoactive Category	Plant's Part / Chemical Compounds Cited in Scientific Periodicals
Eugenia uniflora L.	excitant	↑	leaf / sesquiterpenes (215)
Pimenta dioica (L.) Merr.*	stimulant	↑	fruit / phenols (216)
Syzygium aromaticum (L.) Merr. & L.M. Perry*	excitant and aphrodisiac	↑	oil / phenylpropanoid (217-218)
Oleaceae			
Jasminum sambac (L.) Aiton*	nervous system excitant	↑	flower / monoterpenes and esters (219)
Orchidaceae			
Vanilla planifolia Andrews	stimulant, to counteract chlorosis and any nervous affection	↑	phenols (220)
Papaveraceae			
Papaver somniferum L.*	analgesic substance, especially in insomnia due to pain; narcotic; induces pleasant drunkenness	↓	whole plant / alkaloids, alcohol and fatty acids (221-222)
Passifloraceae			
Passiflora edulis Sims	to calm down and antihysteria	↓	leaf / triterpenes, saponins and flavonoids (223-225)
Phytolaccaceae			
Phytolacca americana L.*	holds a convulsant poison with action on the spine, which in higher doses is narcotic	↑	root / saponins (226)
Pinaceae			
Thuja occidentalis L.*	excitant	↑	leaf / diterpenes (227)
Poaceae			
Avena sativa L.	for making whisky and beer	↓	seed / carotenoids, phenols, fatty acids and flavolignans (228-230)
Hordeum vulgare L.*	fermented produces alcohol for beer production	↓	seed / carotenoids, flavonoids and phenols (231-232)
Secale cereale L.*	fermented produces strong liquor (Prussia)	↓	seed / phenols (233-234)
Polygonaceae			
Rumex crispus L.	tonic and against obesity	↑	leaf and seed / phenols (235)
Ranunculaceae			
Hydrastis canadensis L.*	holds a substance that produces excitability of nerves and sometimes, convulsions; tonic	↑	rhizome / alkaloids (236)
Rhamnaceae			
Discaria americana Gillies & Hook.	tonic	↑	root bark / cyclopeptides (237)
Rosaceae			
Rubus idaeus L.*	fermented produces wine	↓	fruit / flavonoids, phenols, monoterpenes and sesquiterpenes (238-239)
Rubiaceae			
Coffea arabica L.*	nervous system excitant; opium and morphine antidote (counteracts the narcosis); alkaloid excites nervous and muscular systems, increases the contractile potency from muscles and makes the receptivity of the relationship muscles easier from nerve centers excitations; increases the functional activity from medullar and brain cells	↑	essential oil / alkaloids (240)

(Table 1) contd….

Specie	Plant Uses Cited in Pio Correa (Places or Populations)	Psychoactive Category	Plant's Part / Chemical Compounds Cited in Scientific Periodicals
Rutaceae			
Citrus aurantium L.*	tonic	↑	fruit / alkaloids (241-242)
Citrus medica L.*	tonic	↑	peel fruit / aldehydes, monoterpenes, sesquiterpenes, esters and phenylpropanoids (243)
Ruta chalepensis L.*	excitant	↑	root / alkaloids and coumarins (246)
Santalaceae			
Santalum album L.*	stimulant	↑	wood / sesquiterpenes and monoterpenes (247-248)
Saxifragaceae			
Ribes nigrum L.*	tonic	↑	fruit / phenols, anthocyanins, flavonoids, fatty acids and monoterpenes (249-2533)
Scrophulariaceae			
Capraria biflora L.	infusion associated with other plants is stimulant	↑	leaf / sesquiterpenes (254)
Scoparia dulcis L.	tonic (British Guiana)	↑	aerial parts / diterpenes and flavonoids (255-256)
Solanaceae			
Acnistus arborescens (L.) Schltdl.	narcotic	↓	leaf / steroids (257)
Cestrum nocturnum L.	used in bath and poultice to calm	↓	leaf / flavonoids, saponins and steroids (258-259)
Cestrum parqui L'Hér.	sedative, to counteract epilepsy	↓	leaf / phenols and flavonoids (260)
Datura metel L.	narcotic	↓	flower / steroids (261)
Hyoscyamus niger L.*	narcotic	↓	seed / phenols, steroids and lignanamides (262)
Nicotiana tabacum L.*	chewed produces convulsion	↑	leaf / alkaloids (263)
Physalis angulata L.	to calm down	↓	sap / steroids (264-265)
Solanum tuberosum L.	analeptic	↑	tuber / carotenoids, phenols, anthocyanins, alkaloids and fatty acids (266-271)
Sterculiaceae			
Cola acuminata (P. Beauv.) Schott & Endl.*	stimulant masticatory; recovers energy; decreases hunger; aphrodisiac (Western African indigenous)	↑	seed / flavonoids and alkaloid (272)
Turneraceae			
Turnera diffusa Willd. ex Schult.	tonic; stimulant; aphrodisiac; general tonic in neurasthenia and impotency	↑	leaf / phenols and flavonoids (273)
Verbenaceae			
Avicennia marina (Forssk.) Vierh.	aphrodisiac	↑	stem / quinones (274)
Lantana camara L.	tonic	↑	leaf / flavonoids and triterpenes (275)
Vitaceae			
Vitis vinifera L.*	for making wine	↓	fruit / stilbenes, monoterpenes, sesquiterpenes, phenols, alcohols, phenylpropanoids, esters, sulfur compounds, flavonoid, anthocyanidin, anthocyanins, carotenoids, stilbenes, acids, aldehydes, tannins, procyanidins, fatty acids and ketones (107,276-315)

(Table 1) contd….

Specie	Plant Uses Cited in Pio Correa (Places or Populations)	Psychoactive Category	Plant's Part / Chemical Compounds Cited in Scientific Periodicals
Zingiberaceae			
Etlingera elatior (Jack) R.M. Sm.*	tonic	↑	rhizome / diterpenes, steroids and phenols (316)
Zingiber officinale Roscoe*	tonic and aphrodisiac (Northern Africa)	↑	rhizome / monoterpenes, phenols, fatty acids, sesquiterpenes and diarylheptanoids (317-321)

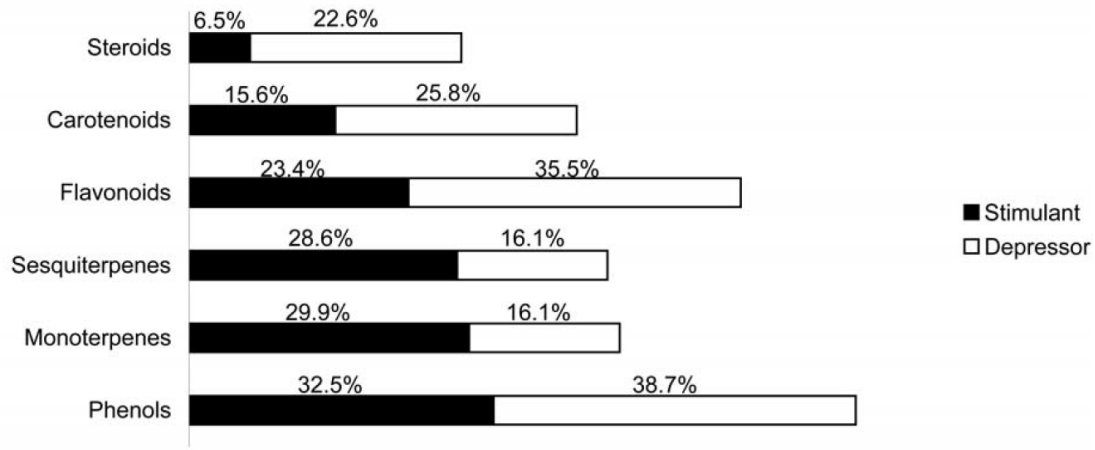

Fig. (1). Percentage of the predominant chemical compounds among depressor and stimulant plant categories.

Lamiaceae plants were comprised of 83.3% monoterpenes, followed by diterpenes (66.7%), sesquiterpenes and phenols (50% each) and flavonoids (33.3%). In Solanaceae, steroids (62.5%), phenols (37.5%) and flavonoids (25%) are the main compounds found Fig. (**2**).

4. DISCUSSION

Some uses for medicinal plants were recurrent in this study as well as in other studies that focused on psychoactive plants, such as tonics and anxiolytics, which were highly cited by Krahô Indians in Brazil [12,322]. Moreover, in a review about adaptogens, Mendes and Carlini [323] also described tonics and aphrodisiacs as the most popular uses reported in Brazilian contemporary books.

Some plants recorded in the present study had similar uses as those in other ethnopharmacological surveys focusing on psychoactive plants, such as: *Passiflora edulis* Sims. [322,324], *Turnera diffusa* Willd. ex Schult. [325, 323], *Anacardium occidentale* L., *Arachis hypogaea* L., *Bixa orellana* L., and *Ilex paraguariensis* A. St.-Hil. [323].

Some of the families most cited in the present study were also the most frequent in other studies that analyze plants related to central nervous system, for example, Fabaceae s.l., Asteraceae, Lamiaceae and Solanaceae [11,12,14,323,324, 325,326,327].

Furthermore, using a regression analysis of local ethnomedicinal flora from Mexico and southern Africa, Leonti *et al.* [328] and Douwes *et al.* [329], respectively, identified the Asteraceae, Fabaceae and Lamiaceae families as the most highly selected by traditional healers, and this does not occur randomly.

The present study observed that the Fabaceae s.l. family had the largest number of plants utilized as stimulants; the same was described by Rodrigues *et al*. [324] in an ethnopharmacological review about 26 native tribes of people. Plants from this family, as well as the Asteraceae and Solanaceae families, are widely distributed throughout the world and are represented by 18,000, 23,000 and 3,000 species, respectively, which explains why they are broadly used by traditional populations [330,331].

Rodrigues *et al.* [324] also observed that most of the plants used as stimulants had flavonoids in their composition. They were also the predominant chemical compounds among those species utilized as anxiolytics and hypnotics (depressors) in two ethnopharmacological reviews [324,327], corroborating data found in the present study. In fact, some studies verified the hypnotic and sedative effects of some flavonoids [332,333,334]. They are widely distributed in plants, mainly in angiosperms [335], which explains their presence in plants utilized for different biological activities.

The flavonoid kaempferol are associated with antioxidant activity; however it did not show central nervous system stimulant activity [336], maybe it is related with other substance. These antioxidant activity are related with a neuroprotective action [337].

According to Simões and Spitzer [338], the volatiles compounds are complex mixtures of volatile substances, are commonly odoriferous and liquid, and have important pharmacological activities as an appetite stimulant, central nerv-

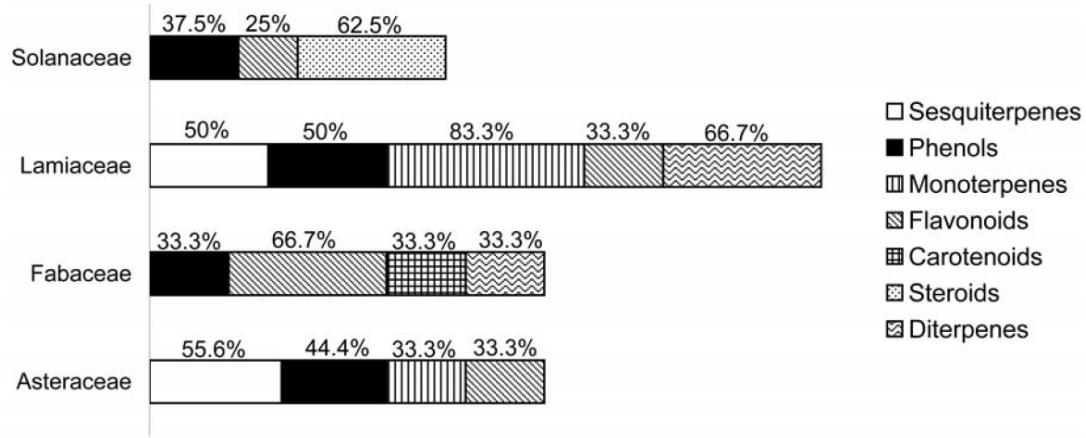

Fig. (2). Percentage of chemical compounds observed in the plants from the families most cited.

ous system affector (stimulant, depressor, and convulsive), or local anesthetic, among others. Rätsch [8] adds that essential oils are common in psychoactive plants, and one of their activities is as an aphrodisiac. In fact, we also observed the presence of volatile compounds in both stimulants and depressors, although in higher percentage among the first.

The plant *Ptychopetalum olacoides* L. is employed by indigenous as the aphrodisiac qualities and one of its compounds is the monoterpene α-pinene and the sesquiterpene α-humulene [339]. A pharmacological study verified that *P. olacoides* has central nervous system effects interacting dopaminergic and/or noradrenergic systems [340]. On the other hand, studies correlating limonene and stimulant effect on central nervous system were not found, only one research relating limonene with gastrointestinal stimulant effect [341].

The high prevalence of phenols in the stimulant plants category could be related to antioxidant activity because some studies reported a relationship between the antioxidant effect and phenolic compounds from herbs used as tonics [342,343,344]. Studies correlating phenols with a depressor effect were not found in scientific literature, although this correlation was observed in the present study.

Some studies mention the beneficial effect of ferulic acid attributed not only to its antioxidant effect [345,346,347], but also to its stimulant effect on gastrointestinal tract [348]. The ferulic acid is not directly related to the stimulating effect; on the other hand caffeic acid produces antidepressant-like effects [349,350]. Although the caffeic acid is one of the main phenols found between depressor plants.

The carotenoids are associated with plant color [351], explaining their prevalence in depressor plants, mainly in wines, and referred to as such by traditional populations due to their purple coloration. Further, the carotenoids are also related to antioxidant effects [352,353,354,355].

As observed in this study, steroids are commonly found in Solanaceae plants [356], while plants in the Fabaceae s.l. family are characterized by impressive phytochemical diversity, with flavonoids being common in these plants [357]. According to Schultes and Raffauf [330], it is common to find sesqui- and diterpenes, carotenoids and flavonoids in Asteraceae plants. Volatiles are commonly found in the Asteraceae, Apiaceae and Lamiaceae families [336].

Studies relating depressant effects of the main specific steroids observed in this study were not found; however some researches mention that some withanolides in the diet may prevent or decrease the growth of tumors in human and other withanolides showed neurite extension in cortical neurons [358,359,360].

According to Douwes *et al*. [329], some plants are selected traditionally on the basis of bioactivity, according to their chemical diversity. Some plants show similar efficacy against certain diseases due to heritable similarities in secondary metabolites.

5. CONCLUSION

Comparing the main chemical groups detected in plants from each category, it was observed that phenols (ferulic and caffeic acid) and flavonoids (kaempferol and quercetin) were found in both stimulants and depressors, although in different frequencies. Monoterpenes (α-pinene and limonene) and sesquiterpenes (α-humulene) were also prevalent in plants from the stimulant category, while among depressors, carotenoids (β-carotene) and steroids (physalins and withanolides) were more common.

Despite the data found, it is not possible to affirm that the prevalence of compounds among plants of each category were responsible for their biological activities. Additionally, it cannot be excluded that the activity of some compounds can be promoted by their interaction with other compounds.

Therefore, as shown in this work, the association between chemotaxonomy and ethnopharmacology could support plant selection in future investigations.

ACKNOWLEDGMENTS

Thanks to FAPESP (Fundação de Apoio à Pesquisa do Estado de São Paulo) and to AFIP (Associação Fundo de Incentivo a Psicofarmacologia) for financial support.

