

Emulsions.*

The emulsions are liquid preparations consisting of oily, fatty, resinous, or otherwise insoluble substances suspended in watery liquids by the intervention of gum, mucilage, or other viscid material called emulsifying agents. They may be divided into (1) natural and (2) artificial emulsions.

Natural Emulsions.—In natural emulsions are included all products of animal or vegetable origin, consisting of oily or resinous substances so combined with gum or albumen as to be readily miscible with water without separation.

Of animal products milk and egg yolk are the most typical emulsions, since their fat globules are so finely divided and so perfectly distributed in the watery liquid as to require considerable agitation to separate them from the albuminous envelope in order to obtain the fat. The operation of "churning" milk to produce butter is a good illustration of this, and is the reverse of the process of emulsification.

The milk-juice of many plants, consisting of oil and gum or albumen, is deposited in fruits and seeds upon evaporation of the water. The nuts, especially almonds, are rich in this mixture, which, upon trituration with water, is restored to its original form of milk-juice or emulsion. The official almond emulsion is a good example. Associated with resin, and sometimes with ethereal oil, the milk-juice of many plants exudes and dries into semi-solid masses or tears. Examples of these we have in the gum-resins, ammoniac, and asafetida, which furnish official emulsions by beating them in a mortar with water. The amount of gum contained in a gum-resin is not always sufficient to emulsify the other constituents, resin and ethereal oil, and it is then necessary to add gum artificially in order to produce complete emulsification.

These natural products are the most perfect emulsions, and to simulate them is the object of pharmaceutical art. A natural emulsion may be greatly diluted with water without causing separation of the oil. This is the best test to indicate that an emulsion is perfect.

Artificial Emulsions.—These are made by mixing the oil with a certain proportion of the emulsifying agent, adding water and trituration of the mixture in a mortar or agitation in a flask. There are various methods, but these are general rules:

The emulsification of the oil should be complete before the mixture is made up to the required measure. When alcoholic liquids are to be added, they should first be diluted as much as possible. Salts should be dissolved before being added. No heat should be employed, as the oil separates in an emulsion when heated. Emulsions should be freshly prepared, and be prepared in a cold place.

* Lecture from the Course of the National Institute of Pharmacy.

The most common emulsifying agents, in the order of their general value, are:

Powdered Gum Acacia.—With the powdered gum contained in a capacious flat-bottomed wedgewood mortar the oil is gradually incorporated. To this one and a half times as much water as of gum is added at once, and the mixture rapidly triturated with a rotary motion of the pestle. Soon the mixture becomes stiff and assumes a milk-white color, the pestle-motion producing a characteristic "crackling" sound when the emulsification is complete. This so-called "mother-emulsion" may now be diluted to the required measure, and other substances, flavors, etc., be added.

The proportion of gum required varies with different oils, an oil rich in gum, such as castor oil, requiring less gum than an oil poor in natural gum, as cod-liver oil. The following proportions hardly ever fail to produce complete emulsification: Oil, 4 parts; gum, 2 parts; water, 3 parts. Whenever a lesser proportion of gum is used, water must be decreased in proportion, viz.: One and a half times as much water as of gum employed. The ethereal or volatile oils require a much larger proportion of gum than the fixed oils.

Powdered Tragacanth.—This may be used in the same way, or in the form of mucilage, but it does not produce as permanent emulsions as does gum acacia.

Mucilages of Acacia or of Irish Moss (N.F.).—These are not as satisfactory as powdered gum; while they produce good emulsions, the division of the oil-globules is not as thorough as in the preceding; emulsification being incomplete, the mixture more rapidly separates into a heavier, watery liquid and a lighter, thick gelatinous emulsion, which requires thorough mixing before use.

Extract of Malt.—Extract of malt is an excellent emulsifying agent, when its use is admissible. The oil should be added to the malt extract contained in a capacious mortar and incorporated in small quantities at the time. A good article will emulsify an equal volume of cod-liver oil.

Condensed Milk and Egg-yolk.—These produce the most perfect emulsions and also the most palatable, but they rapidly ferment and spoil.

Glycerin and sugar added to emulsions for the purpose of preservation and palatability induce separation, and their use is not advisable.

Emulsification by "intervention" is the best and only reliable method to be employed with ethereal oils and all substances of themselves not emulsifiable. It is illustrated in the official chloroform emulsion: Oil of turpentine, for example, is emulsified by dissolving the turpentine oil in twice its volume of a bland fixed oil (almond oil), incorporating an equal weight of powdered acacia, adding water and proceeding as with an ordinary emulsion.

Pancreatin.—Pancreatin emulsionizes

fats in preparing them for digestion, but it does not produce a permanent emulsion when used artificially. While, therefore, not a reliable emulsifying agent, it aids the assimilation of oils, and its addition to emulsions is sometimes therapeutically desirable, as it is only active in alkaline media, the emulsion should be prepared with a little sodium bicarbonate.

The addition of alkalis to emulsions should be avoided. Soaps are not emulsions; neither is the use of soap-bark to be recommended. — *Western Druggist*.

Chemistry for the Pharmacist.

By WM. B. THOMPSON.

There are many reasons why pharmacists, who seek avenues for the application of scientific knowledge, should make especial study of the chemistry of agriculture and the chemistry of soils. Soil analysis is wholly within the possibility of scientific investigation. In the growth of plants and trees, soil loses nothing appreciable of its ponderous material. The elementary substances which enter into it are exhausted by absorption and the processes of vegetable growth. Nature has, it is true, her own occult method of supplying these, but art is a most valuable factor in supplementing or aiding the operations of natural causes. Science has done much, and there is yet much to be done, and agriculture much needs the principles and theories of science applied to its practice. Themes for study are to be sought in determining the action of manures and other animal and mineral fertilizers—the terms or periods necessary for the proper recuperation in cleared and open lands, where the chemical elements are only to be derived from the air, artificial treatment not being feasible; the character of the subsoil as it affects top soil; the action of infiltration and absorption; the upward and downward movements of moisture. In cattle manures the important office of the saturating urines, which, by a species of fermentation, gradually develop the ammonias, these, in turn, combining with acids, and thus oxidation forms less volatile and more soluble salts. — *American Journal of Pharmacy*.

Should Doctors Dispense?

Under this heading a correspondent of the *Birmingham Daily Mail* says: "Such a monstrous state of things is not for a moment allowed on the continent, and why the English Government should allow a man the privilege of writing out death certificates, and yet at the same time sanction his dispensing the medicine for his patients, is beyond all conception. I would submit three important suggestions why doctors should not dispense, and these, I think, must appeal to any intelligent person as reasonable: (1) Their