

heat-treated soya bean meal would lead to the conclusion that, apart from the tryptic inhibitor, there are other factors which modify the nutritive value of soya bean protein.

There was the possibility of the existence in raw soya beans of toxic substances acting as anti-growth factors and which are destroyed by heat. The experiments of Osborne *et al.*¹¹ and Hayward⁵ showed that raw soya bean did not contain any toxic factor soluble in fat solvents. Experiments were carried out in this laboratory to see whether the saponins or other water-soluble factors present in soya bean acted as toxic factors, but it was found that extraction with 70 per cent. alcohol or dialysis of the soya bean meal did not raise the growth-promoting value of the protein. These results lead to the conclusion that it is rather unlikely that soya bean would contain any toxic or growth-retarding factors.

The probable explanation that can be provisionally offered for the increase in nutritive value of soya bean protein by heat treatment is, therefore, in terms of a structural alteration of the protein. The experiments of Julian *et al.*¹² have led them to a similar conclusion.

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STUDIES IN ANTIMALARIALS SOME N¹-(8-QUINOLYL)-N⁵-PHENYL- BIGUANIDES

ANTIMALARIALS of the amino-quinoline series^{1,2,3} have been attaining great importance in view of their value in treating the various types of malaria. Plasmochin,⁴ Pentaquin,² Aralen⁵, all derivatives of amino-quinoline, exert definite curative and prophylactic action against malaria. Plasmochin, however, suffers from the disadvantage of being excessively toxic.⁶

In an effort to find out a better antimalarial, innumerable derivatives of amino-quinoline are, now-a-days, being prepared and their activity against malaria studied. The quest for an ideal antimalarial by Curd and Rose and their collaborators⁷ resulted in the discovery of 'Palu-

drine',⁸ a biguanide derivative, which is the least toxic and most potent of all existing antimalarials. With a view to combining the beneficial qualities of both these types of compounds, several derivatives of the quinolyl-biguanide, type (I), have now been synthesised.

The compounds were obtained by condensing 8-amino-quinoline hydrochloride with the appropriate aryl-cyano-guanidine in alcoholic or dioxane medium by refluxing for 8-12 hours. After treatment of the reaction mixture with dilute alkali solution the base was separated and purified. The hydrochloride or the acetate, as the case may be, of the base was prepared and characterised. While the hydrochlorides contain either two or three molecules of hydrochloric acid and one or two molecules of water of crystallisation, the acetates contain only one molecule of acetic acid and no water of crystallisation.

The compounds and their physical properties are given in Table I.

Type I

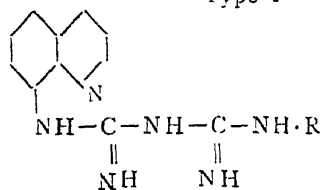


TABLE I
N¹-(8-Quinolyl)-N⁵-R-biguanides

No.	R	M.P. of base °C.	Salt	M.P. of salt °C.
1	Phenyl-	190(d)	3HCl, H ₂ O	183(d)
2	<i>p</i> -Tolyl-	190-91(d)	2HCl, H ₂ O	196(d)
3	<i>p</i> -Anisyl-	179(d)	3HCl, H ₂ O	168(d)
4	<i>p</i> -NO ₂ -phenyl-	188-89(d)	2HCl, 2H ₂ O	238(d)
5	<i>p</i> -AcNH-phenyl-	250(d)	CH ₃ COOH	237-38(d)
6	<i>p</i> -NH ₂ -phenyl-		CH ₃ COOH	151-52
7	<i>p</i> -Cl-phenyl-	191-92(d)	CH ₃ COOH	204-205(d)
8	<i>p</i> -Br-phenyl-	204-205(d)	CH ₃ COOH	212-13(d)
9	<i>p</i> -I-phenyl-	239(d)	CH ₃ COOH	213-14(d)

Full details will be published elsewhere.

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