REFERENCES

[1] Holmstedt, B. In: *Ethnobotany: evolution of a discipline*; Schultes, R.E.; von Reis, S.; Timber Press Inc.: Oregon, **1995**, pp. 320-337.

[2] Holmstedt, B.; Bruhn, J.G. In: *Ethnobotany: evolution of a discipline*; Schultes, R.E.; von Reis, S. Timber Press Inc.: Oregon, **1995**, pp. 338-342.

[3] Kate, K.T.; Laird, S.A. In: *The commercial use of biodiversity: access to genetic resources and the benefit-sharing*; Kate, K.T.; Laird, S.A., Eds. Kew-Royal Botanic Gardens: London, **1999**, pp. 34-77.

[4] Buenz, E.J.; Schnepple, D.J.; Bauer, B.A.; Elkin, P.L.; Riddle, J.M.; Motley, T.J. Techniques: Bioprospecting historical herbal texts by hunting for new leads in old tomes. *Trends Pharmacol. Sci.*, **2004**, *25*, 494-498.

[5] Naranjo, P. In: *Ethnobotany: evolution of a discipline*; Schultes, R.E.; von Reis, S. Timber Press Inc.: Oregon, **1995**, pp. 362-8.

[6] Verpoorte, R. Exploration of nature's chemodiversity: the role of secondary metabolites as leads in drug development. *Drug Discov. Today*, **1998**, *3*, 232-238.

[7] Who-World Health Organization. http://www.who.int/substance_abuse/terminology/psychoactive_substances/en/ (Accessed July, **2009**).

[8] Rätsch, C. The encyclopedia of psychoactive plants: ethnopharmacology and its applications. Park Street Press: Vermont, **2005**.

[9] Chaloult, L. Vers une nouvelle classification des drogues. *Toxicomanies*, **1971**, *4*, 371-375.

[10] Schultes, R.E. The virgin field in psychoactive plant research. *Bol. Mus. Parana. Emílio Goeldi (Botânica)*, **1990**, *6*, 7-82.

[11] Rodrigues, E.; Carlini, E.L.deA. Plants with possible action on the central nervous system used by a *quilombola* group in Brazil. *Phytother. Res*., **2004**, *18*, 748-753.

[12] Rodrigues, E.; Carlini, E. Ritual use of plants with possible action on the central nervous system by the Krahô Indians, Brazil. *Phytother. Res*., **2005**, *19*, 129-135.

[13] De Smet, P.A.G.M. In: *Ethnobotany: evolution of a discipline*; Schultes, R.E.; von Reis, S., Eds.; Timber Press Inc.: Oregon, **1995**, pp. 369-382.

[14] Adams, M.; Gmünder, F.; Hamburger, M. Plants traditional used in age related brain disorders – A survey of ethnobotanical literature. *J. Ethnopharmacol*., **2007**, *113*, 363-381.

[15] Biavatti, M.W.; Marensi, V.; Leite, S.N.; Reis, A. Ethnopharmacognostic survey on botanical compendia for potencial cosmoceutic species from Atlantic Forest. *Rev. Bras. Farmacog*., **2007**, *17*, 640-653.

[16] Phani Kumar, P.; Paramashivappa, R.; Vithayathil, P.J.; Subba Rao, P.V.; Srinivasa Rao, A. Process for isolation of cardanol from technical cashew (*Anacardium occidentale L.*) nut shell liquid. *J. Agric. Food Chem*., **2002**, *50*, 4705-4708.

[17] Paramashivappa, R.; Phani Kumar, P.; Vithayathil, P.J.; Srinivasa Rao, A. Novel method for isolation of major phenolic constituents from cashew (*Anacardium occidentale* L.) nut shell liquid. *J. Agric. Food Chem*., **2001**, *49*, 2548-2551.

[18] Moreira, R.F.A.; Trugo, L.C.; Pietroluongo, M.; De Maria, C.A.B. Flavor composition of cashew (*Anacardium occidentale*) and marmeleiro (Croton species) honeys. *J. Agric. Food Chem*., **2002**, *50*, 7616-7621.

[19] Phillips, K.M.; Ruggio, D.M.; Ashraf-Khorassani, M. Phytosterol composition of nuts and seeds commonly consumed in the United States. *J. Agric. Food Chem*., **2005**, *53*, 9436-9445.

[20] Westenburg, H.E.; Lee, K.J.; Lee, S.K.; Fong, H.H.S.; Van Breemen, R.B.; Pezzuto, J.M.; Kinghorn, A.D. Activity-guided isolation of antioxidative constituents of *Cotinus coggygria*. *J. Nat. Prod*., **2000**, *63*, 1696-1698.

[21] Koutsoudaki, C.; Krsek, M.; Rodger, A. Chemical composition and antibacterial activity of the essential oil and the gum of *Pistacia lentiscus* var. *chia*. *J. Agric. Food Chem*., **2005**, *53*, 7681-7685.

[22] Kim, E.J.; Tian, F.; Woo, M.H. Asitrocin, (2,4)-cis- and trans-asitrocinones: novel bioactive mono-tetrahydrofuran acetogenins from *Asimina triloba* seeds. *J. Nat. Prod*., **2000**, *63*, 1503-1506.

[23] Kim, E.J.; Suh, K.M.; Kim, D.H.; Jung, E.J.; Seo, C.S.; Son, J.K.; Woo, M.H.; Mclaughlin, J.L. Asimitrin and 4-hydroxytrilobin, new bioactive annonaceous acetogenins from the seeds of *Asimina triloba* possessing a bis-tetrahydrofuran ring. *J. Nat. Prod*., **2005**, *68*, 194-197.

[24] Narayan, R.S.; Borhan, B. Synthesis of the proposed structure of mucoxin via regio- nd stereoselective tetrahydrofuran ring-forming strategies. *J. Org. Chem*., **2006**, *71*, 1416-1429.

[25] Yoshimitsu, T.; Makino, T.; Nagaoka, H. Total synthesis of (+)-muconin. *J. Org. Chem*., **2004**, *69*, 1993-1998.

[26] Bonnländer, B.; Winterhalter, P. 9-hydroxypiperitone β-D-glucopyranoside and other polar constituents from dill (*Anethum graveolens* L.) Herb. *J. Agric. Food Chem*., **2000**, *48*, 4821-1825.

[27] Jirovetz, L.; Buchbauer, G.; Stoyanova, A.S.; Georgiev, E.V.; Damianova, S.T. Composition, quality control, and antimicrobial activity of the essential oil of long-time stored dill (*Anethum graveolens* L.) seeds from Bulgaria. *J. Agric. Food Chem*., **2003**, *51*, 3854-3857.

[28] Zheljazkov, V.D.; Warman, P.R. Application of high-Cu compost to dill and peppermint. *J. Agric. Food Chem*., **2004**, *52*, 2615-2622.

[29] López, P.; Sánchez, C.; Batlle, R.; Nerín, C. Solid- and vapor-phase antimicrobial activities of six essential oils: susceptibility of selected foodborne bacterial and fungal strains. *J. Agric. Food Chem*., **2005**, *53*, 6939-6946.

[30] Ching, L.; Mohamed, S. Alpha-tocopherol content in 62 edible tropical plants. *J. Agric. Food Chem*., **2001**, *49*, 3101-3105.

[31] Smallfield, B.M.; Van Klink, J.W.; Perry, N.B.; Dodds, K.G. Coriander spice oil: effects of fruit crushing and distillation time on yield and composition. *J. Agric. Food Chem*., **2001**, *49*, 118-123.

[32] Gil, A.; De La Fuente, E.B.; Lenardis, A.E.; Pereira, M.L.; Suárez, S.A.; Bandoni, A.; Van Baren, C.; Lira, P.D.L.; Ghersa, C.M. Coriander essential oil composition from two genotypes grown in different environmental conditions. *J. Agric. Food Chem*., **2002**, *50*, 2870-2877.

[33] Cantore, P.L.; Iacobellis, N.S.; De Marco, A.; Capasso, F.; Senatore, F. Antibacterial activity of *Coriandrum sativum* L. and *Foeniculum vulgare* Miller var. *vulgare* (Miller) essential oils. *J. Agric. Food Chem*., **2004**, *52*, 7862-7866.

[34] Ramadan, M.F.; Kroh, L.W.; Mörsel, J.T. Radical scavenging activity of black cumin (*Nigella sativa* L.), coriander (*Coriandrum sativum* L.), and niger (*Guizotia abyssinica* Cass.) crude seed oils and oil fractions. *J. Agric. Food Chem*., **2003**, *51*, 6961-6969.

[35] Kjeldsen, F.; Christensen, L.P.; Edelenbos, M. Quantitative analysis of aroma compounds in carrot (*Daucus carota* L.) cultivars by capillary gas chromatography using large-volume injection technique. *J. Agric. Food Chem*., **2001**, *49*, 4342-4348.

[36] Kjeldsen, F.; Christensen, L.P.; Edelenbos, M. Changes in volatile compounds of carrots (*Daucus carota* L.) during refrigerated and frozen storage. *J. Agric. Food Chem*., **2003**, *51*, 5400-5407.

[37] Surles, R.L.; Weng, N.; Simon, P.W.; Tanumihardjo, S.A. Carotenoid profiles and consumer sensory evaluation of specialty carrots (*Daucus carota* L.) of various colors. *J. Agric. Food Chem*., **2004**, *52*, 3417-3421.

[38] Baranska, M.; Schulz, H.; Baranski, R.; Nothnagel, T.; Christensen, L.P. *In situ* simultaneous analysis of polyacetylenes, carotenoids and polysaccharides in carrot roots. *J. Agric. Food Chem*., **2005**, *53*, 6565-6571.

[39] Klaiber, R.G.; Baur, S.; Koblo, A.; Carle, R. Influence of washing treatment and storage atmosphere on phenylalanine ammonia-lyase activity and phenolic acid content of minimally processed carrot sticks. *J. Agric. Food Chem*., **2005**, *53*, 1065-1072.

[40] Koch, T.C.; Goldman, I.L. Relationship of carotenoids and tocopherols in a sample of carrot root-color accessions and carrot germplasm carrying *Rp* and *rp* alleles. *J. Agric. Food Chem*., **2005**, *53*, 325-331.

[41] Nissinen, A.; Ibrahim, M.; Kainulainen, P.; Tiilikkala, K.; Holopainen, J.K. Influence of carrot psyllid (*Trioza apicalis*) feeding or exogenous limonene or methyl jasmonate treatment on composition of carrot (*Daucus carota*) leaf essential oil and headspace volatiles. *J. Agric. Food Chem*., **2005**, *53*, 8631-8638.

[42] Momin, R.A.; Nair, M.G. Pest-managing efficacy of trans-asarone isolated from *Daucus carota* L. seeds. *J. Agric. Food Chem*., **2002**, *50*, 4475-4478.

[43] Schwarz, M.; Wray, V.; Winterhalter, P. Isolation and identification of novel pyranoanthocyanins from black carrot (*Daucus carota* L.) juice. *J. Agric. Food Chem*., **2004**, *52*, 5095-5101.

[44] Turker, N.; Aksay, S.; Ekiz, H.I. Effect of storage temperature on the stability of anthocyanins of a fermented black carrot (*Daucus carota* var. L.) beverage: shalgam. *J. Agric. Food Chem*., **2004**, *52*, 3807-3813.

[45] Rossi, P.G.; Bao, L.; Luciani, A.; Panighi, J.; Desjobert, J.M.; Costa, J.; Casanova, J.; Bolla, J.M.; Berti, L. (E)-Methylisoeugenol and elemicin: antibacterial components of *Daucus carota* L. essential oil against *Campylobacter jejuni*. *J. Agric. Food Chem*., **2007**, *55*, 7332-7336.

[46] Piccaglia, R.; Marotti, M. Characterization of some Italian types of wild fennel (*Foeniculum vulgare* Mill.). *J. Agric. Food Chem*., **2001**, *49*, 239-244.

[47] Bilia, A.R.; Fumarola, M.; Gallori, S.; Mazzi, G.; Vincieri, F.F. Identification by HPLC-DAD and HPLC-MS analyses and quantification of constituents of fennel teas and decoctions. *J. Agric. Food Chem*., **2000**, *48*, 4734-4738.

[48] Lee, H.S. Acaricidal activity of constituents identified in *Foeniculum vulgare* fruit oil against *Dermatophagoides* spp. (Acari: Pyroglyphidae). *J. Agric. Food Chem*., **2004**, *52*, 2887-2889.

[49] Kim, D.H.; Kim, S.; Chang, K.S.; Ahn, Y.J. Repellent activity of constituents identified in *Foeniculum vulgare* fruit against *Aedes aegypti* (Diptera: Culicidae). *J. Agric. Food Chem*., **2002**, *50*, 6993-6996.

[50] Parejo, I.; Jauregui, O.; Sánchez-Rabaneda, F.; Viladomat, F.; Bastida, J.; Codina, C. Separation and characterization of phenolic compounds in fennel (*Foeniculum vulgare*) using liquid chromatography-negative electrospray ionization tandem mass spectrometry. *J. Agric. Food Chem*., **2004**, *52*, 3679-3687.

[51] Parejo, I.; Viladomat, F.; Bastida, J.; Schmeda-Hirschmann, G.; Burillo, J.; Codina, C. Bioguided isolation and identification of the nonvolatile antioxidant compounds from fennel (*Foeniculum vulgare* Mill.) waste. *J. Agric. Food Chem*., **2004**, *52*, 1890-1897.

[52] Díaz-Maroto, M.C.; Pérez-Coello, M.S.; Esteban, J.; Sanz, J. Comparison of the volatile composition of wild fennel samples (*Foeniculum vulgare* Mill.) from Central Spain. *J. Agric. Food Chem*., **2006**, *54*, 6814-6818.

[53] Dadaliolu, I.; Evrendilek, G.A. Chemical compositions and antibacterial effects of essential oils of Turkish oregano (*Origanum minutiflorum*), bay laurel (*Laurus nobilis*), Spanish lavender (*Lavandula stoechas* L.), and fennel (*Foeniculum vulgare*) on common food borne pathogens. *J. Agric. Food Chem*., **2004**, *52*, 8255-8260.

[54] Díaz-Maroto, M.C.; Hidalgo, I.J.D.M.; Sánchez-Palomo, E.; Pérez-Coello, M.S. Volatile components and key odorants of fennel (*Foeniculum vulgare* Mill.) and thyme (*Thymus vulgaris* L.) oil extracts obtained by simultaneous distillation-extraction and supercritical fluid extraction. *J. Agric. Food Chem*., **2005**, *53*, 5385-5389.

[55] Subehan; Zaidi, S.F.H; Kadota, S.; Tezuka, Y. Inhibition on human liver cytochrome P450 3A4 by constituents of fennel (*Foeniculum vulgare*): identification and characterization of a mechanism-based inactivator. *J. Agric. Food Chem*., **2007**, *55*, 10162-10167.

[56] McCoy, E.; O'Connor, S.E. Directed biosynthesis of alkaloid analogs in the medicinal plant *Catharanthus roseus*. *J. Am. Chem. Soc*., **2006**, *128*, 14276-14277.

[57] Zheng, W.; Wang, S.Y. Antioxidant activity and phenolic compounds in selected herbs. *J. Agric. Food Chem*., **2001**, *49*, 5165-5170.

