

and 24" × 8" for the rose-end chips. The weights of the 40 normal and 60 chip seeds sown on August 7, 1944, were 11.6 ozs. and 4.56 ozs. respectively. The germination of the normal seeds was 90 per cent. and of the chips, 96 per cent. The difference is not statistically significant. The nature of the vegetative growth of the plants from normal and chip seeds was similar. The tubers were lifted on December 26, 1944, and the yield obtained from 37 surviving normal plants was 14 lbs. 14 ozs., and from 57 chip plants, 13 lbs. 15 ozs. The difference in yield observed is not statistically significant.

The results of Experiments 5 and 6 indicate that yield similar to that obtained from normal seeds of 'Majestic' and Patna variety of potatoes can be obtained under similar cultural conditions when rose-end chips are used for seeds but sown with closer spacings. The average saving of potato tuber material when chips are used for seed purposes is very appreciable, being 85 to 88 per cent. in case of 'Majestic' and about 60 per cent. in case of small Patna variety. The utilisation of the tuber material saved can best be achieved by the setting up of dehydration plants or industrial units in the potato-growing areas.

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LIESEGANG PHENOMENON IN RUBBER LATEX

A NEW case of Liesegang rings formation has been observed during coagulation of rubber latex in our investigation of the properties of rubber latex.

Rubber latex (ammonia-preserved) having a dry rubber content of about 30 per cent., and an ammonia content of about 0.5 per cent., was spread as a thin film on a glass plate. One drop of zinc chloride solution (15 per cent.) was placed at the centre of the film, and the plate was then kept covered. After some time (about 10 to 12 hours) the development of characteristic concentric rings was observed. With stronger solutions of zinc chloride a multitude of microscopic rings, very closely spaced, was observed. This is analogous to the 'Secondary rings' reported by Möeller¹ and also by Schleussner.² Other salt solutions such as zinc sulphate, magnesium chloride, magnesium sulphate, cadmium chloride and barium chloride were also found to give similar ring systems.

The same type of periodic phenomenon was observed when a narrow glass tube containing

rubber latex was kept dipping in a solution of any of the above-mentioned salts. In these experiments definite bands of precipitate were not formed, but the coagulum consisted of an undulatory filament of a 'crimped' structure. The distance between successive peaks of the "wave" could easily be measured by means of a cathetometer. This observation is analogous to the results obtained by Hedges³ in his experiments on periodic structures caused by coagulation of arsenious sulphide sol by ferric chloride in the absence of any gel medium.

Further work in this line is in progress.

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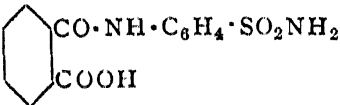
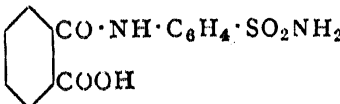
A SIMPLE METHOD OF PREPARATION OF N⁴-SUBSTITUTED DISULPHANILAMIDO-DERIVATIVES OF SOME DIBASIC ACIDS

N⁴-ACYL derivatives of sulphanilamide derived from dibasic acids have recently been prepared by a few workers by indirect methods^{1,2,3,4} and in a few cases by the reaction of the appropriate dibasic acid,⁵ the ester,⁶ acid chloride,^{4,5,6,7} anhydride^{8,9} or amide⁴ with sulphanilamide. Excepting the work of Bergmann and Haskelberg⁷ there is no mention in the previous work of the formation of any disulphanilamido derivatives.

There appeared to be no reason, however, why a direct fusion of sulphanilamide with the common dibasic acids or their derivatives should not form such di-derivatives. This note summarises the results of the successful application of this simple method to the preparation of the di- as well as monosulphanilamido derivatives of the dibasic acids and their derivatives tabulated below:

The apparatus used in all these condensations was a hard-glass test tube fitted with an air-condenser, carrying a calcium chloride guard tube, and heated in an oil-bath till no more water, alcohol or ammonia as the case may be, was evolved. The products of the reaction were usually worked up by treatment with dilute hydrochloric acid to remove unchanged sulphanilamide, and purified either by solution in dilute sodium hydroxide and reprecipitation by dilute hydrochloric acid or by crystallisation from water or alcohol.

