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## NOTE ON CAPSICUMS.

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For many years pharmacists have appreciated the fact that different varieties of ginger vary in pungency and flavor, but that capsicums vary in the same way and to a much greater extent, seems to have escaped attention.

The pungent principle of Capsicum is capsaicin, a crystalline body which E. K. Nelson says is so hot that one drop of a solution 1 in 1,000,000—or less than one millionth of a grain—will make itself known to the tongue. He found one variety of capsicum to contain 0.14% of this principle.

H. C. Irish in a "Revision of the Genus Capsicum" describes 42 garden varieties and quotes authorities to the statement that the different varieties readily degenerate or change under cultivation or the lack of it. Hence the pungency of capsicum varies not only with the species, but with variations in growth or cultivation. Paprika, one of the mildest forms, has been grown quite free from capsaicin—in short, a non-peppery pepper. And while Tabasco by another name might be quite as hot, yet the Tabasco species may not always come up to its reputation.

In other words, the pharmacist cannot, by specifying a certain species of capsicum, be sure thereby of securing the most active medicinally. The best method of selection appears to be the physiological test—which will be referred to again below.

In commerce the greater demand for capsicum is as a condiment, and for the preparation of sauces, pickles, etc. In these a full rich flavor is desired as well as pungency. Supplies for such purposes are marketed as "Japan Chillies," "Zanzibar Chillies" and "Mombasso Chillies." Doubtless there are other brands, but these appear to be the leading ones. A limited number of tests on these three brands shows that Japan Chillies have a very rich and full flavor, but are not very pungent, as compared to the others. They command a higher price, and make a superior condiment. Zanzibar Chillies came next in pungency and flavor, and Mombasso Chillies are the most pungent and the poorest in flavor.

Physiological tests are tabooed in some quarters, yet when the tongue is sensitive to less than a millionth of a grain it certainly has an advantage over the analytical balance, which has a sensitiveness far below that, and since it is not necessary to compare different capsicums in terms of percentage of capsicum, when a direct ratio of drug to drug expresses all that is needed, the physiological test offers here a ready and satisfactory means of selecting capsicum.

The method I have used is as follows: One grain of ground capsicum is macerated over night in 100 cc. of alcohol. After thorough shaking, filtered. This alcoholic solution is then added to sweetened water in definite proportions until

a distinct but weak pungency is perceptible on the tongue.

By this method, Japan Chillies tested 1 in 20,000 to 1 in 30,000, Zanzibar Chillies 1 in 40,000 and 1 in 45,000 (two lots), and Mombassa Chillies 1 in 50,000 to 1 in 100,000. From a limited number of tests the Mombassa brand appears to be decidedly stronger in capsaicin. We have not had it under observation long enough to decide on a limit of acceptability that will represent the average of the drug, but there appears to be no trouble in obtaining it of a strength of 1 in 50,000 or above.

Oleoresin of capsicum may test 1 in 150,000 and upwards. When used as a rubefacient, flavor is of no consequence, but a high capsaicin content is desirable.

It may be of interest to state that commercial capsicums vary also in fat-content and color to a marked degree. Oleoresins were examined which contained as little as 5 per cent. of fat insoluble in alcohol, while others contained above 50 per cent., yet the more pungent oleoresin (based on the entire mixture) were those containing considerable fat. The fat in some instances was a marked green- quite free from red; in others it was orange and in others a deep red; no relation of color or fat to pungency could be observed.

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1. Journal Ind. and Eng. Chem., 1910, page 419.
2. Report M[issouri] Bot[anical] Gardens, 1898, page 53.

## DISCUSSION.

Mr. Beringer said that much fat would always be found in a well-developed fruit containing well-developed seeds, and that in the selection of capsicum we should avoid large matured fruits in which the seeds were fully developed.

Mr. Raubenheimer inquired of the author of the paper whether he had discovered any relation between the color of the ground capsicum and the finished tincture? In his experience he had not been able to discover any such relation. No matter what was the tint of the powdered drug the tincture always had a reddish color.

Mr. Eldred inquired if the quantity of fat in the oleoresin did not bear some relation to the pungency?

Mr. Scoville, in reply, stated that his work had begun as a study of the oleoresin, separating the fats insoluble in alcohol. He found the fats to vary from 5 to 50 percent. One containing 5 percent of fat was comparatively weak in pungency, those having the larger pods being more pungent, though he did not believe that this was due to their containing a large amount of fat; neither could he discover any relation between the pungency and the color of the capsicum.

The only test he had found to be satisfactory was the physiological test. He had examined a number of samples which tested 1 to 100,000.