[58] Wang, X.; Plomley, J.B.; Newman, R.A.; Cisneros, A. LC/MS/MS Analyses of an oleander extract for cancer t treatment. *Anal. Chem*., **2000**, *72*, 3547-3552.

[59] Tor, E.R.; Filigenzi, M.S.; Puschner, B. Determination of oleandrin in tissues and biological fluids by liquid chromatography-electrospray tandem mass spectrometry. *J. Agric. Food Chem*., **2005**, *53*, 4322-4325.

[60] Fu, L.; Zhang, S.; Li, N.; Wang, J.; Zhao, M.; Sakai, J.; Hasegawa, T.; Mitsui, T.; Kataoka, T.; Oka, S.; Kiuchi, M.; Hirose, K.; Ando, M. Three new triterpenes from *Nerium oleander* and biological activity of the isolated compounds. *J. Nat. Prod*., **2005**, *68*, 198-206.

[61] Zhao, M.; Zhang, S.; Fu, L.; Li, N.; Bai, J.; Sakai, J.; Wang, L.; Tang, W.; Hasegawa, T.; Ogura, H.; Kataoka, T.; Oka, S.; Kiuch, M.; Hirose, K.; Ando, M. Taraxasterane- and ursane-type triterpenes from *Nerium* oleander and their biological activities. *J. Nat. Prod*., **2006**, *69*, 1164-1167.

[62] Bai, L.; Wang, L.; Zhao, M.; Toki, A.; Hasegawa, T.; Ogura, H.; Kataoka, T.; Hirose, K.; Sakai, J.; Bai, J.; Ando, M. Bioactive pregnanes from *Nerium oleander*. *J. Nat. Prod*., **2007**, *70*, 14-18.

[63] Zhao, M.; Bai, L.; Wang, L.; Toki, A.; Hasegawa, T.; Kikuchi, M.; Abe, M.; Sakai, J.; Hasegawa, R.; Bai, Y.; Mitsui, T.; Ogura, H.; Kataoka, T.; Oka, S.; Tsushima, H.; Kiuchi, M.; Hirose, K.; Tomida, A.; Tsuruo, T.; Ando, M. Bioactive cardenolides from the stems and twigs of *Nerium oleander*. *J. Nat. Prod*., **2007**, *70*, 1098-1103.

[64] Chandra, S.; de Mejia, E.G. Polyphenolic compounds, antioxidant capacity, and quinone reductase activity of an aqueous extract of *Ardisia compressa* in comparison to mate (*Ilex paraguariensis*) and green (*Camellia sinensis*) teas. *J. Agric. Food Chem*., **2004**, *52*, 3583-3589.

[65] Esmelindro, A.A.; Girardi, J.dosS.; Mossi, A.; Jacques, R.A.; Dariva, C. Influence of agronomic variables on the composition of mate tea leaves (*Ilex paraguariensis*) extracts obtained from CO_2 extraction at 30 °C and 175 bar. *J. Agric. Food Chem*., **2004**, *52*, 1990-1995.

[66] de Mejia, E.G.; Song, Y.S.; Ramirez-Mares, M.V.; Kobayashi, H. Effect of yerba mate (*Ilex paraguariensis*) tea on topoisomerase inhibition and oral carcinoma cell proliferation. *J. Agric. Food Chem*., **2005**, *53*, 1966-1973.

[67] Choi, Y.H.; Sertic, S.; Kim, H.K.; Wilson, E.G.; Michopoulos, F.; Lefeber, A.W.M.; Erkelens, C.; Kricun, S.D.P.; Verpoorte, R. Classification of Ilex species based on metabolomic fingerprinting using nuclear magnetic resonance and multivariate data analysis. *J. Agric. Food Chem*., **2005**, *53*, 1237-1245.

[68] Cardozo Jr., E.L.; Cardozo-Filho, L.; Ferrarese Filho, O.; Zanoelo, E.F. Selective liquid CO_2 extraction of purine alkaloids in different *Ilex paraguariensis* progenies grown under environmental influences. *J. Agric. Food Chem*., **2007**, *55*, 6835-6841.

[69] Jacques, R.A.; Krause, L.C.; Freitas, L.dosS.; Dariva, C.; Oliveira, J.V.; Caramão, E.B. Influence of drying methods and agronomic variables on the chemical composition of mate tea leaves (*Ilex paraguariensis* A. St.-Hil) obtained from high-pressure CO_2 extraction. *J. Agric. Food Chem*., **2007**, *55*, 10081-10085.

[70] Li, W.; Gu, C.; Zhang, H.; Awang, D.V.C.; Fitzloff, J.F.; Fong, H.H.S.; van Breemen, R.B. Use of high-performance liquid chromatography-tandem mass spectrometry to distinguish *Panax ginseng* C. A. Meyer (Asian ginseng) and *Panax quinquefolius* L. (North American ginseng). *Anal. Chem*., **2000**, *72*, 5417-5422.

[71] Gafner, S.; Bergeron, C.; McCollom, M.M.; Cooper, L.M.; McPhail, K.L.; Gerwick, W.H.; Angerhofer, C.K. Evaluation of the efficiency of three different solvent systems to extract triterpene saponins from roots of *Panax quinquefolius* using high-performance liquid chromatography. *J. Agric. Food Chem*., **2004**, *52*, 1546-1550.

[72] Corbit, R.M.; Ferreira, J.F.S.; Ebbs, S.D.; Murphy, L.L. Simplified extraction of ginsenosides from American ginseng (*Panax quinquefolius* L.) for high-performance liquid chromatography-ultraviolet analysis. *J. Agric. Food Chem*., **2005**, *53*, 9867-9873.

[73] Assinewe, V.A.; Baum, B.R.; Gagnon, D.; Arnason, J.T. Phytochemistry of wild populations of *Panax quinquefolius* L. (North American ginseng). *J. Agric, Food Chem*., **2003**, *51*, 4549-4553.

[74] Roy, M.C.; Chang, F.R.; Huang, H.C.; Chiang, M.Y.N.; Wu, Y.C. Cytotoxic principles from the Formosan milkweed, *Asclepias curassavica*. *J. Nat. Prod*., **2005**, *68*, 1494-1499.

[75] Cartagena, E.; Bardón, A.; Catalán, C.A.N.; Hernández, Z.N.J.de; Hernández, L.R.; Joseph-Nathan, P. Germacranolides and a new type of guaianolide from *Acanthospermum hispidum*. *J. Nat. Prod*., **2000**, *63*, 1323-1328.

[76] Meepagala, K.M.; Sturtz, G.; Wedge, D.E. Antifungal constituents of the essential oil fraction of *Artemisia dracunculus* L. var. *dracunculus*. *J. Agric. Food Chem*., **2002**, *50*, 6989-6992.

[77] Kordali, S.; Kotan, R.; Mavi, A.; Cakir, A.; Ala, A.; Yildirim, A. Determination of the chemical composition and antioxidant activity of the essential oil of *Artemisia dracunculus* and of the antifungal and antibacterial activities of Turkish *Artemisia absinthium*, *A. dracunculus*, *Artemisia santonicum*, and *Artemisia spicigera* essential oils. *J. Agric. Food Chem*., **2005**, *53*, 9452-9458.

[78] Engelmeier, D.; Hadacek, F.; Hofer, O.; Lutz-Kutschera, G.; Nagl, M.; Wurz, G.; Greger, H. Antifungal 3-butylisocoumarins from Asteraceae-Anthemideae. *J. Nat. Prod*., **2004**, *67*, 19-25.

[79] Blagojević, P.; Radulović, N.; Palić, R.; Stojanović, G. Chemical composition of the essential oils of serbian wild-growing *Artemisia absinthium* and *Artemisia vulgaris*. *J. Agric. Food Chem*., **2006**, *54*, 4780-4789.

[80] Cassel, E.; Frizzo, C.D.; Vanderlinde, R.; Atti-Serafini, L.; Lorenzo, D.; Dellacassa, E. Extraction of Baccharis oil by supercritical CO_2. *Ind. Eng. Chem. Res*., **2000**, *39*, 4803-4805.

[81] Park, Y.K.; Alencar, S.M.; Aguiar, C.L. Botanical origin and chemical composition of Brazilian propolis. *J. Agric. Food Chem*., **2002**, *50*, 2502-2506.

[82] Park, Y.K.; Paredes-Guzman, J.F.; Aguiar, C.L.; Alencar, S.M.; Fujiwara, F.Y. Chemical constituents in *Baccharis dracunculifolia* as the main botanical origin of southeastern Brazilian propolis. *J. Agric. Food Chem*., **2004**, *52*, 1100-1103.

[83] Park, Y.K.; Fukuda, I.; Ashida, H.; Nishiumi, S.; Yoshida, K.; Daugsch, A.; Sato, H.H.; Pastore, G.M. Suppressive effects of

ethanolic extracts from propolis and its main botanical origin on dioxin toxicity. *J. Agric. Food Chem*., **2005**, *53*, 10306-10309.

[84] Innocenti, M.; Gallori, S.; Giaccherini, C.; Ieri, F.; Vincieri, F.F.; Mulinacci, N. Evaluation of the phenolic content in the aerial parts of different varieties of *Cichorium intybus* L. *J. Agric. Food Chem*., **2005**, *53*, 6497-6502.

[85] Salvatore, S.; Pellegrini, N.; Brenna, O.V.; Del Rio, D.; Frasca, G.; Brighenti, F.; Tumino, R. Antioxidant characterization of some Sicilian edible wild greens. *J. Agric. Food Chem*., **2005**, *53*, 9465-9471.

[86] Foster, J.G.; Clapham, W.M.; Belesky, D.P.; Labreveux, M.; Hall, M.H.; Sanderson, M.A. Influence of cultivation site on sesquiterpene lactone composition of forage chicory (*Cichorium intybus* L.). *J. Agric. Food Chem*., **2006**, *54*, 1772-1778.

[87] Kim, H.J.; Fonseca, J.M.; Choi, J.H.; Kubota, C. Effect of methyl jasmonate on phenolic compounds and carotenoids of romaine lettuce (*Lactuca sativa* L.). *J. Agric. Food Chem*., **2007**, *55*, 10366-10372.

[88] Barzana, E.; Rubio, D.; Santamaria, R.I.; Garcia-Correa, O.; Garcia, F.; Ridaura Sanz, V.E.; López-Munguía, A. Enzyme-mediated solvent extraction of carotenoids from marigold flower (*Tagetes erecta*). *J. Agric. Food Chem*., **2002**, *50*, 4491-4496.

[89] Breithaupt, D.E.; Bamedi, A. Carotenoids and carotenoid esters in potatoes (*Solanum tuberosum* L.): new insights into an ancient vegetable. *J. Agric. Food Chem*., **2002**, *50*, 7175-7181.

[90] Amar, I.; Aserin, A.; Garti, N. Solubilization patterns of lutein and lutein esters in food grade nonionic microemulsions. *J. Agric. Food Chem*., **2003**, *51*, 4775-4781.

[91] Naranjo-Modad, S.; López-Munguía, A.; Vilarem, G.; Gaset, A.; Bárzana, E. Solubility of purified lutein diesters obtained from *Tagetes erecta* in supercritical CO_2 and the effect of solvent modifiers. *J. Agric. Food Chem*., **2000**, *48*, 5640-5642.

[92] Rohloff, J.; Mordal, R.; Dragland, S. Chemotypical variation of tansy (*Tanacetum vulgare* L.) from 40 different locations in Norway. *J. Agric. Food Chem*., **2004**, *52*, 1742-1748.

[93] Dragland, S.; Rohloff, J.; Mordal, R.; Iversen, T.H. Harvest regimen optimization and essential oil production in five tansy (*Tanacetum vulgare* L.) genotypes under a northern climate. *J. Agric. Food Chem*., **2005**, *53*, 4946-4953.

[94] Hudec, J.; Burdov, M.; Kobida, L.; Komora, L.; Macho, V.; Kogan, G.; Turianica, I.; Kochanov, R.; Loek, O.; Habn, M.; Chlebo, P. Antioxidant capacity changes and phenolic profile of *Echinacea purpurea*, nettle (*Urtica dioica* L.), and dandelion (*Taraxacum officinale*) after application of polyamine and phenolic biosynthesis regulators. *J. Agric. Food Chem*., **2007**, *55*, 5689-5696.

[95] Galindo-Cuspinera, V.; Lubran, M.B.; Rankin, S.A. Comparison of volatile compounds in water- and oil-soluble annatto (*Bixa orellana* L.) extracts. *J. Agric. Food Chem*., **2002**, *50*, 2010-2115.

[96] Felicissimo, M.P.; Bittencourt, C.; Houssiau, L.; Pireaux, J.J. Time-of-flight secondary ion mass spectrometry and X-ray photoelectron spectroscopy analyses of *Bixa orellana* seeds. *J. Agric. Food Chem*., **2004**, *52*, 1810-1814.

[97] Reddy, M.K.; Alexander-Lindo, R.L.; Nair, M.G. Relative inhibition of lipid peroxidation, cyclooxygenase enzymes, and human tumor cell proliferation by natural food colors. *J. Agric. Food Chem*., **2005**, *53*, 9268-73.

[98] Jirovetz, L.; Smith, D.; Buchbauer, G. Aroma compound analysis of *Eruca sativa* (Brassicaceae) SPME headspace leaf samples using GC, GC-MS, and olfactometry. *J. Agric. Food Chem*., **2002**, *50*, 4643-4646.

[99] Martínez-Sánchez, A.; Llorach, R.; Gil, M.I.; Ferreres, F. Identification of new flavonoid glycosides and flavonoid profiles to characterize rocket leafy salads (*Eruca vesicaria* and *Diplotaxis tenuifolia*). *J. Agric. Food Chem*., **2007**, *55*, 1356-1363.

[100] Barillari, J.; Canistro, D.; Paolini, M.; Ferroni, F.; Pedulli, G.F.; Iori, R.; Valgimigli, L. Direct antioxidant activity of purified glucoerucin, the dietary secondary metabolite contained in rocket (*Eruca sativa* Mill.) seeds and sprouts. *J. Agric. Food Chem*., **2005**, *53*, 2475-2482.

[101] Palaniswamy, U.R.; McAvoy, R.J.; Bible, B.B.; Stuart, J.D. Ontogenic variations of ascorbic acid and phenethyl isothiocyanate concentrations in watercress (*Nasturtium officinale* R.Br.) leaves. *J. Agric. Food Chem*., **2003**, *51*, 5504-5509.

[102] Engelen-Eigles, G.; Holden, G.; Cohen, J.D.; Gardner, G. The effect of temperature, photoperiod, and light quality on gluconasturtiin concentration in watercress (*Nasturtium officinale* R. Br.). *J. Agric. Food Chem*., **2006**, *54*, 328-334.

[103] Kopsell, D.A.; Barickman, T.C.; Sams, C.E.; McElroy, J.S. Influence of nitrogen and sulfur on biomass production and carotenoid and glucosinolate concentrations in watercress (*Nasturtium officinale* R. Br.). *J. Agric. Food Chem*., **2007**, *55*, 10628-10634.

[104] Preston, C.; Richling, E.; Elss, S.; Appel, M.; Heckel, F.; Hartlieb, A.; Schreier, P. On-line gas chromatography combustion/pyrolysis isotope ratio mass spectrometry (HRGC-C/P-IRMS) of pineapple (*Ananas comosus* L. Merr.) volatiles. *J. Agric. Food Chem*., **2003**, *51*, 8027-8031.

