THE USE OF SILICA GEL AS A FILTERING AGENT IN PHARMACY.

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The object of this paper is to give a brief description of the chemical nature and surface of silica gel and to point out wherein the pharmacist may take advantage of this excellent adsorbent.

Chemically, silica gel is a hydrated form of pure silica and offers extreme resistance to most reagents. The gel as it appears in commerce contains approximately 18 percent of water. The water content of different samples of silica gel is not always uniform, since on exposure to air at ordinary temperature it will give off or take up moisture, the degree of which depends upon the water content of the gel and the humidity of the atmosphere.

Silica gel possesses a honeycomb structure of an agglomeration of silica nuclei, which is equivalent to a great number of small capillary tubes of silica. Because of this surface arrangement, the gel possesses a tremendous amount of surface energy and is admirably adapted for use as an adsorbent for gases and colloidal impurities in liquids. Chemists have been using the gel for the clarification of oils and especially for the adsorption of such gases as carbon dioxide, ammonia and sulphur dioxide, the results of which have proved to be most successful.

With the above-mentioned chemists' view of silica gel, the writer carried out experiments using the gel in place of talc in official and other formulas. A sample of aromatic elixir was made by the Pharmacopoeial process using silica gel in place of talc and with one filtration a clear preparation was obtained. Another sample of the elixir was prepared without agitation and a clear elixir was obtained after two filtrations, which is quite impossible to obtain with talc under the same conditions.

In syrup of orange, which is possibly one of the most difficult preparations in the Pharmacopoeia to filter clear, a transparent liquid was obtained by the use of silica gel, after returning the first 25 cc of the filtrate to the filter in making a liter.

The official waters, prepared by trituration of the volatile oil with talc, can be filtered clear with one filtration if silica gel be used as the filtering agent. The finished water, in addition to being clear, is free from any foreign coloring matter and possesses as much of the aroma of the oil as an aromatic water made with talc.

The elixirs of the National Formulary can be filtered clear with one filtration by the use of silica gel. For example,—elixir of iron, quinine and strychnine; elixir of cinchona alkaloids, and elixir of cinchona alkaloids with iron or with pepsin can be rendered perfectly clear by means of silica gel. In each case, the quantity of silica gel necessary is about equal to the amount of talc prescribed in the formulas and the manipulation of the gel is identical with that of talc.

From the above experiments the writer has drawn the following conclusions:

1. Silica gel lends itself as a filtering agent because of the character of its surface.

2. In pharmaceutical preparations, silica gel is a more efficient filtering agent than talc.

3. In practically every type of formula in which talc is used as a filtering agent an equal quantity of silica gel may be substituted with more efficient results as to filtering.

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