

VARIATIONS IN NUX VOMICA AND ITS PREPARATIONS.\*

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One of the more important changes in the U. S. P. IX as compared to the former revision is that of the alkaloidal requirement for Nux Vomica and its assay process. The former requirement called for 1.25% strychnine and in its determination the well-known assay process was used in which the total alkaloids are extracted, the brucine destroyed, by means of nitric acid and the remaining alkaloid calculated as strychnine. In the U. S. P. IX the requirements are for 2.5% total alkaloids and the assay process is of course based on the simple extraction and titrating of all the alkaloids of Nux Vomica.

It was found by the author that a greater percentage of samples of Nux Vomica met the requirements of the new Pharmacopoeia than that of the old. In other words that 2.5% total alkaloids was a lower standard than 1.25% strychnine. In order to definitely determine this question a number of samples of powdered Nux Vomica were taken and assayed according to the U. S. P. IX for total alkaloids. After titrating the latter the solution was made alkaline with ammonia water, completely shaken out with chloroform, the latter evaporated and the residue taken up with 15 mils of 3% sulphuric acid. This solution was now treated with nitric acid to destroy the brucine and the assay completed as described in the U. S. P. VIII, for the determination of strychnine. This data so obtained gave the total alkaloidal content, the percentage of brucine and that of strychnine in Nux Vomica, it being taken for granted that the other alkaloids present appear in so small a quantity as to justify their not being considered. The results obtained were as follows:

Sample.	POWDERED NUX VOMICA		Strychnine. Method U. S. P. VIII.	Brucine. by difference.
	U. S. P. VIII = 1.25% STRYCHNINE.	U. S. P. IX = 2.5% TOTAL ALKALOIDS.		
	Total alkaloid. Method U. S. P. IX.			
A.....	2.64%		0.88%	1.76%
B.....	2.93		1.32	1.61
C.....	2.52		0.73	1.79
D.....	1.92		0.73	1.19
E.....	2.97		1.54	1.43
F.....	3.21		1.25	1.96
G.....	2.71		1.30	1.41
H.....	3.53		1.30	2.23
I.....	2.38		1.26	1.12

A number of interesting points may be obtained by studying these results. Of the nine samples all but two would come up to the requirements of the U. S. P. IX while three would not meet those of the U. S. P. VIII. Samples A and C would pass U. S. P. IX but not U. S. P. VIII. Sample D would pass neither the old nor the new requirements while Sample I would pass the U. S. P. VIII and not IX. There therefore seems to be absolutely no relation between the percentage of total alkaloid and that of strychnine. The percentage of strychnine in the total alkaloid varies from 33 to 53%.

Samples of fluidextract and tincture of Nux Vomica were now taken at random and assayed in similar manner as before described, first in accordance with the

\* Read before New Jersey Pharmaceutical Association, 1918 meeting.

U. S. P. IX to determine total alkaloid after titration was shaken out with chloroform and the strychnine determined according to the U. S. P. VIII with the following results:

FLUIDEXTRACT { U. S. P. VIII = 1% STRYCHNINE.  
U. S. P. IX = 2.37-2.63% TOTAL ALKALOIDS.

Sample.	Total alkaloid. Method U. S. P. IX.	Strychnine. Method U. S. P. VIII.	Brucine by difference.
A.....	2.46%	0.79%	1.67%
B.....	2.64	1.27	1.37
C.....	2.51	1.03	1.48
D.....	2.39	0.91	1.48
E.....	2.41	1.21	1.20
F.....	2.48	0.77	1.71

EXTRACT { U. S. P. VIII = 5% STRYCHNINE.  
U. S. P. IX = 15.2-16.8% TOTAL ALKALOIDS.

Sample.	Total alkaloid. Method U. S. P. IX.	Strychnine. Method U. S. P. VIII.	Brucine by difference.
A.....	15.41%	4.93%	10.48%
B.....	16.32	6.69	9.63
C.....	14.89	5.21	9.68
D.....	17.1	8.21	8.89
E.....	15.61	6.71	8.9
F.....	16.45	6.01	10.44

TINCTURE { U. S. P. VIII = 0.1% STRYCHNINE.  
U. S. P. IX = 0.237-0.263% TOTAL ALKALOIDS.

Sample.	Total alkaloid. Method U. S. P. IX.	Strychnine. Method U. S. P. VIII.	Brucine by difference.
A.....	0.241%	0.111%	0.130%
B.....	0.271	0.084	0.187
C.....	0.213	0.079	0.134
D.....	0.224	0.114	0.110
E.....	0.251	0.080	0.171
F.....	0.249	0.102	0.147

Again the results show that there is absolutely no relation between the percentage of total alkaloid and that of strychnine and some of the samples while meeting the requirements of our present Pharmacopoeia show a decided deficiency in strychnine content as required by the U. S. P. VIII.

The question therefore suggests itself whether it would not be better to have both a requirement for total alkaloid and for strychnine. Considering the results obtained from the powdered Nux Vomica, Sample C contained 2.52% total alkaloid and yet is of decidedly inferior quality since it only contains 0.73% strychnine. On the other hand Sample I contains 1.26% strychnine but only 2.38% of total alkaloids therefore also of inferior quality. In the opinion of the author no difficulty would be had in obtaining Nux Vomica on the market, which contains at least 2.5% total alkaloids and 1.25% of strychnine. The combination assay process as suggested before could be used thereby requiring only one sample for the entire assay and making it a little more difficult and complex than the assay of the U. S. P. IX.