[105] Tominaga, T.; Gimbertau, G.; Dubourdieu, D. Contribution of benzenemethanethiol to smoky aroma of certain *Vitis vinifera* L. wines. *J. Agric. Food Chem*., **2003**, *51*, 1373-1376.

[106] Butera, D.; Tesoriere, L.; Di Gaudio, F.; Bongiorno, A.; Allegra, M.; Pintaudi, A.M.; Kohen,R.; Livrea, M.A. Antioxidant activities of Sicilian prickly pear (*Opuntia ficus indica*) fruit extracts and reducing properties of its betalains: betanin and indicaxanthin. *J. Agric. Food Chem*., **2002**, *50*, 6895-6901.

[107] Castellar, R.; Obón, J.M.; Alacid, M.; Fernández-López, J.A. Color properties and stability of betacyanins from Opuntia fruits. *J. Agric. Food Chem*., **2003**, *51*, 2772-2776.

[108] Galati, E.M.; Mondello, M.R.; Giuffrida, D.; Dugo, G.; Miceli, N.; Pergolizzi, S.; Taviano, M.F. Chemical characterization and biological effects of Sicilian *Opuntia ficus indica* (L.) Mill. fruit juice: antioxidant and antiulcerogenic activity. *J. Agric. Food Chem*., **2003**, *51*, 4903-4908.

[109] Stintzing, F.C.; Herbach, K.M.; Mosshammer, M.R.; Carle, R.; Yi, W.; Sellappan, S.; Akoh, C.C.; Bunch, R.; Felker, P. Color, betalain pattern, and antioxidant properties of cactus pear (*Opuntia* spp.) clones. *J. Agric. Food Chem*., **2005**, *53*, 442-451.

[110] Tesoriere, L.; Fazzari, M.; Allegra, M.; Livrea, M.A. Biothiols, taurine, and lipid-soluble antioxidants in the edible pulp of Sicilian cactus pear (*Opuntia ficus-indica*) fruits and changes of bioactive juice components upon industrial processing. *J. Agric. Food Chem*., **2005**, *53*, 7851-7855.

[111] Kagata, T.; Saito, S.; Shigemori, H.; Ohsaki, A.; Ishiyama, H.; Kubota, T.; Kobayashi, J. Paratunamides A-D, oxindole alkaloids from *Cinnamodendron axillare*. *J. Nat. Prod*., **2006**, *69*, 1517-1521.

[112] Eri, S.; Khoo, B.K.; Lech, J.; Hartman, T.G. Direct thermal desorption-gas chromatography and gas chromatography-mass spectrometry profiling of hop (*Humulus lupulus* L.) essential oils in support of varietal characterization. *J. Agric. Food Chem*., **2000**, *48*, 1140-1149.

[113] Steinhaus, M.; Schieberle, P. Comparison of the most odor-active compounds in fresh and dried hop cones (*Humulus lupulus* L. variety spalter select) based on GC-olfactometry and odor dilution techniques. *J. Agric. Food Chem*., **2000**, *48*, 1776-1783.

[114] Taylor, A.W.; Barofsky, E.; Kennedy, J.A.; Deinzer, M.L. Hop (*Humulus lupulus* L.) proanthocyanidins characterized by mass spectrometry, acid catalysis, and gel permeation chromatography. *J. Agric. Food Chem*., **2003**, *51*, 4101-4110.

[115] Bohr, G.; Gerhäuser, C.; Knauft, J.; Zapp, J.; Becker, H. Anti-inflammatory acylphloroglucinol derivatives from hops (*Humulus lupulus*). *J. Nat. Prod*., **2005**, *68*. 1545-1548.

[116] Li, H.J.; Deinzer, M.L. Structural identification and distribution of proanthocyanidins in 13 different hops. *J. Agric. Food Chem*., **2006**, *54*, 4048-4056.

[117] Stevens, J.F.; Miranda, C.L.; Wolthers, K.R.; Schimerlik, M.; Deinzer, M.L.; Buhler, D.R. Identification and *in vitro* biological activities of hop proanthocyanidins: inhibition of nNOS activity and scavenging of reactive nitrogen species. *J. Agric. Food Chem*., **2002**, *50*, 3435-3443.

[118] Stevens, J.F.; Miranda, C.L.; Frei, B.; Buhler, D.R. Inhibition of peroxynitrite-mediated LDL oxidation by prenylated flavonoids: the α, β-unsaturated keto functionality of 2'-hydroxychalcones as a novel antioxidant pharmacophore. *Chem. Res. Toxicol*., **2003**, *16*, 1277-1286.

[119] De Keukeleire, J.; Ooms, G.; Heyerick, A.; Roldan-Ruiz, I.; Van Bockstaele, E.; De Keukeleire, D. Formation and accumulation of α -Acids, β -Acids, desmethylxanthohumol, and xanthohumol during flowering of hops (*Humulus lupulus* L.). *J. Agric. Food Chem*., **2003**, *51*, 4436-4441.

[120] Dietz, B.M.; Kang, Y.H.; Liu, G.; Eggler, A.L.; Yao, P.; Chadwick, L.R.; Pauli, G.F.; Farnsworth, N.R.; Mesecar, A.D.; van Breemen,

R.B.; Bolton, J.L. Xanthohumol isolated from *Humulus lupulus* inhibits menadione-induced DNA damage through induction of quinone reductase. *Chem. Res. Toxicol.*, **2005**, *18*, 1296-1305.

[121] Overk, C.R.; Yao, P.; Chadwick, L.R.; Nikolic, D.; Sun, Y.; Cuendet, M.A.; Deng, Y.; Hedayat, A.S.; Pauli, G.F.; Farnsworth, N.R.; van Breemen, R.B.; Bolton, J.L. Comparison of the *in vitro* estrogenic activities of compounds from hops (*Humulus lupulus*) and red clover (*Trifolium pratense*). *J. Agric. Food Chem*., **2005**, *53*, 6246-6253.

[122] Matoušek, J.; Vrba, L.; Novák, P.; Patzak, J.; De Keukeleire, J.; Škopek, J.; Heyerick, A.; Roldán-Ruiz, I.; De Keukeleire, D. Cloning and molecular analysis of the regulatory factor HlMyb1 in hop (*Humulus lupulus* L.) and the potential of hop to produce bioactive prenylated flavonoids. *J. Agric. Food Chem*., **2005**, *53*, 4793-4798.

[123] Chadwick, L.R.; Nikolic, D.; Burdette, J.E.; Overk, C.R.; Bolton, J.L.; van Breemen, R.B.; Fröhlich, R.; Fong, H.H.S.; Farnsworth, N.R.; Pauli, G.F. Estrogens and congeners from spent hops (*Humulus lupulus*). *J. Nat. Prod*., **2004**, *67*, 2024-2032.

[124] De Keukeleire, J.D.; Janssens, I.; Heyerick, A.; Ghekiere, G.; Cambie, J.; Roldán-Ruiz, I.; Van Bockstaele, E.; De Keukeleire, D. Relevance of organic farming and effect of climatological conditions on the formation of α-Acids, β-Acids, desmethylxanthohumol, and xanthohumol in hop (*Humulus lup*ulus L.). *J. Agric. Food Chem*., **2007**, *55*, 61-66.

[125] Schwekendiek, A.; Spring, O.; Heyerick, A.; Pickel, B.; Pitsch, N.T.; Peschke, F.; de Keukeleire, D.; Weber, G. Constitutive expression of a grapevine stilbene synthase gene in transgenic hop (*Humulus lupulus* L.) yields resveratrol and its derivatives in substantial quantities. *J. Agric. Food Chem.*, **2007**, *55*, 7002-7009.

[126] Wu, X.; Gu, L.; Prior, R.L.; McKay, S. Characterization of anthocyanins and proanthocyanidins in some cultivars of Ribes, Aronia, and Sambucus and their antioxidant capacity. *J. Agric. Food Chem*., **2004**, *52*, 7846-7856.

[127] Gonnet, J.F.; Fenet, B. "Cyclamen red" colors based on a macrocyclic anthocyanin in carnation flowers. *J. Agric. Food Chem*., **2000**, *48*, 22-26.

[128] Hsieh, P.W.; Chang, F.R.; Wu, C.C.; Wu, K.Y.; Li, C.M.; Chen, S.L.; Wu, Y.C. New cytotoxic cyclic peptides and dianthramide from *Dianthus superbus*. *J. Nat. Prod*., **2004**, *67*, 1522-1527.

[129] Dini, I.; Tenore, G.C.; Schettino, O.; Dini, A. New oleanane saponins in *Chenopodium quinoa*. *J. Agric. Food Chem*., **2001**, *49*, 3976-3981.

[130] Dini, I.; Schettino, O.; Simioli, T.; Dini, A. Studies on the constituents of *Chenopodium quinoa* seeds: isolation and characterization of new triterpene saponins. *J. Agric. Food Chem*., **2001**, *49*, 741-746.

[131] Dini, I.; Tenore, G.C.; Dini, A. Oleanane saponins in "Kancolla", a sweet variety of *Chenopodium quinoa*. *J. Nat. Prod*., **2002**, *65*, 1023-1026.

[132] Woldemichael, G.M.; Wink, M. Identification and biological activities of triterpenoid saponins from *Chenopodium quinoa*. *J. Agric. Food Chem*., **2001**, *49*, 2327-2332.

[133] Zhu, N.; Kikuzaki, H.; Vastano, B.C.; Nakatani, N.; Karwe, M.V.; Rosen, R.T.; Ho, C.T. Ecdysteroids of quinoa seeds (*Chenopodium quinoa* Willd.). *J. Agric. Food Chem*., **2001**, *49*, 2576-2578.

[134] Zhu, N.; Sheng, S.; Sang, S.; Jhoo, J.W.; Bai, N.; Karwe, M.V.; Rosen, R.T.; Ho, C.T. Triterpene saponins from debittered quinoa (*Chenopodium quinoa*) seeds. *J. Agric. Food Chem*., **2002**, *50*, 865-867.

[135] Rosso, V.V.de; Mercadante, A.Z. Identification and quantification of carotenoids, by HPLC-PDA-MS/MS, from Amazonian fruits. *J. Agric. Food Chem*., **2007**, *55*, 5062-5072.

[136] Barjaktarović, B.; Sovilj, M.; Knez, Z. Chemical composition of *Juniperus communis* L. fruits supercritical CO_2 extracts: dependence on pressure and extraction time. *J. Agric. Food Chem*., **2005**, *53*, 2630-2636.

[137] Innocenti, M.; Michelozzi, M.; Giaccherini, C.; Ieri, F.; Vincieri, F.F.; Mulinacci, N. Flavonoids and biflavonoids in Tuscan berries of *Juniperus communis* L.: detection and quantitation by HPLC/DAD/ESI/MS. *J. Agric. Food Chem*., **2007**, *55*, 6596-6602.

[138] Xu, F.; Morikawa, T.; Matsuda, H.; Ninomiya, K.; Yoshikawa, M. Structures of new sesquiterpenes and hepatoprotective constituents from the Egyptian herbal medicine *Cyperus longus*. *J. Nat. Prod*., **2004**, 67, 569-576.

[139] Jeong, S.J.; Miyamoto, T.; Inagaki, M.; Kim, Y.C.; Higuchi, R. Rotundines A-C, three novel sesquiterpene alkaloids from *Cyperus rotundus*. *J. Nat. Prod*., **2000**, *63*, 673-675.

[140] Jensen, H.D.; Krogfelt, K.A.; Cornett, C.; Hansen, S.H.; Christensen, S.B. Hydrophilic carboxylic acids and iridoid glycosides in the juice of American and European cranberries (*Vaccinium macrocarpon* and *V. oxycoccos*), lingonberries (*V. vitis-idaea*), and blueberries (*V. myrtillus*). *J. Agric. Food Chem*., **2002**, *50*, 6871-6874.

[141] Ichiyanagi, T.; Shida, Y.; Rahman, M.M.; Hatano, Y.; Konishi, T. Bioavailability and tissue distribution of anthocyanins in bilberry (*Vaccinium myrtillus* L.) extract in rats. *J. Agric. Food Chem*., **2006**, *54*, 6578-6587.

[142] Lätti, A.K.; Riihinen, K.R.; Kainulainen, P.S. Analysis of anthocyanin variation in wild populations of bilberry (*Vaccinium myrtillus* L.) in Finland. *J. Agric. Food Chem*., **2008**, *56*, 190-196.

[143] Casini, C.; Dardanelli, J.L.; Martínez, M.J.; Balzarini, M.; Borgogno, C.S.; Nassetta, M. Oil quality and sugar content of peanuts (*Arachis hypogaea*) grown in Argentina: their relationship with climatic variables and seed yield. *J. Agric. Food Chem*., **2003**, *51*, 6309-6313.

[144] Chang, J.C.; Lai, Y.H.; Djoko, B.; Wu, P.L.; Liu, C.D.; Liu, Y.W.; Chiou, R.Y.Y. Biosynthesis enhancement and antioxidant and anti-inflammatory activities of peanut (*Arachis hypogaea* L.) arachidin-1, arachidin-3, and isopentadienylresveratrol. *J. Agric. Food Chem*., **2006**, *54*, 10281-10287.

[145] Chukwumah, Y.C.; Walker, L.T.; Verghese, M.; Bokanga, M.; Ogutu, S.; Alphonse, K. Comparison of extraction methods for the quantification of selected phytochemicals in peanuts (*Arachis hypogaea*). *J. Agric. Food Chem*., **2007**, *55*, 285-290.

[146] Pudhom, K.; Sommit, D.; Suwankitti, N.; Petsom, A. Cassane Furanoditerpenoids from the Seed Kernels of *Caesalpinia bonduc* from Thailand. *J. Nat. Prod*., **2007**, *70*, 1542-1544.

[147] Ragasa, C.Y.; Hofileña, J.G.; Rideout, J.A. New furanoid diterpenes from *Caesalpinia pulcherrima*. *J. Nat. Prod*., **2002**, *65*, 1107-1110.

[148] Roach, J.S.; McLean, S.; Reynolds, W.F.; Tinto, W.F. Cassane diterpenoids of *Caesalpinia pulcherrima*. *J. Nat. Prod*., **2003**, *66*, 1378-1381.

[149] Papagiannopoulos, M.; Wollseifen, H.R.; Mellenthin, A.; Haber, B.; Galensa, R. Identification and quantification of polyphenols in carob fruits (*Ceratonia siliqua* L.) and derived products by HPLC-UV-ESI/MS^n. *J. Agric. Food Chem*., **2004**, *52*, 3784-3791.

[150] Chung, H.Y. Volatile flavor components in red fermented soybean (*Glycine max*) curds. *J. Agric. Food Chem*., **2000**, *48*, 1803-1809.

[151] Choung, M.G.; Baek, I.Y.; Kang, S.T.; Han, W.Y.; Shin, D.C.; Moon, H.P.; Kang, K.H. Isolation and determination of anthocyanins in seed coats of black soybean (*Glycine max* (L.) Merr.). *J. Agric. Food Chem*., **2001**, *49*, 5848-5851.

[152] Britz, S.J.; Kremer, D.F. Warm temperatures or drought during seed maturation increase free α-tocopherol in seeds of soybean (*Glycine max* [L.] Merr.). *J .Agric. Food Chem*., **2002**, *50*, 6058-6063.

[153] Vyn, T.J.; Yin, X.; Bruulsema, T.W.; Jackson, C.J.C.; Rajcan, I.; Brouder, S.M. Potassium fertilization effects on isoflavone concentrations in soybean [*Glycine max* (L.) Merr.]. *J. Agric. Food Chem*., **2002**, *50*, 3501-3506.

