

ISOLATION OF PROTEINS FROM COTTONSEED MEAL.

IV. CONTENT OF GOSSYPOL IN THE PROTEINS OBTAINED BY SALT EXTRACTION

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We have previously investigated the influence of the conditions of defatting cotton seeds on the yield of protein [1]. We have now determined the amounts of gossypol in the proteins obtained in the salt method [2] (Table 1).

It can be seen from Table 1 that bound gossypol is practically absent from the proteins, while the free gossypol is partially concentrated in them in the process of their isolation. In order to confirm these results, we have studied the dependence of the solubility of gossypol on the pH of the medium in the absence and in the presence of protein. For this purpose, a freshly prepared 0.1% solution of gossypol in water (pH 10) was acidified to a predetermined pH, the precipitate was separated by centrifuging, and the amount of gossypol in the solution was determined from the absorption at 390 nm [3], using a calibration graph. Similar determinations were performed with a 1% solution of globulin obtained as described previously [2] and not containing free gossypol. In addition to this gossypol was also found in the precipitates formed on acidification. In both cases the same relationship was found: the solubility of gossypol in neutral and acid solutions fell sharply to 2-3%, both in the absence and in the presence of protein.

The gossypol precipitated with the proteins on acidification of the extract can be par-

TABLE 1

Meal and protein	Yield of protein, %	Gossypol, % [2]		
		total	free	bound
Aqueous acetone meal		0,16	0,08	0,08
Protein extraction with:				
a) 10% NaCl, pH 7.5	25	0,04	0,02	0,02
b) 10% NH ₄ Cl	25	0,08	0,04	0,04
Factory meal		1,24	0,08	1,16
Protein extracted with:				
a) 10% NaCl, pH 7.5	13	0,04	0,02(0,01) †	0,02
b) 01% NH ₄ Cl	13	0,08	0,63(0,01) †	0,05
c) 10% CH ₃ COONa	10	0,05	0,02	0,03

* Single extraction (1 : 10) at room temperature; the pH of 8.5 on extraction with 10% NaCl was changed to 7.5 to decrease the amount of gossypol bound to the alkali-soluble fraction according to method [2].

† After washing the meal with 70% aqueous acetone.

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tially removed by washing the protein with solvents (acetone, ethanol). When factory meal was washed with 70% acetone before the extraction of the protein, the amount of gossypol in the protein also fell by a factor of 2-3 (see Table 1).

Thus, in the food protein isolated from factory meal by salt extraction and freeze-dried there is practically no bound gossypol, and the free gossypol can be eliminated by solvent washing of the protein or the meal (before extraction).

LITERATURE CITED

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