The Manipulation of Gum Acacia to Form Permanent Emulsions.

BY W. H. WEARN.

Gum acacia has long been known as an emulsifying agent, and many methods have been prescribed for its manipulation in forming emulsions, all of which are known too well to require an explanation.

As an emulsifying agent, it is acknowledged by all to be a success, but unsatisfactory, because its emulsions do not remain permanent; the emulsified oil separating at an early date from the water used in its preparation. This fact, independent of the price of gum acacia, caused leading pharmacists to seek for other agents whose products would remain permanent; the prominent ones discovered being gum tragacanth and chondrous crispas, which have been advocated from time to time by various writers through the pharmaceutical press as preferable to gum acacia. Their principal features being formation of permanent emulsions unaffected by iron.

My experience with them, and others, has demonstrated that they are inferior to gum acacia, and, strictly speaking, do not emulify, as I will endeavor to show later. And that the non-permanence of emulsions formed with gum acacia is due to the construction and manipulation of their formula.

An emulsion is a product produced by mechanical manipulation, from an oil that is almost, if not entirely, insoluble, in Aqueous menstrua by the action of its emulsifying agent, which, by its solubility in water and inherent tenacity, first exerts its tenacious effect atom to atom of oil, which is intensified by the friction produced by continued trituration, breaking down the globules of pure oil and stretching them into the realm of solution, termed in pharmacy, emulsion. It is evident that the success of the product is dependent upon the tenacity and solubility of its agent in water.

In gum acacia we have an agent soluble in twice its weight of water, of very great tenacity: being dense in its nature it does not increase the consistency of the product beyond that of a thick liquid when used in its greatest proportion. With it I have been able to form a permanent emulsion by its use in the proper proportion and manipulation. That others may have the benefit of the result I have written this paper; its formula and manipulation being as follows: The excess of water usually separating in old formulas demonstrated the necessity of its being utilized by an increase in the amount of gum acacia and oil, forming a larger per cent. of emulsified oil per volume. This was tried with success, by the following formula and manipulations; using cod-liver oil, as being the oil most difficult to emulsify: *Oil 48 parts, gum acacia 24 parts, saech. alba 24 parts* and water 36 parts by weight. Saech. alba fortifies strength of acacia. This will furnish a product yielding 50 per cent. oil by volume; same formula applying to all oils.

Manipulations: Rub sugar and gum acacia up with just enough water to form a heavy tenacious paste, gradually adding the oil in fractional proportions, triturating vigorously then regularly until all the oil is incorporated, adding water at such intervals as the tenacity of emulsion seems to weaken, which is due to the oil being in great excess; always reserving 10 per cent. of water for last addition. The emulsion will not be formed at this stage, as will be the case of regular formulas and manipulations.

The manipulation consisting after this in allowing it to stand in the mortar long enough to allow gum acacia and emulsified oil to collect "en masse" again after each trituration, so that the gum and emulsified oil may renew the tenacity of their atoms, thereby enabling them to incorporate free oil each time, and stretching the emulsified oil into closer union. This process is slower, owing to the small amount of water used, especially where large quantities are prepared, but the product doubly repays for excess time in point of pharmaceutical elegance.

The emulsion when formed exhibits the united tenacity of its elements, by cracking with a loud noise when triturated, and as it runs from the pestle stretching itself in to a thread. It is of a beautiful cream-white color, and of semi-liquid consistency, and remains permanent. Strictly speaking, chondrous crispus and gum tragacanth are insoluble in water, and by virtue of their swelling properties simply occupy space instead of entering into solution, forming a jelly in a comparatively small portion of water, the inherent capacity of their cells being weak. Therefore, it cannot be expected that these elements could carry an associate into an element that they do not enter themselves. Oils emulsified by them form emulsions which are of gelatinous consistency and poor tenacity. The oil, strictly speaking, is simply forced into intercellular space and retained by minute tenacity of their swollen cells and their compact jelly formation, and are not emulsified.

ADULTERATION OF PHENACETIN.—Phenacetin is said to be adulterated with antifebrin sometimes. If that be so one can easily detect it by boiling 5 grs. of the sample in a drachm of water; cool and filter. Boil the filtrate with a little nitrate of potash and dilute nitric acid, then add a few drops of solution of nitrate or mercury, and boil again. If no red coloration appears antifebrin is either absent, or present in less proportion than 2 per cent.

MITES in flaxseed meal and ground mustard multiply rapidly, and render the meal unfit for use. H. David (*Bulletin Commerc.*) recommends the seeds of both, flax and mustard, be ground fresh for use. The mite is a species of *acaridæ, and is* known as Tyroglyphus siro. It is also met with upon cheese in company with another species.