[154] Variyar, P.S.; Limaye, A.; Sharma, A. Radiation-induced enhancement of antioxidant contents of soybean (*Glycine max* Merrill). *J. Agric. Food Chem*., **2004**, *52*, 3385-3388.

[155] Caldwell, C.R.; Britz, S.J.; Mirecki, R.M. Effect of temperature, elevated carbon dioxide, and drought during seed development on the isoflavone content of dwarf soybean [*Glycine max* (L.) Merrill] grown in controlled environments. *J. Agric. Food Chem*., **2005**, *53*, 1125-1129.

[156] Charron, C.S.; Allen, F.L.; Johnson, R.D.; Pantalone, V.R.; Sams, C.E. Correlations of oil and protein with isoflavone concentration in soybean [*Glycine max* (L.) Merr.]. *J. Agric. Food Chem*., **2005**, *53*, 7128-7135.

[157] Rupasinghe, H.P.V.; Jackson, C.J.C.; Poysa, V.; Di Berardo, C.; Bewley, J.D.; Jenkinson, J. Soyasapogenol A and B distribution in soybean (*Glycine max* L. Merr.) in relation to seed physiology, genetic variability, and growing location. *J. Agric. Food Chem*., **2003**, *51*, 5888-5894.

[158] Kirakosyan, A.; Kaufman, P.; Nelson, R.L.; Kasperbauer, M.J.; Duke, J.A.; Seymour, E.; Chang, S.C.; Warber, S.; Bolling, S. Isoflavone levels in five soybean (*Glycine max*) genotypes are al-

tered by phytochrome-mediated light treatments. *J. Agric. Food Chem*., **2006**, *54*, 54-58.

[159] Lee, J.H.; Lee, B.W.; Kim, J.H.; Jeong, T.S.; Kim, M.J.; Lee, W.S.; Park, K.H. LDL-antioxidant pterocarpans from roots of *Glycine max* (L.) Merr. *J. Agric. Food Chem*., **2006**, *54*, 2057-2063.

[160] Lee, S.J.; Ahn, J.K.; Khanh, T.D.; Chun, S.C.; Kim, S.L.; Ro, H.M.; Song, H.K.; Chung, I-M. Comparison of isoflavone concentrations in soybean (*Glycine max* (L.) Merrill) sprouts grown under two different light conditions. *J. Agric. Food Chem*., **2007**, *55*, 9415-9421.

[161] Welch, R.M.; House, W.A.; Beebe, S.; Cheng, Z. Genetic selection for enhanced bioavailable levels of iron in bean (*Phaseolus vulgaris* L.) seeds. *J. Agric. Food Chem*., **2000**, *48*, 3576-3580.

[162] Mejía, E.G.; Guzmán-Maldonado, S.H.; Acosta-Gallegos, J.A.; Reynoso-Camacho, R.; Ramírez-Rodríguez, E.; Pons-Hernández, J.L.; González-Chavira, M.M.; Castellanos, J.Z.; Kelly, J.D. Effect of cultivar and growing location on the trypsin inhibitors, tannins, and lectins of common beans (*Phaseolus vulgaris* L.) grown in the semiarid highlands of Mexico. *J. Agric. Food Chem*., **2003**, *51*, 5962-5966.

[163] Beninger, C.W.; Hosfield, G.L. Antioxidant activity of extracts, condensed tannin fractions, and pure flavonoids from *Phaseolus vulgaris* L. seed coat color genotypes. *J. Agric. Food Chem*., **2003**, *51*, 7879-7883.

[164] Choung, M.G.; Choi, B.R.; An, Y.N.; Chu, Y.H.; Cho, Y.S. Anthocyanin profile of Korean cultivated kidney bean (*Phaseolus vulgaris* L.). *J. Agric. Food Chem*., **2003**, *51*, 7040-7043.

[165] Romani, A.; Vignolini, P.; Galardi, C.; Mulinacci, N.; Benedettelli, S.; Heimler, D. Germplasm characterization of zolfino landraces (*Phaseolus vulgaris* L.) by flavonoid content. *J. Agric. Food Chem*., **2004**, *52*, 3838-3842.

[166] Marotti, I.; Bonetti, A.; Biavati, B.; Catizone, P.; Dinelli, G. Biotransformation of common bean (*Phaseolus vulgaris* L.) flavonoid glycosides by bifidobacterium species from human intestinal origin. *J. Agric. Food Chem*., **2007**, *55*, 3913-3919.

[167] Aparicio-Fernandez, X.; Yousef, G.G.; Loarca-Pina, G.; de Mejia, E.; Lila, M.A. Characterization of polyphenolics in the seed coat of black jamapa bean (*Phaseolus vulgaris* L.). *J. Agric. Food Chem.*, **2005**, *53*, 4615-4622.

[168] Beninger, C.W.; Gu, L.; Prior, R.L.; Junk, D.C.; Vandenberg, A.; Bett, K.E. Changes in polyphenols of the seed coat during the after-darkening process in pinto beans (*Phaseolus vulgaris* L.). *J. Agric. Food Chem*., **2005**, *53*, 7777-7782.

[169] Heimler, D.; Vignolini, P.; Dini, M.G.; Romani, A. Rapid tests to assess the antioxidant activity of *Phaseolus vulgaris* L. dry beans. *J. Agric. Food Chem*., **2005**, *53*, 3053-3056.

[170] Díaz-Batalla, L.; Widholm, J.M.; Fahey Jr., G.C.; Castaño-Tostado, E.; Paredes-López, O. Chemical components with health implications in wild and cultivated Mexican common bean seeds (*Phaseolus vulgaris* L.). *J. Agric. Food Chem*., **2006**, *54*, 2045-2052.

[171] Espinosa-Alonso, L.G.; Lygin, A.; Widholm, J.M.; Valverde, M.E.; Paredes-Lopez, O. Polyphenols in wild and weedy Mexican common beans (*Phaseolus vulgaris* L.). *J. Agric. Food Chem*., **2006**, *54*, 4436-4444.

[172] Ariza-Nieto, M.; Blair, M.W.; Welch, R.M.; Glahn, R.P. Screening of iron bioavailability patterns in eight bean (*Phaseolus vulgaris* L.) genotypes using the Caco-2 cell *in vitro* model. *J. Agric. Food Chem*., **2007**, *55*, 7950-7956.

[173] Ranilla, L.G.; Genovese, M.I.; Lajolo, F.M. Polyphenols and antioxidant capacity of seed coat and cotyledon from Brazilian and Peruvian bean cultivars (*Phaseolus vulgaris* L.). *J. Agric. Food Chem*., **2007**, *55*, 90-98.

[174] Valverde, J.; This, H. ^{1}H NMR Quantitative determination of photosynthetic pigments from green beans (*Phaseolus vulgaris* L.). *J. Agric. Food Chem*., **2008**, *56*, 314-320.

[175] Valentão, P.; Fernandes, E.; Carvalho, F.; Andrade, P.B.; Seabra, R.M.; Bastos, M.L. Antioxidant activity of *Centaurium erythraea* infusion evidenced by its superoxide radical scavenging and xanthine oxidase inhibitory activity. *J. Agric. Food Chem*., **2001**, *49*, 3476-3479.

[176] Valentão, P.; Andrade, P.B.; Silva, E.; Vicente, A.; Santos, H.; Bastos, M.L.; Seabra, R.M. Methoxylated xanthones in the quality control of small centaury (*Centaurium erythraea*) flowering tops. *J. Agric. Food Chem*., **2002**, *50*, 460-463.

[177] Haddad, M.; Herent, M.F.; Tilquin, B.; Quetin-Leclercq, J. Effect of gamma and e-beam radiation on the essential oils of *Thymus vulgaris thymoliferum*, *Eucalyptus radiata*, and *Lavandula angustifolia*. *J. Agric. Food Chem*., **2007**, *55*, 6082-6086.

[178] Vági, E.; Simándi, B.; Daood, H.G.; Deák, A.; Sawinsky, J. Recovery of pigments from *Origanum majorana* L. by extraction with supercritical carbon dioxide. *J. Agric. Food Chem*., **2002**, *50*, 2297-2301.

[179] Vági, E.; Rapavi, E.; Hadolin, M.; Perédi, K.V.; Balázs, A.; Blázovics, A.; Simándi, B. Phenolic and triterpenoid antioxidants from *Origanum majorana* L. herb and extracts obtained with different solvents. *J. Agric. Food Chem*., **2005**, *53*, 17-21.

[180] Zheng, Z.; Shetty, K. Azo dye-mediated regulation of total phenolics and peroxidase activity in thyme (*Thymus vulgaris* L.) and rosemary (*Rosmarinus officinalis* L.) clonal lines. *J. Agric. Food Chem*., **2000**, *48*, 932-937.

[181] Flamini, G.; Cioni, P.L.; Morelli, I.; Macchia, M.; Ceccarini, L. Main agronomic-productive characteristics of two ecotypes of *Rosmarinus officinalis* L. and chemical composition of their essential oils. *J. Agric. Food Chem*., **2002**, *50*, 3512-3517.

[182] del Baño, M.J.; Lorente, J.; Castillo, J.; Benavente-García, O.; del Río, J.A.; Ortuño, A.; Quirin, K.W.; Gerard, D. Phenolic diterpenes, flavones, and rosmarinic acid distribution during the development of leaves, flowers, stems, and roots of *Rosmarinus officinalis*. Antioxidant activity. *J. Agric. Food Chem*., **2003**, *51*, 4247-4253.

[183] del Baño, M.J.; Lorente, J.; Castillo, J.; Benavente-García, O.; Marín, M.P.; del Río, J.A.; Ortuño, A.; Ibarra, I. Flavonoid distribution during the development of leaves, flowers, stems, and roots of *Rosmarinus officinalis*. Postulation of a biosynthetic pathway. *J. Agric. Food Chem*., **2004**, *52*, 4987-4992.

[184] Wellwood, C.R.L.; Cole, R.A. Relevance of carnosic acid concentrations to the selection of rosemary, *Rosmarinus officinalis* (L.), accessions for optimization of antioxidant yield. *J. Agric. Food Chem*., **2004**, *52*, 6101-6107.

[185] Cantrell, C.L.; Richheimer, S.L.; Nicholas, G.M.; Schmidt, B.K.; Bailey, D.T. seco-Hinokiol, a new abietane diterpenoid from *Rosmarinus officinalis*. *J. Nat. Prod*., **2005**, *68*, 98-100.

[186] Altinier, G.; Sosa, S.; Aquino, R.P.; Mencherini, T.; Loggia, R.D.; Tubaro, A. Characterization of topical antiinflammatory compounds in *Rosmarinus officinalis* L. *J. Agric. Food Chem*., **2007**, *55*, 1718-1723.

[187] Bozin, B.; Mimica-Dukic, N.; Samojlik, I.; Jovin, E. Antimicrobial and antioxidant properties of rosemary and sage (*Rosmarinus officinalis* L. and *Salvia officinalis* L., Lamiaceae) essential oils. *J. Agric. Food Chem*., **2007**, *55*, 7879-7885.

[188] Wang, M.; Kikuzaki, H.; Zhu, N.; Sang, S.; Nakatani, N.; Ho, C.T. Isolation and structural elucidation of two new glycosides from sage (*Salvia officinalis* L.). *J. Agric. Food Chem*., **2000**, *48*, 235-238.

[189] Miura, K.; Kikuzaki, H.; Nakatani, N. Antioxidant activity of chemical components from sage (*Salvia officinalis* L.) and thyme (*Thymus vulgaris* L.) measured by the oil stability index method. *J. Agric. Food Chem*., **2002**, *50*, 1845-1851.

[190] Santos-Gomes, P.C.; Fernandes-Ferreira, M. Organ- and season-dependent variation in the essential oil composition of *Salvia officinalis* L. cultivated at two different sites. *J. Agric. Food Chem*., **2001**, *49*, 2908-9216.

[191] Santos-Gomes, P.C.; Fernandes-Ferreira, M. Essential oils produced by *in vitro* shoots of sage (*Salvia officinalis* L.). *J. Agric. Food Chem*., **2003**, *51*, 2260-2266.

[192] Güllüce, M.; Sökmen, M.; Daferera, D.; Aar, G.; Özkan, H.; Kartal, N.; Polissiou, M.; Sökmen, A.; Şahi n, F. *In vitro* antibacterial, antifungal, and antioxidant activities of the essential oil and methanol extracts of herbal parts and callus cultures of *Satureja hortensis* L. *J. Agric. Food Chem*., **2003**, *51*, 3958-3965.

[193] Dapkevicius, A.; van Beek, T.A.; Lelyveld, G.P.; van Veldhuizen, A.; de Groot, A.; Linssen, J.P.H.; Venskutonis, R. Isolation and structure elucidation of radical scavengers from *Thymus vulgaris* leaves. *J. Nat. Prod*., **2002**, *65*, 892-896.

[194] Silva, J.K.R.da; Sousa, P.J.C.; Andrade, E.H.A.; Maia, J.G.S. Antioxidant capacity and cytotoxicity of essential oil and methanol extract of *Aniba canelilla* (H.B.K.) Mez. *J. Agric. Food Chem*., **2007**, *55*, 9422-9426.

[195] Caredda, A.; Marongiu, B.; Porcedda, S.; Soro, C. Supercritical carbon dioxide extraction and characterization of *Laurus nobilis* essential oil. *J. Agric. Food Chem*., **2002**, *50*, 1492-1496.

[196] Díaz-Maroto, M.C.; Pérez-Coello, M.S.; Cabezudo, M.D. Effect of drying method on the volatiles in bay leaf (*Laurus nobilis* L.). *J. Agric. Food Chem*., **2002**, *50*, 4520-4524.

[197] Gómez-Coronado, D.J.M.; Barbas, C. Optimized and validated HPLC Method for α- and γ-tocopherol measurement in *Laurus nobilis* leaves. New data on tocopherol content. *J. Agric. Food Chem*., **2003**, *51*, 5196-5201.

[198] De Marino, S.; Borbone, N.; Zollo, F.; Ianaro, A.; Di Meglio, P.; Iorizzi, M. Megastigmane and phenolic components from *Laurus nobilis* L. leaves and their inhibitory effects on nitric oxide production. *J. Agric. Food Chem*., **2004**, *52*, 7525-7531.

[199] Flamini, G.; Cioni, P.L.; Morelli, I. Differences in the fragrances of pollen and different floral parts of male and female flowers of *Laurus nobilis*. *J. Agric. Food Chem*., **2002**, *50*, 4647-4652.

[200] Kilic, A.; Hafizoglu, H.; Kollmannsberger, H.; Nitz, S. Volatile constituents and key odorants in leaves, buds, flowers, and fruits of *Laurus nobilis* L. *J. Agric. Food Chem*., **2004**, *52*, 1601-1606.

[201] Kilic, A.; Kollmannsberger, H.; Nitz, S. Glycosidically bound volatiles and flavor precursors in *Laurus nobilis* L. *J. Agric. Food Chem*., **2005**, *53*, 2231-2235.

[202] Longo, L.; Vasapollo, G. Anthocyanins from bay (*Laurus nobilis* L.) berries. *J. Agric. Food Chem*., **2005**, *53*, 8063-8067.

[203] Hu, Y.; Xu, J.; Hu, Q. Evaluation of antioxidant potential of *Aloe vera* (*Aloe barbadensis* Miller) extracts. *J. Agric. Food Chem*., **2003**, *51*, 7788-7791.

