Plant extracts

Polyphenols and alkaloids are active molecules isolated by extraction and purification from plant extracts. The purification step is often associated with adsorbent or ion exchange resins.

Polyphenols

Polyphenols are broadly distributed in the plant kingdom. They have positive impacts on health by preventing cardio-vascular, inflammatory and neurological diseases through their antioxidant activity by scavenging free radicals in the body. To be used efficiently as dietary or pharmaceutical additives they need to be extracted from the plants and then recovered from the extracting media and purified. Polyphenols include phenolics acids, flavonoids, tannins and the less common stilbenes and lignans. Hydrolysable tannins are compounds containing a central core of glucose or another polyol esterified with gallic acid, also called gallotannins, or with hexahydroxydiphenic acid, also called ellagitannins. Condensed tannins are oligomers or polymers of flavan-3-ol linked through an interflavan carbon bond. They are also referred to as proanthocyanidins. Polymeric adsorbents from the **AMBERLITE™ XAD™** product range are cutting edge products to recover and purify polyphenols extracted from natural products.

Alkaloids

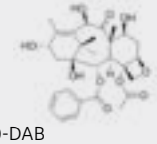
The term “alkaloid” (alkali-like) is commonly used to designate basic heterocyclic nitrogenous compounds of plant origin that are physiologically active. Alkaloids have diverse and important physiological effects on humans and other animals. Well-known alkaloids include morphine, strychnine, quinine, ephedrine, codeine, caffeine and nicotine. Because some alkaloids demonstrate weak basicity, it is possible to recover them from alcoholic and aqueous extractants with a strong acidic cationic resin such as **AMBERLITE™ FPC22 H**. Examples include extractions of Quinine from Cinchona bark, vindoline and vinblastine (anti carcinogens) from Brazilian “vinca rosea”, maistemonine from Stemona japonica, and ephedrine from ephedra herb or from Macleaya cordata.

Taxol

Paclitaxel (brand name Taxol), a taxane diterpene, is active against certain cancers of the lung, ovary, breast, head, and neck, disrupting cell division and interfering with separation of the nuclear chromosomes. The semi-synthetic process starts with extraction of 10-DAB (10-deacetylbaccatin III), which occurs in large quantities in needles of English Yew (Taxus Baccata) trees, i.e. a renewable resource. This intermediate is separated from other compounds by reverse phase chromatography (**AMBERCHROM™ CG161M**) and then converted to Paclitaxel by the means of different chemical steps before being isolated and purified by a reverse phase chromatography step (with for instance **AMBERCHROM™ XT30** or **XT20**).

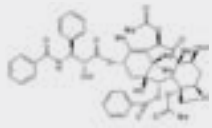
Taxus Baccata

1. Maceration of needles in ethanol
2. Solvent extraction
3. Chromatography **AMBERCHROM™ CG161M**



10-DAB
10-deacetylbaccatin III

1. Chemical steps
2. Chromatography **AMBERCHROM™ XT30**



Paclitaxel (Taxol)

Plant extracts	Function	Source	Resin
Alkaloids	Wide range of pharmaceutical activities: analgesic, antimalarial, antiasthma, anticancer, etc.	Morphine (opium poppy), quinine (Cinchona bark), vindoline and vinblastine (vinca rosea), maistemonine (Stemona japonica), ephedrine (ephedra herb, Macleaya cordata)	AMBERLITE™ FPC22 H
Paclitaxel (Taxol)	Chemotherapy medication	Pacific yew trees (Taxus brevifolia)	AMBERCHROM™ CG161M AMBERCHROM™ XT30
Anthocyanins	Antioxidant	Grape skin, winery waste, blueberries, blackberries, black rice, red cabbage, red radish, purple wheat, eggplant peel, olive leafs, and purple corn	AMBERLITE™XAD™7HP
Flavonoids	Nutraceutical, pharmaceutical, medicinal and cosmetic applications	Fruits, vegetables, grains, bark, roots, stems, flowers, tea and wine	AMBERLITE™XAD™7HP
Proanthocyanidins	Potent antioxidants	Grape seeds, pine tree bark, skin of peanuts, ginkgo leaves, locust fruit, cranberry, cola nuts, Rhatany-root and Japanese green tea	AMBERLITE™XAD™7HP
Ellagitannins	Antioxidant, anti-atherosclerotic and anticancer	Pomegranates, black raspberries, raspberries, strawberries, walnuts and almonds	AMBERLITE™FPX66
Saponins	Glycosides	Soybeans, peas, sea cucumber, horse chestnut, ginseng, quinoa, licorice, oat and alfalfa	AMBERLITE™XAD™1180N
Pinitol	Anti diabetic	Carob tree (Ceratonia siliqua)	AMBERLITE™CR1310
Chlorogenic acid	Anti-inflammatory agent	Lonicera japonica (Caprifoliaceae) leaves	AMBERLITE™ XAD™4
Stevia	Sweetener	Stevia rebaudiana	AMBERLITE™ FPC23H AMBERLITE™ FPA51 AMBERLITE™XAD™7HP

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