**VOLATILE OILS**

1. **What are terpeneless volatile oil.**

Terpeneless volatile oil are volatile oils from which hydrocarbon fraction is removed by subjecting to either fractional distillation (since hydrocarbons have lower boiling point as compared to their oxygenated derivatives and hence are removed first) or by subjecting to column chromatography on silica gel. Terpeneless volatile oils offers advantage of being rich in oxygenated compounds, increase alcohol solubility, strong odour and have better shelf life. Example is terpeneless lemon and orange peel volatile oil (in which limonene and other hydrocarbons are removed, remaining oil is rich in citral and other oxygenated volatile oil components)

1. Commercially used drug for citral production and its preferred method of extraction

Lemon grass (Cymbopogan flexuous, Graminae) is commercially used for citral production, from which beta ionine is prepared. Beta ionine is starting material for vitamin A synthesis. Volatile oil is extracted by distillation method.

1. **Complete classification of volatile oil** based on functional group present with example
2. Acyclic monoterpene: citral, coriandrol, nerol, geraniol
3. Monocylic monoterpene: Menthol, Menthone, carvone
4. Bicyclic monoterpene: camphor, pinene
5. Sesquiterpene: turmerone, zinziberine
6. Drug containing methyl salicylate as main constituent: Oil of winter green (ester volatile oil, Gaultheria procumbens, Ericaceae)

**Steroidal and terpenoidal drugs**

1. Example of triterpenoidal saponin drug: Liquorice (Glycyrrhiza glabra, leguminosae)
2. Example of commercially used steroidal saponin containing drug: Dioscorea (steroidal saponin containing drug, contains dioscin a steroidal glycoside, which on hydrolysis gives diosgenin, which in turn is converted to 16-DPA which is starting material for synthesis of various steroidal hormones.
3. Terpenoidal drug used for immunomodulator property: Ginseng
4. Drug containing hecogenin (an alternative of diosgenin): Agave
5. Source of drug containing diosgenin apart from Dioscorea: Fenugreek
6. Drug containing bufedienolide: Squill (Urgenia maritime, Liliaceae)
7. Test for presence of deoxy sugars in cardiac glycosides: Keller killiani test (extract+glacial acetic acid+ 5%FeCl3+conc H2SO4: Reddish brown ring at the junction of two liquids, upper layer bluish green.
8. Different dioscorea species: D. Floribunda, D. Deltoida, D. Chinensis, D.composita, Dioscoreace

**Resins**

**Complete classification based on acid resin, ester resin etc. Or gum resin, oleo gum resin or oleo resin examples**

1. Pathological resins examples are (3.1 is all pathological resins):

Colophony (also known as rosin, amber resin), *Pinus palustris*, Pinaceae, acid resin containing abetic acid.

Specific test for colophony: Colophonye+pet ether+dil copper acetate, pet ether layer takes emerald green color due to copper salt of abetic acid

Myrrh: Commiphora molmol, Bursaraceae, acid resin, commiphoric acid, forms emulsion with water due to oleogumresin content.

Benzoin (also known as stryax): Sumatra benzoin (Styrax benzoin) and Siam bezoin (Styrax tonkinensis) family Styraceae, Contains not less than 25% of balsamic acids (benzoic acid and cinnamic acid).

Tolu balsam: Myroxylon balsamum, leguminosae

Peru balsam: Myroxylon balsamum var. Pereirae, leguminosae

1. Guggul: Oleo gum resin, guggulsterone, Lieberman burchard test positive (for guggulsterone)
2. Physiological resin examples are (all drugs mentioned in 3.2 are pathological resins)
3. Resin under control of narcotic and psychotropic act: Cannabis (dried flowering tops of *Cannabis sativum*, cannabinaceae)
4. Resin from Solanaceae family: Capsicum annum (containing carotenoid (colored compounds) and resin capsaicin (pungent compound)
5. Resin obtained from Animal source: Shellac (insect encrustations of Laccicer lacca, Laccidae, containing aleuritic acid and shelloic acid)

**Phenyl Propanoids**

1. Isoflavone containing drug: Soyabean (seeds of Glycine max, leguminosae, contains genestein and diadzein, which are plant phytoestrogens and are used in Hormonal Replacement therapy)
2. Buckwheat (Fagopyrum esculentum, polygonaceae): Contains flavonoid Rutin, improves capillary strength
3. Drug containing lignan (dimer of phenylpropanoid) derivative: Podophyllum (anticancer) and Phyllanthus (Hepatoprotective)
4. Drugs used as photosemsitizer: furanocoumarins containing drugs (Psoralea corylifolia and Ammi majus)
5. Confirmataory test for flavonoid: Shinoda test (Extract+Mg+Conc HCL: red orange color) due to conversion of flavonoids to corresponding anthocyanin.)
6. Iridoid (cyclopentane fused with pyran ring, modified terpenoids) containing drugs: Picrorrhiza (picroside I, II and kutkoside, bitter glycosides) and gentian (bittermost constituent amarogentin)
7. Terpenoidal drug for anti malarial property: Artemesia annua, Asteraceae, Artemisinin
8. Terpenoidal drug used as anticancer: Taxus (Taxus brevifolia, Taxaceae, Contains taxol)
9. Terpenoidal drug for Hepatoprotective activity: Kalmegh (Andrographis paniculata, Acanthaceae)
10. Examples of Carotenoids: Lutein, Zeaxanthin, crocin, lycopene

**Traditional drugs**

1. Punarnava (Boerhavia diffusa, Nyctaginace, enhances immunity)
2. Shakhpushpi (Convolvulus macrophyllus, Convolvulaceae) nerve tonic, memory enhancer
3. Lehsun: Allium sativum, Liliaceae, sulphur containing volatile oil, allin, allicin, diallyl suphide, antihyperlipidimic, antidiabetic
4. Chirata: (swertia chirata) bitter glycoside, chiratin used as appetizer and tonic
5. Ashoka bark: Saraca india, leguminosae, uterine tonic, in dysmennorhea

**Herbal excipients:**

1. Napthaquinone derivatives used for hair care: Henna (Lawsonia innermis, Lythraceae)
2. Herbal excipients as colorant: Turmeric
3. Constituents responsible for hair care effect of tea: EGCG (epigallocatechin gallate)
4. Difference between aloe vera gel and aloe vera juice: Gel contains polysaccharides (acemannons) used in skin care while juice contains anthraquinone derivatives (aloin) used for purgative property
5. Herbal sweetener:

Nutritive (calorific): honey, sucrose,

Non Nutritive (non calorific): glycyrrhiza, stevia

1. Binder: gums mucilage containing drugs (acacia gum, tragacanth, Starch mucilage)
2. Disintegrants: starch powder
3. Flavours: vanilla, menthol
4. Perfumes (fragrance): Rose, sandalwood
5. Definition of different ayurvedic formulations with example of marketed formulation

Asava: Kumariasava, drakshasava, lohasavum

Arista: dashmularishta, ashokarishta, arjunarishta

Ghrita: brahmi ghrita, triphala ghrita

Churna: triphala churna, kayam churna, sitopaladi churna

Avaleha: Chavyanprash, ashwagandha leha

Taila: Kumkumadi taila, mahabhringraj taila

Standardization parameters, Safety parameters

Drug interactions: with examples