[204] Deli, J.; Matus, Z.; Tóth, G. Carotenoid composition in the fruits of *Asparagus officinalis*. *J. Agric. Food Chem*., **2000**, *48*, 2793-2796.

[205] Jang, D.S.; Cuendet, M.; Fong, H.H.S.; Pezzuto, J.M.; Kinghorn, A.D. Constituents of *Asparagus officinalis* evaluated for inhibitory activity against cyclooxygenase-2. *J. Agric. Food Chem*., **2004**, *52*, 2218-2222.

[206] Yagoub, A.E.A.; Mohamed, B.E.; Ahmed, A.H.R.; El Tinay, A.H. Study on Furundu, a traditional Sudanese fermented Roselle (*Hibiscus sabdariffa* L.) seed: effect on *in vitro* protein digestibility, chemical composition, and functional properties of the total proteins. *J. Agric. Food Chem*., **2004**, *52*, 6143-6150.

[207] Carpinella, M.C.; Defago, M.T.; Valladares, G.; Palácios, S.M. Antifeedant and insecticide properties of a limonoid from *Melia azedarach* (Meliaceae) with potential use for pest management. *J. Agric. Food Chem*., **2003**, *51*, 369-374.

[208] Zhou, H.; Hamazaki, A.; Fontana, J.D.; Takahashi, H.; Esumi, T.; Wandscheer, C.B.; Tsujimoto, H.; Fukuyama, Y. New ring C-seco limonoids from Brazilian *Melia azedarach* and their cytotoxic activity. *J. Nat. Prod*., **2004**, *67*, 1544-1547.

[209] Tang, W.; Hioki, H.; Harada, K.; Kubo, M.; Fukuyama, Y. Antioxidant phenylpropanoid-substituted epicatechins from *Trichilia catigua*. *J. Nat. Prod*., **2007**, *70*, 2010-2013.

[210] Asano, N.; Yamashita, T.; Yasuda, K.; Ikeda, K.; Kizu, H.; Kameda, Y.; Kato, A.; Nash, R.J.; Lee, H.S.; Ryu, K.S. Polyhydroxylated alkaloids isolated from mulberry trees (*Morus alba* L.) and silkworms (*Bombyx mori* L.). *J. Agric. Food Chem*., **2001**, *49*, 4208-4213.

[211] Jang, D.S.; Park, E.J.; Hawthorne, M.E.; Vigo, J.S.; Graham, J.G.; Cabieses, F.; Santarsiero, B.D.; Mesecar, A.D.; Fong, H.H.S.; Mehta, R.G.; Pezzuto, J.M.; Kinghorn, A.D. Constituents of *Musa* × *paradisiaca* cultivar with the potential to induce the phase II enzyme, quinone reductase. *J. Agric. Food Chem*., **2002**, *50*, 6330-6334.

[212] Niyas, Z.; Variyar, P.S.; Gholap, A.S.; Sharma, A. Effect of γ-irradiation on the lipid profile of nutmeg (*Myristica fragrans* Houtt.). *J. Agric. Food Chem*., **2003**, *51*, 6502-6504.

[213] Morita, T.; Jinno, K.; Kawagishi, H.; Arimoto, Y.; Suganuma, H.; Inakuma, T.; Sugiyama, K. Hepatoprotective effect of myristicin from nutmeg (*Myristica fragrans*) on lipopolysaccharide/D-galactosamine-induced liver injury. *J. Agric. Food Chem*., **2003**, *51*, 1560-1565.

[214] Yang, Y.C.; Choi, H.Y.; Choi, W.S.; Clark, J.M.; Ahn, Y.J. Ovicidal and adulticidal activity of *Eucalyptus globulus* leaf oil terpenoids against *Pediculus humanus capitis* (Anoplura: Pediculidae). *J. Agric. Food Chem*., **2004**, *52*, 2507-2511.

[215] Kanazawa, A.; Patin, A.; Greene, A.E. Efficient, highly enantioselective synthesis of selina-1,3,7(11)-trien-8-one, a major component of the essential oil of *Eugenia uniflora*. *J. Nat. Prod*., **2000**, *63*, 1292-1294.

[216] Kikuzaki, H.; Sato, A.; Mayahara, Y.; Nakatani, N. Galloylglucosides from berries of *Pimenta dioica*. *J. Nat. Prod*., **2000**, *63*, 749-752.

[217] Miyazawa, M.; Hisama, M. Suppression of chemical mutagen-induced SOS response by alkylphenols from clove (*Syzygium aromaticum*) in the *Salmonella typhimurium* TA1535/pSK1002 umu test. *J. Agric. Food Chem*., **2001**, *49*, 4019-4025.

[218] Miyazawa, M.; Hisama, M. Antimutagenic activity of phenylpropanoids from clove (*Syzygium aromaticum*). *J. Agric. Food Chem*., **2003**, *51*, 6413-6422.

[219] Ito, Y.; Sugimoto, A.; Kakuda, T.; Kubota, K. Identification of potent odorants in Chinese jasmine green tea scented with flowers of *Jasminum sambac*. *J. Agric. Food Chem*., **2002**, *50*, 4878-4884.

[220] Debowska, R.; Podstolski, A. Properties of diphenolase from *Vanilla planifolia* (Andr.) shoot primordia cultured *in vitro*. *J. Agric. Food Chem*., **2001**, *49*, 3432-3437.

[221] Frick, S.; Kramell, R.; Schmidt, J.; Fist, AJ.; Kutchan, T.M. Comparative qualitative and quantitative determination of alkaloids in narcotic and condiment *Papaver somniferum* cultivars. *J. Nat. Prod*., **2005**, *68*, 666-673.

[222] Krist, S.; Stuebiger, G.; Unterweger, H.; Bandion, F.; Buchbauer, G. Analysis of volatile compounds and triglycerides of seed oils extracted from different poppy varieties (*Papaver somniferum* L.). *J. Agric. Food Chem*., **2005**, *53*, 8310-8316.

[223] Yoshikawa, K.; Katsuta, S.; Mizumori, J.; Arihara, S. New cycloartane triterpenoids from *Passiflora edulis. J. Nat. Prod*., **2000**, *63*, 1377-1380.

[224] Yoshikawa, K.; Katsuta, S.; Mizumori, J.; Arihara, S. Four cycloartane triterpenoids and six related saponins from *Passiflora edulis*. *J. Nat. Prod*., **2000**, *63*, 1229-1234.

[225] Ferreres, F.; Sousa, C.; Valentão, P.; Andrade, P.B.; Seabra, R.M.; Gil-Izquierdo, A. New c-deoxyhexosyl flavones and antioxidant properties of *Passiflora edulis* leaf extract. *J. Agric. Food Chem*., **2007**, *55*, 10187-10193.

[226] Wang, L.; Bai, L.; Nagasawa, T.; Hasegawa, T.; Yang, X.; Sakai, J.; Bai, Y.; Kataoka, T.; Oka, S.; Hirose, K.; Tomida, A.; Tsuruo, T.; Ando, M. Bioactive triterpene saponins from the roots of *Phytolacca americana*. *J. Nat. Prod*., **2008**, *71*, 35-40.

[227] Chang, L.C.; Song, L.L.; Park, E.J.; Luyengi, L.; Lee, K.J.; Farnsworth, N.R.; Pezzuto, J.M.; Kinghorn, A.D. Bioactive constituents of *Thuja occidentalis*. *J. Nat. Prod*., **2000**, *63*, 1235-1238.

[228] Bryngelsson, S.; Dimberg, L.H.; Kamal-Eldin, A. Effects of commercial processing on levels of antioxidants in oats (*Avena sativa* L.). *J. Agric. Food Chem*., **2002**, *50*, 1890-1896.

[229] Bratt, K.; Sunnerheim, K.; Bryngelsson, S.; Fagerlund, A.; Engman, L.; Andersson, R.E.; Dimberg, L.H. Avenanthramides in oats (*Avena sativa* L.) and structure-antioxidant activity relationships. *J. Agric. Food Chem*., **2003**, *51*, 594-600.

[230] Wenzig, E.; Kunert, O.; Ferreira, D.; Schmid, M.; Schühly, W.; Bauer, R.; Hiermann, A. Flavonolignans from *Avena sativa*. *J. Nat. Prod*., **2005**, *68*, 289-292.

[231] Duh, P.D.; Yen, G.C.; Yen, W.J.; Chang, L.W. Antioxidant effects of water extracts from barley (*Hordeum vulgare* L.) prepared under different roasting temperatures. *J. Agric. Food Chem*., **2001**, *49*, 1455-1463.

[232] Vanbeneden, N.; Gils, F.; Delvaux, F.; Delvaux, F.R. Variability in the release of free and bound hydroxycinnamic acids from diverse malted barley (*Hordeum vulgare* L.) cultivars during Wort production. *J. Agric. Food Chem*., **2007**, *55*, 11002-11010.

[233] Andreasen, M.F.; Christensen, L.P.; Meyer, A.S.; Hansen, A. Content of phenolic acids and ferulic acid dehydrodimers in 17 rye (*Secale cereale* L.) varieties. *J. Agric. Food Chem*., **2000**, *48*, 2837-2842.

[234] Andreasen, M.F.; Landbo, A.K.; Christensen, L.P.; Hansen, A.; Meyer, A.S. Antioxidant effects of phenolic rye (*Secale cereale* L.) extracts, monomeric hydroxycinnamates, and ferulic acid dehydrodimers on human low-density lipoproteins. *J. Agric. Food Chem*., **2001**, *49*, 4090-4096.

[235] Yıldırım, A.; Mavi, A.; Kara, A.A. Determination of antioxidant and antimicrobial activities of *Rumex crispus* L. extracts. *J. Agric. Food Chem*., **2001**, *49*, 4083-4089.

[236] McNamara, C.E.; Perry, N.B.; Follett, J.M.; Parmenter, G.A.; Douglas, J.A. A new glucosyl feruloyl quinic acid as a potential marker for roots and rhizomes of goldenseal, *Hydrastis canadensis*. *J. Nat. Prod*., **2004**, *67*, 1818-1822.

[237] Giacomelli, S.R.; Missau, F.C.; Mostardeiro, M.A.; Silva, U.F.da; Dalcol, I.I.; Zanatta, N.; Morel, A.F. Cyclopeptides from the bark of *Discaria americana*. *J. Nat. Prod*., **2001**, *64*, 997-999.

[238] Zafrilla, P.; Ferreres, F.; Tomás-Barberán, F.A. Effect of processing and storage on the antioxidant ellagic acid derivatives and flavonoids of red raspberry (*Rubus idaeus*) jams. *J. Agric. Food Chem*., **2001**, *49*, 3651-3655.

[239] Hampel, D.; Swatski, A.; Mosandl, A.; Wüst, M. Biosynthesis of monoterpenes and norisoprenoids in raspberry fruits (*Rubus idaeus* L.): The role of cytosolic mevalonate and plastidial methylerythritol phosphate pathway. *J. Agric. Food Chem*., **2007**, *55*, 9296-9304.

[240] Richling, E.; Preston, C.; Kavvadias, D.; Kahle, K.; Heppel, C.; Hummel, S.; König, T.; Schreier, P. Determination of the 2H/1H and 15N/14N ratios of alkylpyrazines from coffee beans (*Coffea arabica* L. and *Coffea canephora* var. *robusta*) by isotope ratio mass spectrometry. *J. Agric. Food Chem*., **2005**, *53*, 7925-7930.

[241] Mattoli, L.; Cangi, F.; Maidecchi, A.; Ghiara, C.; Tubaro, M.; Traldi, P. A rapid liquid chromatography electrospray ionization mass spectrometryn method for evaluation of synephrine in *Citrus aurantium* L. samples. *J. Agric. Food Chem*., **2005**, *53*, 9860-9866.

[242] Nelson, B.C.; Putzbach, K.; Sharpless, K.E.; Sander, L.C. Mass spectrometric determination of the predominant adrenergic protoalkaloids in bitter orange (*Citrus aurantium*). *J. Agric. Food Chem*., **2007**, *55*, 9769-9775.

[243] Verzera, A.; Trozzi, A.; Zappalá, M.; Condurso, C.; Cotroneo, A. Essential oil composition of *Citrus meyerii* Y. Tan. and *Citrus medica* L. cv. Diamante and their lemon hybrids. *J. Agric. Food Chem*., **2005**, *53*, 4890-4894.

[244] El Sayed, K.; Al-Said, M.S.; El-Feraly, F.S.; Ross, S.A. New quinoline alkaloids from *Ruta chalepensis*. *J. Nat. Prod*., **2000**, *63*, 995-997.

[245] Kim, T.H.; Ito, H.; Hatano, T.; Hasegawa, T.; Akiba, A.; Machiguchi, T.; Yoshida, T. Bisabolane- and santalane-type sesquiterpenoids from *Santalum album* of Indian origin. *J. Nat. Prod*., **2005**, *68*, 1805-1808.

[246] Ochi, T.; Shibata, H.; Higuti, T.; Kodama, K.; Kusumi, T.; Takaishi, Y. Anti-*Helicobacter pylori* compounds from *Santalum album*. *J. Nat. Prod*., **2005**, *68*, 819-824.

[247] Landbo, A.K.; Meyer, A.S. Enzyme-assisted extraction of antioxidative phenols from black currant juice press residues (*Ribes nigrum*). *J. Agric. Food Chem*., **2001**, *49*, 3169-3177.

[248] McDougall, G.J.; Gordon, S.; Brennan, R.; Stewart, D. Anthocyanin-flavanol condensation products from black currant (*Ribes nigrum* L.). *J. Agric. Food Chem*., **2005**, *53*, 7878-7885.

[249] Slimestad, R.; Solheim, H. Anthocyanins from black currants (*Ribes nigrum* L.). *J. Agric. Food Chem*., **2002**, *50*, 3228-3231.

[250] Anttonen, M.J.; Karjalainen, R.O. High-performance liquid chromatography analysis of black currant (*Ribes nigrum* L.) fruit phenolics grown either conventionally or organically. *J. Agric. Food Chem*., **2006**, *54*, 7530-7538.

[251] del Castillo, M.L.R.; Dobson, G.; Brennan, R.; Gordon, S. Fatty acid content and juice characteristics in black currant (*Ribes nigrum* L.) genotypes. *J. Agric. Food Chem*., **2004**, *52*, 948-952.

[252] Kapasakalidis, P.G.; Rastall, R.A.; Gordon, M.H. Extraction of polyphenols from processed black currant (*Ribes nigrum* L.) residues. *J. Agric. Food Chem*., **2006**, *54*, 4016-4021.

[253] Varming, C.; Andersen, M.L.; Poll, L. Volatile monoterpenes in black currant (*Ribes nigrum* L.) juice: effects of heating and enzymatic treatment by β-glucosidase. *J. Agric. Food Chem*., **2006**, *54*, 2298-2302.

[254] Collins, D.O.; Gallimore, W.A.; Reynolds, W.F.; Williams, L.A.D.; Reese, P.B. New skeletal sesquiterpenoids, caprariolides A-D, from *Capraria biflora* and their insecticidal activity. *J. Nat. Prod*., **2000**, *63*, 1515-1518.

[255] Ahsan, M.; Islam, S.K.N.; Gray, A.I.; Stimson, W.H. Cytotoxic diterpenes from *Scoparia dulcis*. *J. Nat. Prod*., **2003**, *66*, 958-961.

