

hoof whether it was treated with alkali or not. In the present paper, I isolated three isomers of cystathionine from the native part of the hoof. They are respectively hexagonal, needleshaped, and amorphous.

The yields of cystathionine from the wall-part of the hoof are 1.82% of hexagonal crystal, 0.57% of needle-shaped crystal, and 2.12% of amorphous form, and from the sole-part, 0.44% of hexagonal crystal, 0.32% of needle-crystal, and 0.92% of amorphous form.

The hexagonal crystal is nearly insoluble in water, its melting point being 231-233°, and  $[\alpha]_D^{22} = -7 \pm 10$ . The needle-shaped crystal and amorphous form are sparingly soluble, both melting points being 215°, while  $[\alpha]_D^{22} = -5 \pm 1$  in the amorphous form and  $-3 \pm 1$  in the needleshaped crystal.

From the values of the rotatory powers, the hexagonal crystal appears to be a native constituent of the horse-hoof, but the other two forms seem to be partly racemized by heating and ammonia-treating during the process of isolation.

### 32. Studies on the Alcoholization of Cellulose Materials. (VI)

On the Spent-wash of the Fermentation-Mash of the Saccharified Solution of Wood. (Part 1)

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The spent wash (pH 5.5), the distillery waste liquor of the alcohol solution obtained from the saccharified solution of Mulberry-tree, contained 2.0434 g organic matters, 0.9931 g reducing sugars (as glucose), 0.4700 g pentose and 0.0842 g total nitrogen in its 100 cc.

In order to verify the availability of these constituents to yeast, some experiments were carried out on the spent wash added by Reader's nutrients, with three strains of pentose-assimilation yeast isolated by us and with *Torula utilis* previously acclimatized to pentose. During 120 hours ordinary culture, 1/3 parts of reducing sugars including more than 2/3 parts of pentose were consumed. It is pointed out that small amount of organic matters other than sugars were assimilated, and any noticeable toxic substance was never detected.

In case of shaking-culture, the amount of remaining sugar and the yield of yeast were measured on 12, 18, 24 and 36 hours incubations. The yield of yeast, especially newly isolated yeast No. 107, attained to a maximum on 24 hours culture, when 41~46%, 30% and 75% yields of yeast were observed for the organic matters, total nitrogen and pentose respectively.

The chemical compositions of the yeast thus obtained (7~9% ash, 43~47% crude protein) were found to be similar to those of the yeast obtained from the spent washes of ordinary wood or pulp waste liquor.