(4) The destructive actions of H_2O_2 on carotene were estimated and that the ratio of destruction increases in accordance with the concentration of H_2O_2 was observed.

(5) The effects of tannins were examined when H_2O_2 was added to the carotene solution as promoting agent for its decomposition.

(6) The antioxidative ability of tannin was examined, when sweet potato-juice was added to the carotene solution on which the enzyme influencing the decomposition of carotene was made to act. In this test, tannin was always recognized as effective.

(7) The influence of temperature on the stability of carotene solution was very eminent.

(8) In carotene-sweet potato there existed together with carotene some substances that prevented its oxidation. They were principally consists of sweet potato-tannin.

(9) As the important components that prevent the oxidation of carotene, the existence of ortho hydroxy compounds such as chlorogenic acid or coffeic acid etc. in the sweet potato-tannin may not be overlooked.

VI. On the Constitution of Sweet Potato-tannin

Kôtaro NISHIDA, Akira KOBAYASHI and Kazuko YAMAMOTO

The authors pointed out in the foregoing reports, the sweet potato-tannin as the substances which exist in sweet potato together with carotene and prevent its oxidation. On the constitution of this tannin, however, there has been reported scarcely any study.

Ose *et al.*[56] reported that the sweet potato-tannin was assumed to be grouped in the catechol tannin, since several qualitative reactions on it showed that of catechol tannin, being excepted the HCl-formaldehyde reaction. For the study on the constitution of the sweet potato-tannin, the authors adopted the paper chromatography on the potash fusion products of it. Paper chromatography is recently becoming to be applied also in the field of tannin investigations,[58)~62)] and among them Asquith,[61)] using new solvents, solved difficulties in the paper chromatography of the simpler phenols.

Experiments and results

a) Potash fusion of sweet potato-tannin: Potash fusion of sweet potato-tannin was executed after the manner which the authors had

Table 25.

The Rf values of sweet potato-tannin and potash fusion products of it

	Phenol (water 20% added)	Phenol-acetic acid-water (20 : 2 : 3)
Sweet potato-tannin	Greyish 0.45 Purple	0.66 Grey
KOH-fused tannin	Greyish 0.10 Purple 0.25 Greenish Purple	0.54 Purple 0.66 Greyish
Protocatechuic acid	0.22 Purple	0.54 Purple

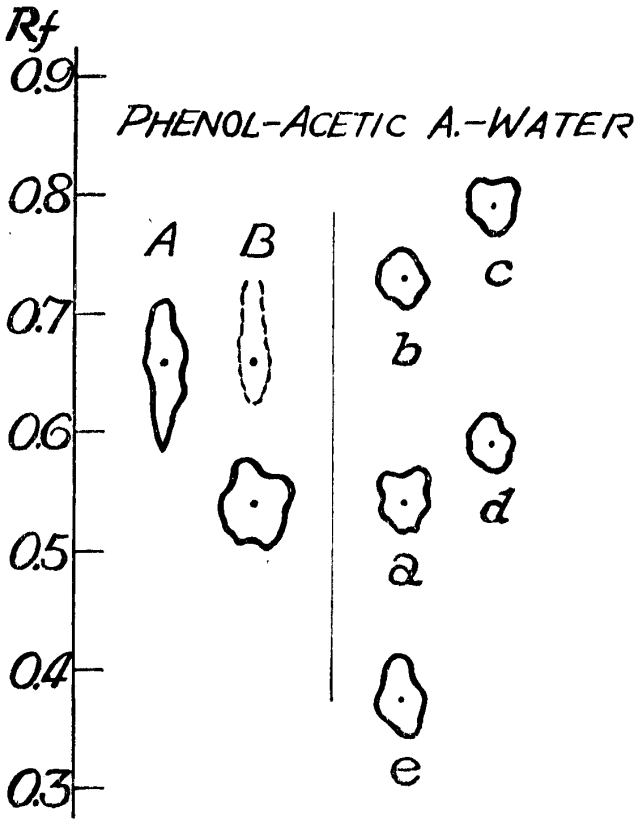

Fig. 5. Chromatogram with phenol-acetic acid-water (20 : 2 : 3)

		color with $FeCl_3$
A:	sweet potato-tannin	grey
B:	potash fused tannin	purple
a :	protocatechuic acid	purple
b :	resorcinol	yellowish brown
c :	pyrocatechol	greenish black
d :	pyrogallol	brown
e :	phloroglucinol	brownish purple

practiced on another tannin.[63] That is, 500 mg. of sweet potato-tannin, 1.5 gm. of KOH and 0.5 cc. of water were put into a platinum crucible, and after digested for 30 minutes, dissolved in water. The precipitate neutralized with dil.-H_2SO_4 to slightly acidic was filtered off. The filtrate was condensed under vacuum, from which K_2SO_4 separated was removed. The mother liquor (gave blue purple coloration with $FeCl_3$) was continuously extracted with ether for 12 hrs. The extract free from ether was dissolved in 2 cc. of ethanol and was used as the sample solution for paper chromatography.

b) Paper chromatography:

i) Method: One-dimensional ascending process was adopted with the use of Tôyô No. 2 filter paper (2×40 cm.). As the developing solvents, phenol to which respectively water by 20 wt. % of it; and gracial acetic acid[61] by 10 wt. % and water by 15 wt. % were added, was used. After the chromatograms were dried thoroughly, the slightly appeared spots were sprayed with 1% $FeCl_3$ solution and confirmed as colored spots.

ii) Results: The spots observed in the consequence of paper chromatography on the sweet potato-tannin and potash fusion products of the tannin are shown in Table 25 and Fig. 5.

Discussion

Two spots were certificated in the potash fused tannin in the case developed with phenol, and one of them was assumed to be due to protocatechuic acid. It was identified with addition of authentic specimen and being enhanced intensity of this spot. Another spot, being not fully confirmed because of its very small quantity, differed from the spots of several polyphenols such as pyrocatechol, resorcinol, phloroglucinol, and pyrogallol.

Summary

(1) The sweet potato-tannin was potash fused and this fusion products were paper chromatographically studied.

(2) Being identified in the chromatogram, protocatechuic acid was presumed to be a constituent of sweet potato-tannin.

(3) For further details, the authors are continuously studying.

Acknowledgement:—The authors express their appreciation for having had every year from the Educational Ministry the Grants for Scientific Research in the execution of these studies.