[256] Li, Y.; Chen, X.; Satake, W.; Oshima, Y.; Ohizumi, Y. Acetylated flavonoid glycosides potentiating NGF action from *Scoparia dulcis*. *J. Nat. Prod*., **2004**, *67*, 725-727.

[257] Veras, M.L.; Bezerra, M.Z.B.; Lemos, T.L.G.; Uchoa, D.E.deA.; Braz-Filho, R.; Chai, H.B.; Cordell, G.A.; Pessoa, O.D.L. Cytotoxic withaphysalins from the leaves of *Acnistus arborescens*. *J. Nat. Prod*., **2004**, *67*, 710-713.

[258] Mimaki, Y.; Watanabe, K.; Ando, Y.; Sakuma, C.; Sashida, Y.; Furuya, S.; Sakagami, H. Flavonol glycosides and steroidal saponins from the leaves of *Cestrum nocturnum* and their cytotoxicity. *J. Nat. Prod*., **2001**, *64*, 17-22.

[259] Mimaki, Y.; Watanabe, K.; Sakagami, H.; Sashida, Y. Steroidal glycosides from the leaves of *Cestrum nocturnum*. *J. Nat. Prod*., **2002**, *65*, 1863-1868.

[260] D'Abrosca, B.; Greca, M.D.; Fiorentino, A.; Monaco, P.; Zarrelli, A. Low molecular weight phenols from the bioactive aqueous fraction of *Cestrum parqui*. *J. Agric. Food Chem*., **2004**, *52*, 4101-4108.

[261] Pan, Y.; Wang, X.; Hu, X. Cytotoxic withanolides from the flowers of *Datura metel*. *J. Nat. Prod*., **2007**, *70*, 1127-1132.

[262] Ma, C.Y.; Liu, W.K.; Che, C.T. Lignanamides and nonalkaloidal components of *Hyoscyamus niger* seeds. *J. Nat. Prod*., **2002**, *65*, 206-209.

[263] Gavilano, L.B.; Coleman, N.P.; Burnley, L.E.; Bowman, M.L.; Kalengamaliro, N.E.; Hayes, A.; Bush, L.; Siminszky, B. Genetic engineering of *Nicotiana tabacum* for reduced nornicotine content. *J. Agric. Food Chem*., **2006**, *54*, 9071-9078.

[264] Kuo, P.C.; Kuo, T.H.; Damu, A.G.; Su, C.R.; Lee, E.J.; Wu, T.S.; Shu, R.; Chen, C.M.; Bastow, K.F.; Chen, T.H.; Lee, K.H. Physanolide A, a novel skeleton steroid, and other cytotoxic principles from *Physalis angulata*. *Org. Lett*., **2006**, *8*, 2953-2956.

[265] Damu, A.G.; Kuo, P.C.; Su, C.R.; Kuo, T.H.; Chen, T.H.; Bastow, K.F.; Lee, K.H.; Wu, T.S. Isolation, structures, and structure-cytotoxic activity relationships of withanolides and physalins from *Physalis angulata*. *J. Nat. Prod*., **2007**, *70*, 1146-1152.

[266] Breithaupt, D.E.; Wirt, U.; Bamedi, A. Differentiation between lutein monoester regioisomers and detection of lutein diesters from marigold flowers (*Tagetes erecta* L.) and several fruits by liquid chromatography-mass spectrometry. *J. Agric. Food Chem*., **2002**, *50*, 66-70.

[267] Reyes, L.F.; Cisneros-Zevallos, L. Wounding stress increases the phenolic content and antioxidant capacity of purple-flesh potatoes (*Solanum tuberosum* L.). *J. Agric. Food Chem*., **2003**, *51*, 5296-5300.

[268] Nikolic, N.C.; Stankovic, M.Z. Solanidine hydrolytic extraction and separation from the potato (*Solanum tuberosum* L.) vines by using solid-liquid-liquid systems. *J. Agric. Food Chem*., **2003**, *51*, 1845-1849.

[269] Turakainen, M.; Väänänen, T.; Anttila, K.; Ollilainen, V.; Hartikainen, H.; Seppänen, M. Effect of selenate supplementation on glycoalkaloid content of potato (*Solanum tuberosum* L.). *J. Agric. Food Chem*., **2004**, *52*, 7139-7143.

[270] Dobson, G.; Griffiths, D.W.; Davies, H.V.; McNicol, J.W. Comparison of fatty acid and polar lipid contents of tubers from two potato species, *Solanum tuberosum* and *Solanum phureja*. *J. Agric. Food Chem*., **2004**, *52*, 6306-6314.

[271] Parr, A.J.; Mellon, F.A.; Colquhoun, I.J.; Davies, H.V. Dihydrocaffeoyl polyamines (kukoamine and allies) in potato (*Solanum tuberosum*) tubers detected during metabolite profiling. *J. Agric. Food Chem*., **2005**, *53*, 5461-5466.

[272] Atawodi, S.E.; Pfundstein, B.; Haubner, R.; Spiegelhalder, B.; Bartsch, H.; Owen, R.W. Content of polyphenolic compounds in the Nigerian stimulants *Cola nitida* ssp. *alba*, *Cola nitida* ssp. *rubra* A. Chev, and *Cola acuminata* Schott & Endl and their antioxidant capacity. *J. Agric. Food Chem*., **2007**, *55*, 9824-9828.

[273] Zhao, J.; Pawar, R.S.; Ali, Z.; Khan, I.A. Phytochemical investigation of *Turnera diffusa*. *J. Nat. Prod*., **2007**, *70*, 289-292.

[274] Han, L.; Huang, X.; Dahse, H.M.; Moellmann, U.; Fu, H.; Grabley, S.; Sattler, I.; Lin, W. Unusual naphthoquinone derivatives from the twigs of *Avicennia marina*. *J. Nat. Prod*., **2007**, *70*, 923-927.

[275] Begum, S.; Wahab, A.; Siddiqui, B.S.; Qamar, F. Nematicidal constituents of the aerial parts of *Lantana camara*. *J. Nat. Prod*., **2000**, *63*, 765-767.

[276] Adrian, M.; Jeandet, P.; Douillet-Breuil, A.C.; Tesson, L.; Bessis, R. Stilbene content of mature *Vitis vinifera* berries in response to UV-C elicitation. *J. Agric. Food Chem*., **2000**, *48*, 6103-6105.

[277] Krasnow, M.N.; Murphy, T.M. Polyphenol glucosylating activity in cell suspensions of grape (*Vitis vinifera*). *J. Agric. Food Chem*., **2004**, *52*, 3467-3472.

[278] Bureau, S.M.; Baumes, R.L.; Razungles, A.J. Effects of vine or bunch shading on the glycosylated flavor precursors in grapes of *Vitis vinifera* L. Cv. Syrah. *J. Agric. Food Chem*., **2000**, *48*, 1290-1297.

[279] Gachons, C.P.des; Tominaga, T.; Dubourdieu, D. Measuring the aromatic potential of *Vitis vinifera* L. Cv. Sauvignon Blanc grapes

by assaying S-cysteine conjugates, precursors of the volatile thiols responsible for their varietal aroma. *J. Agric. Food Chem*., **2000**, *48*, 3387-3391.

[280] Luan, F.; Hampel, D.; Mosandl, A.; Wüst, M. Enantioselective analysis of free and glycosidically bound monoterpene polyols in *Vitis vinifera* L. Cvs. Morio Muscat and Muscat Ottonel: evidence for an oxidative monoterpene metabolism in grapes. *J. Agric. Food Chem*., **2004**, *52*, 2036-2041.

[281] Corcho-Corral, B.; Olivares-Marín, M.; Valdes-Sánchez, E.; Fernández-González, C.; Macías-García, A.; Gómez-Serrano, V. Development of activated carbon using vine shoots (*Vitis vinifera*) and its use for wine treatment. *J. Agric. Food Chem*., **2005**, *53*, 644-650.

[282] Cortell, J.M.; Kennedy, J.A. Effect of shading on accumulation of flavonoid compounds in (*Vitis vinifera* L.) Pinot Noir fruit and extraction in a model system. *J. Agric. Food Chem*., **2006**, *54*, 8510-8520.

[283] Agati, G.; Meyer, S.; Matteini, P.; Cerovic, Z.G. Assessment of anthocyanins in grape (*Vitis vinifera* L.) berries using a noninvasive chlorophyll fluorescence method. *J. Agric. Food Chem*., **2007**, *55*, 1053-1061.

[284] Cortell, J.M.; Halbleib, M.; Gallagher, A.V.; Righetti, T.L.; Kennedy, J.A. Influence of vine vigor on grape (*Vitis vinifera* L. Cv. Pinot Noir) anthocyanins. 1. anthocyanin concentration and composition in fruit. *J. Agric. Food Chem*., **2007**, *55*, 6575-6584.

[285] Cortell, J.M.; Halbleib, M.; Gallagher, A.V.; Righetti, T.L.; Kennedy, J.A. Influence of vine vigor on grape (*Vitis vinifera* L. Cv. Pinot Noir) anthocyanins. 2. anthocyanins and pigmented polymers in wine. *J. Agric. Food Chem*., **2007**, *55*. 6585-6595.

[286] Aron, P.M.; Kennedy, J.A. Compositional investigation of phenolic polymers Isolated from *Vitis vinifera* L. Cv. Pinot Noir during fermentation. *J. Agric. Food Chem*., **2007**, *55*, 5670-5680.

[287] Bindon, K.A.; Dry, P.R.; Loveys, B.R. Influence of plant water status on the production of C13-norisoprenoid precursors in *Vitis vinifera* L. Cv. Cabernet Sauvignon grape berries. *J. Agric. Food Chem*., **2007**, *55*, 4493-4500.

[288] Stagos, D.; Spanou, C.; Margariti, M.; Stathopoulos, C.; Mamuris, Z.; Kazantzoglou, G.; Magiatis, P.; Kouretas, D. Cytogenetic effects of grape extracts (*Vitis vinifera*) and polyphenols on mitomycin C-induced sister chromatid exchanges (SCEs) in human blood lymphocytes. *J. Agric. Food Chem*., **2007**, *55*, 5246-5252.

[289] Thimothe, J.; Bonsi, I.A.; Padilla-Zakour, O.I.; Koo, H. Chemical characterization of red wine grape (*Vitis vinifera* and *Vitis* interspecific hybrids) and pomace phenolic extracts and their biological activity against *Streptococcus mutans*. *J. Agric. Food Chem*., **2007**, *55*, 10200-10207.

[290] Boido, E.; Lloret, A.; Medina, K.; Fariña, L.; Carrau, F.; Versini, G.; Dellacassa, E. Aroma composition of *Vitis vinifera* Cv. Tannat: the typical red wine from Uruguay. *J. Agric. Food Chem*., **2003**, *51*, 5408-5413.

[291] Boido, E.; Alcalde-Eon, C.; Carrau, F.; Dellacassa, E.; Rivas-Gonzalo, J.C. Aging effect on the pigment composition and color of *Vitis vinifera* L. Cv. Tannat wines. Contribution of the main pigment families to wine color. *J. Agric. Food Chem*., **2006**, *54*, 6692-6704.

[292] Fernández, K.; Kennedy, J.A.; Agosin, E. Characterization of *Vitis vinifera* L. Cv. Carménère grape and wine proanthocyanidins. *J. Agric. Food Chem*., **2007**, *55*, 3675-3680.

[293] Monagas, M.; Hernández-Ledesma, B.; Gómez-Cordovés, C.; Bartolomé, B. Commercial dietary ingredients from *Vitis vinifera* L. leaves and grape skins: antioxidant and chemical characterization. *J. Agric. Food Chem*., **2006**, *54*, 319-327.

[294] Torres, J.L.; Bobet, R. New flavanol derivatives from grape (*Vitis vinifera*) byproducts. Antioxidant aminoethylthio-flavan-3-ol conjugates from a polymeric waste fraction used as a source of flavanols. *J. Agric. Food Chem*., **2001**, *49*, 4627-4634.

[295] Torres, J.L.; Varela, B.; García, M.T.; Carilla, J.; Matito, C.; Centelles, J.J.; Cascante, M.; Sort, X.; Bobet, R. Valorization of grape (*Vitis vinifera*) byproducts. Antioxidant and biological properties of polyphenolic fractions differing in procyanidin composition and flavonol content. *J. Agric. Food Chem*., **2002**, *50*, 7548-7555.

[296] Selga, A.; Sort, X.; Bobet, R.; Torres, J.L. Efficient one pot extraction and depolymerization of grape (*Vitis vinifera*) pomace procyanidins for the preparation of antioxidant thio-conjugates. *J. Agric. Food Chem*., **2004**, *52*, 467-473.

[297] Wirth, J.; Guo, W.; Baumes, R.; Günata, Z. Volatile compounds released by enzymatic hydrolysis of glycoconjugates of leaves and grape berries from *Vitis vinifera* Muscat of Alexandria and Shiraz cultivars. *J. Agric. Food Chem*., **2001**, *49*, 2917-2923.

[298] Castillo, J.; Benavente-García, O.; Lorente, J.; Alcaraz, M.; Redondo, A.; Ortuño, A.; Del Rio, J.A. Antioxidant activity and radioprotective effects against chromosomal damage induced *in vivo* by X-rays of flavan-3-ols (procyanidins) from grape seeds (*Vitis vinifera*): comparative study versus other phenolic and organic compounds. *J. Agric. Food Chem*., **2000**, *48*, 1738-1745.

[299] Peng, Z.; Hayasaka, Y.; Iland, P.G.; Sefton, M.; Høj, P.; Waters, E.J. Quantitative analysis of polymeric procyanidins (tannins) from grape (*Vitis vinifera*) seeds by reverse phase high-performance liquid chromatography. *J. Agric. Food Chem*., **2001**, *49*, 26-31.

[300] Simonetti, P.; Ciappellano, S.; Gardana, C.; Bramati, L.; Pietta, P. Procyanidins from *Vitis vinifera* seeds: *in vivo* effects on oxidative stress. *J. Agric. Food Chem*., **2002**, *50*, 6217-6221.

[301] Cadot, Y.; Miñana-Castelló, M.T.; Chevalier, M. Anatomical, histological, and histochemical changes in grape seeds from *Vitis vinifera* L. cv Cabernet franc during fruit development. *J. Agric. Food Chem.*, **2006**, *54*, 9206-9215.

[302] Janisch, K.M.; Ölschläger, C.; Treutter, D.; Elstner, E.F. Simulated digestion of *Vitis vinifera* seed powder: polyphenolic content and antioxidant properties. *J. Agric. Food Chem*., 2006, *54*, 4839-4848.

[303] Monagas, M.; Gómez-Cordovés, C.; Bartolomé, B.; Laureano, O.; Silva, J.M.R.da. Monomeric, oligomeric, and plymeric flavan-3-ol composition of wines and grapes from *Vitis vinifera* L. Cv. Graciano, Tempranillo, and Cabernet Sauvignon. *J. Agric. Food Chem*., **2003**, *51*, 6475-6481.

[304] Cortell, J.M.; Halbleib, M.; Gallagher, A.V.; Righetti, T.L.; Kennedy, J.A. Influence of vine vigor on grape (*Vitis vinifera* L. Cv. Pinot Noir) and wine proanthocyanidins. *J. Agric. Food Chem*., **2005**, *53*, 5798-5808.

[305] Koşar, M.; Küpeli, E.; Malyer, H.; Uylaşer, V.; Türkben, C.; Başer, K.H.C. Effect of brining on biological activity of leaves of *Vitis vinifera* L. (Cv. Sultani Çekirdeksiz) from Turkey. *J. Agric. Food Chem*., **2007**, *55*, 4596-4603.