A rather interesting complexity in these reactions is the further condensation of the oxalyl disulphanilamide with an additional molecule of methyl oxalate. This compound has been analysed for its methoxy content and equivalent. In addition, the products of its hydrolysis have been identified to be oxalic acid and N⁴N^{4'}-oxalyl-disulphanilamide.

Sulphanilamide (2 moles) + Dibasic acid or its derivative	Temp. and time of fusion	Products isolated	M.P. in °C.	Yield %	Percentage of Nitrogen	
					Calcd.	Found
Urea (1 mole)	160° for 6 hrs.	$\begin{array}{l} \text{CO} \begin{array}{l} \diagup \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \\ \diagdown \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \end{array} \end{array}$	290° (decomp)	71	15.13	15.06
Oxalic acid (1 mole)	160° for 2 hrs.	$\begin{array}{l} \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \\ \\ \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \end{array}$	above 330°	60	14.07	13.83
Methyl oxalate (1 mole)	130° for 1½ hrs.	$\begin{array}{l} \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \\ \\ \text{CO} \cdot \text{N} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \\ \\ \text{CO} \cdot \text{COOC}_2\text{H}_5 \end{array}$	255° (decomp)	60	11.57, methoxy 6.40 equivt. 242	11.41 5.84 226
Ethyl malonate (1 mole)	160° for 3½ hrs.	$\begin{array}{l} \text{CH}_2 \begin{array}{l} \diagup \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \\ \diagdown \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \end{array} \end{array}$	272° (decomp)	70	13.59	13.43
Malonic acid (1 mole)	125-130° for 6 hrs.	(1) $\text{CH}_3\text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2$ (2) $\begin{array}{l} \text{CH}_2 \begin{array}{l} \diagup \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \\ \diagdown \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \end{array} \end{array}$	211-12° 272° (decomp)	20 5		
Succinic acid (1 mole)	150-160° for 4 hrs.	$\begin{array}{l} \text{CH}_2 \cdot \text{CO} \\ \\ \text{CH}_2 \cdot \text{CO} \end{array} \begin{array}{l} \diagup \\ \diagdown \end{array} \text{N} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2$	281-82° (decomp)	75	11.02	11.32
Ethyl succinate (1 mole)	No reaction					
Succinic anhydride (2 moles)	170° for 12 hrs.	$\begin{array}{l} \text{CH}_2 \cdot \text{CO} \\ \\ \text{CH}_2 \cdot \text{CO} \end{array} \begin{array}{l} \diagup \\ \diagdown \end{array} \text{N} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2$	284-85° (decomp)	94	11.02	10.83
Glutaric acid (1 mole)	140-160° for 8 hrs.	$\begin{array}{l} \text{CH}_2 \begin{array}{l} \diagup \text{CH}_2 \cdot \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \\ \diagdown \text{CH}_2 \cdot \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \end{array} \end{array}$	257° (decomp)	73	12.73	12.22
Adipic acid (1 mole)	150-170° for 5 hrs.	(1) $\begin{array}{l} \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \\ \\ \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \end{array}$ (2) $\begin{array}{l} \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CO} \cdot \text{NH} \cdot \text{C}_6\text{H}_4 \cdot \text{SO}_2\text{NH}_2 \\ \\ \text{CH}_2 \cdot \text{CH}_2 \cdot \text{COOH} \end{array}$	287° (decomp) 178-79°	61 10	12.33 9.33 equivt. 302	11.85 9.14 300
Phthalic acid (1 mole)	170-200° for 8 hrs.		322°	89	8.75 equivt. 320	8.59 312
Phthalic anhydride (2 moles)	170-200° for 30 hr.		324°	89	8.75 equivt. 320	8.71 312

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