[306] Hampel, D.; Mosandl, A.; Wüst, M. Induction of de novo volatile terpene biosynthesis via cytosolic and plastidial pathways by methyl jasmonate in foliage of *Vitis vinifera* L. *J. Agric. Food Chem*., **2005**, *53*, 2652-2657.

[307] Tominaga, T.; Blanchard, L.; Darriet, P.; Dubourdieu, D. A powerful aromatic volatile thiol, 2-furanmethanethiol, exhibiting roast coffee aroma in wines made from several *Vitis vinifera* grape varieties. *J. Agric. Food Chem*., **2000**, *48*, 1799-1802.

[308] Tominaga, T.; Dubourdieu, D. A novel method for quantification of 2-methyl-3-furanthiol and 2-furanmethanethiol in wines made from *Vitis vinifera* grape varieties. *J. Agric. Food Chem*., **2006**, *54*, 29-33.

[309] Schwarz, M.; Quast, P.; von Baer, D.; Winterhalter, P. Vitisin A content in Chilean wines from *Vitis vinif*era Cv. Cabernet Sauvignon and contribution to the color of aged red wines. *J. Agric. Food Chem*., **2003**, *51*, 6261-6267.

[310] Schwarz, M.; Hofmann, G.; Winterhalter, P. Investigations on anthocyanins in wines from *Vitis vinifera* cv. Pinotage: factors influencing the formation of pinotin A and its correlation with wine age. *J. Agric. Food Chem*., **2004**, *52*, 498-504.

[311] Castillo-Muñoz, N.; Gómez-Alonso, S.; García-Romero, E.; Hermosín-Gutiérrez, I. Flavonol profiles of *Vitis vinifera* red grapes and their single-cultivar wines. *J. Agric. Food Chem*., **2007**, *55*, 992-1002.

[312] Koundouras, S.; Marinos, V.; Gkoulioti, A.; Kotseridis, Y.; van Leeuwen, C. Influence of vineyard location and vine water status on fruit maturation of nonirrigated Cv. Agiorgitiko (*Vitis vinifera* L.). Effects on wine phenolic and aroma components. *J. Agric. Food Chem*., **2006**, *54*, 5077-5086.

[313] Püssa, T.; Floren, J.; Kuldkepp, P.; Raal, A. Survey of grapevine *Vitis vinifera* stem polyphenols by liquid chromatography-diode array detection-tandem mass spectrometry. *J. Agric. Food Chem*., **2006**, *54*, 7488-7494.

[314] Baltenweck-Guyot, R.; Trendel, J.M.; Albrecht, P.; Schaeffer, A. Glycosides and phenylpropanoid glycerol in *Vitis vinifera* Cv. Gewurztraminer wine. *J. Agric. Food Chem*., **2000**, *48*, 6178-6182.

[315] Waffo-Teguo, P.; Lee, D.; Cuendet, M.; Mérillon, J.M.; Pezzuto, J.M.; Kinghorn, A.D. Two new stilbene dimer glucosides from grape (*Vitis vinifera*) cell cultures. *J. Nat. Prod*., **2001**, *64*, 136-138.

[316] Mohamad, H.; Lajis, N.H.; Abas, F.; Ali, A.M.; Sukari, M.A.; Kikuzaki, H.; Nakatani, N. Antioxidative constituents of *Etlingera elatior*. *J. Nat. Prod*., **2005**, *68*, 285-288.

[317] Sekiwa-Iijima, Y.; Aizawa, Y.; Kubota, K. Geraniol dehydrogenase activity related to aroma formation in ginger (*Zingiber officinale* Roscoe). *J. Agric. Food Chem*., **2001**, *49*, 5902-5906.

[318] Wohlmuth, H.; Leach, D.N.; Smith, M.K.; Myers, S.P. Gingerol content of diploid and tetraploid clones of ginger (*Zingiber officinale* Roscoe). *J. Agric. Food Chem*., **2005**, *53*, 5772-5778.

[319] Kato, A.; Higuchi, Y.; Goto, H.; Kizu, H.; Okamoto, T.; Asano, N.; Hollinshead, J.; Nash, R.J.; Adachi, I. Inhibitory effects of *Zingiber officinale* Roscoe derived components on aldose reductase activity *in vitro* and *in vivo*. *J. Agric. Food Chem*., **2006**, *54*, 6640-6644.

[320] Wohlmuth, H.; Smith, M.K.; Brooks, L.O.; Myers, S.P.; Leach, D.N. Essential oil composition of diploid and tetraploid clones of ginger (*Zingiber officinale* Roscoe) grown in Australia. *J. Agric. Food Chem*., **2006**, 54, 1414-1419.

[321] Tao, Q.F.; Xu, Y.; Lam, R.Y.Y.; Schneider, B.; Dou, H.; Leung, P.S.; Shi, S.Y.; Zhou, C.X.; Yang, L.X.; Zhang, R.P.; Xiao, Y.C.; Wu, X.; Stöckigt, J.; Zeng, S.; Cheng, C.H.K.; Zhao, Y. Diarylheptanoids and a monoterpenoid from the rhizomes of *Zingiber officinale*: antioxidant and cytoprotective properties. *J. Nat. Prod*., **2008**, *71*, 12-17.

[322] Rodrigues, E.; Carlini, E.A. Plants with possible psychoactive effects used by the Krahô Indians, Brazil. *Rev. Bras. Psiquiatr*., **2006**, *28*, 277-282.

[323] Mendes, F.R.; Carlini, E.A. Brazilian plants as possible adaptógenas: an ethnopharmacological survey of books edited in Brazil. *J. Ethnopharmacol*., **2007**, *109*, 493-500.

[324] Rodrigues, E.; Mendes, F.R.; Negri, G. Plants indicated by Brazilian Indians to Central Nervous System disturbances: A bibliographical survey. *Curr. Med. Chem. - CNS Agents*, **2006**, *6*, 211-244.

[325] Díaz, J.L. Ethnopharmacology of sacred psychoactive plants used by the Indians of Mexico. *Annu. Ver. Pharmacol*., **1977**, *17*, 647-675.

[326] Rodrigues, E.; Carlini, E.A. Possíveis efeitos sobre o Sistema Nervoso Central de plantas utilizadas por duas culturas brasileiras (quilombos e índios). *Arq. Bras. Fitomed. Cient*., **2003**, *1*, 147-154.

[327] Rodrigues, E.; Tabach, R.; Galduróz, J.C.F.; Negri, G. Plants with possible anxiolytic and/or hypnotic effects indicated by three Brazilian cultures – Indians, Afro-Brazilians and river-dwellers. *Stud. Nat. Prod. Chem*., **2008**, *35*,549-595.

[328] Leonti, M.; Ramirez, F.; Sticher, O.; Heinrich, M. Medicinal flora of the Popoluca, Mexico: a botanical systematical perspective. *Econ. Bot*., **2003**, *57*, 218-230.

[329] Douwes, E.; Crouch, N.R.; Edwards, T.J.; Mulholland, D.A. Regression analyses of southern African ethnomedicinal plants: informing the targeted selection of bioprospecting and pharmacological screening subjects. *J. Ethnopharmacol*., **2008**, *119*, 356-364.

[330] Schultes, R.E.; Raffauf, R.F. The healing forest: medicinal and toxic plants of the Northwest Amazonia, Dioscorides Press: Oregon, **1990**.

[331] Souza, V.C.; Lorenzi, H. Botânica Sistemática: guia ilustrado para identificação das famílias de Angiospermas da flora brasileira, baseado em APG II, Instituto Plantarum: Nova Odessa-SP, **2005**.

[332] Soulimani, R.; Younos, C.; Jarmouni, S.; Bousta, D.; Misslin, R.; Mortier, F. Behavioural effects of *Passiflora incarnata* L. and its indole alkaloid and flavonoid derivatives and maltol in the mouse. *J. Ethnopharmacol*., **1997**, *57*, 11-20.

[333] Gyllenhaal, C.; Merritt, S.L.; Peterson, S.D.; Block, K.I.; Gochenour, T. Efficacy and safety of herbal stimulants and sedatives in sleep disorders. *Sleep Med. Rev*., **2000**, *4*, 229-251.

[334] Adachi, N.; Tomonaga, S.; Tachibana, T.; Denbow, D.M. Furuse M. (-)-Epigallocatechin gallate attenuates acute stress responses through GABAergic system in the brain. *Eur. J. Pharmacol*., **2006**, *531*, 171-175.

[335] Zuanazzi, J.A.daS. In: *Farmacognosia: da planta ao medicamento*; Simões, C.M.O.; Schenkel, E.P.; Gosmann, G.; De Mello, J.C.P.; Mentz, L.A.; Petrovick, P.R., Org.; Ed. UFRGS/UFSC: Florianópolis, **2000**, pp. 489-516.

[336] Filip, R; Ferraro, G.E. Researching on new species of "Mate": *Ilex brevicuspis*: phytochemical and pharmacology study. *Eur J Nutr*., **2003**, 42(1):50-54.

[337] Silva, B.; Oliveira, P.J.; Dias, A.; Malva, J.O. Quercetin, kaempferol and biapigenin from *Hypericum perforatum* are neuroprotective against excitotoxic insults. *Neurotox Res*, **2008**, 13: 265-279.

[338] Simões, C.M.O.; Spitzer, V. In: *Farmacognosia: da planta ao medicamento*; Simões, C.M.O.; Schenkel, E.P.; Gosmann, G.; De Mello, J.C.P.; Mentz, L.A.; Petrovick, P.R., Org.; Ed. UFRGS/UFSC: Florianópolis, **2000**, pp. 679-706.

[339] Waynberg, J.; Brewer, S. Effects of herbal vX on libido and sexual activity in premenopausal and postmenopausal women. *Adv Nat Ther*., **2000**, 17(5): 255-262.

[340] Siqueira, I.R.; Lara, D.R.; Silva, D.; Gaieski, F.S.; Nunes, D.S.; Elisabetsky, E. Psychopharmacological properties of *Ptychopetalum Olacoides* bentham (Olacaceae). *Pharm Biol*., **1998**, 36(5): 327-334.

[341] Itthipanichpong, C.; Ruangrungsi, N.; Pattanaautsahakit, C. Chemical compositions and pharmacological effects of essential oil from the fruit of *Zanthoxylum limonella*. *J Med Assoc Thai.,* **2002**, 85:S344-S354.

[342] Ou, B.; Huang, D.; Hampsch-Woodill, M.; Flanagan, J.A. When east meets west: the relationship between yin-yang and antioxidation-oxidation. *FASEB J*., **2003**, *17*,127-129.

[343] Kamara, B.I.; Brand, D.J.; Brandt, E.V.; Joubert, E. Phenolic metabolites from honeybush tea (*Cyclopia subternata*). *J. Agric. Food Chem*., **2004**, *52*, 5391-5395.

[344] Guo, D.J.; Cheng, H.L.; Chan, S.W.; Yu, P.H. Antioxidative activities and the total phenolic contents of tonic Chinese medicinal herbs. *Inflammopharmacology*, **2008**, *16*, 201-207.

[345] Graf, E. Antioxidant potential of ferulic acid. *Free Radic Biol Med*., **1992**, *13*, 435-448.

[346] Kikuzaki, H.; Hisamoto, M.; Hirose, K.; Akiyama, K.; Taniguchi, H. Antioxidant properties of ferulic acid and its related compounds. *J. Agric. Food Chem*., **2002**, *50*, 2161-2168.

[347] Mathew, S.; Abraham, T.E. Ferulic acid: an antioxidant found naturally in plant cell walls and feruloyl esterases involved in its release and their applications. *Crit Rev Biotechnol*., **2004**, *24*, 59-83.

[348] Badary, O.A.; Awad, A.S.; Sherief, M.A.; Hamada, F.M.A. *In vitro* and *in vivo* effects of ferulic acid on gastrointestinal motility: Inhibition of cisplatin-induced delay in gastric emptying in rats. *World J Gastroenterol*, **2006**, *12*, 5363-5367.

[349] Dzitoyeva, S.; Imbesi, M.; Uz, T.; Dimitrijevic, N.; Manev, H.; Manev, R. Caffeic acid attenuates the decrease of cortical BDNF transcript IV mRNA induced by swim stress in wild-type but not in 5-lipoxygenase-deficient mice. *J Neural Transm*., **2008**, *115*, 823-827.

[350] Ito, N.; Nagai, T.; Oikawa, T.; Yamada, H.; Hanawa, T. Antidepressant-like effect of l-perillaldehyde in stress-induced depression-like model mice through regulation of the olfactory nervous system. *Evid. Based Complement. Alternat. Med*., **2008** Jul 16. [Epub ahead of print].

[351] Britton, G. Structure and properties of carotenoids in relation to function. *FASEB J*., **1995**, *9*, 1551-1558.

[352] Krinsky, N.I. The antioxidant and biological properties of the carotenoids. *Ann. N. Y. Acad. Sci*., **1998**, *20*, 443-447.

[353] Böhm, V.; Puspitasari-Nienaber, N.L.; Ferruzzi, M.G.; Schwartz, S.J. Trolox equivalent antioxidant capacity of different geometrical isomers of alpha-carotene, beta-carotene, lycopene, and zeaxanthin. *J. Agric. Food Chem*., **2002**, *50*, 221-226.

[354] Kris-Etherton, P.M.; Hecker, K.D.; Bonanome, A.; Coval, S.M.; Binkoski, A.E.; Hilpert, K.F.; Griel, A.E.; Etherton, T.D. Bioactive compounds in foods: their role in the prevention of cardiovascular disease and cancer. *Am. J. Med*., **2002**, *113*, 71S-88S.

[355] Fiorentino, A.; D'abrosca, B.; Pacifico, S.; Mastellone, C.; Piscopo, V.; Monaco, P. Spectroscopic identification and antioxidant activity of glucosylated carotenoid metabolites from *Cydonia vulgaris* fruits. *J. Agric. Food Chem*., **2006**, *54*, 9592-9597.

[356] Tomassini, T.C.B.; Barbi, N.S.; Ribeiro, I.M.; Xavier, D.C.D. Gênero Physalis – uma revisão sobre vitaesteróides. *Quim. Nova*, **2000**, *23*, 47-57.

[357] Heinrich, M.; Barnes, J.; Gibbons, S.; Williamson, E.M. *Fundamentals of pharmacognosy and phytotherapy*. Churchill Livingstone: London, **2004**.

[358] Jayaprakasam, B.; Zhang, Y.; Seeram, N.P.; Nair, M.G. Growth inhibition of human tumor cell lines by withanolides from *Withania somnifera* leaves. *Life Sci*., **2003**, *74*, 125-132.

[359] Tohda, C.; Kuboyama, T.; Komatsu, K. Search for natural products related to regeneration of the neuronal network. *Neurosignals*, **2005**, *14*, 34-45.

[360] Bargagna-Mohan, P.; Paranthan, R.R.; Hamza, A.; Dimova, N.; Trucchi, B.; Srinivasan, C.; Elliott, G.I.; Zhan, C.G.; Lau, D.L.; Zhu, H.; Kasahara, K.; Inagaki, M.; Cambi, F.; Mohan, R. Withaferin A targets intermediate filaments glial fibrillary acidic protein and vimentin in a model of retinal gliosis. *J. Biol Chem*., **2010**, *285*, 7657-7669.

Received: ????????????? **Revised:** ?????????????? **Accepted:** ??????????????