than that of crude fiber, or of nitrogen free extract, yet bearing nearly a constant ratio between them.

3. The digestibility of xylan, isolated from rice straw, varied remarkably as the kind of animals used. The rabbit digested 78.9% of xylan, the albino rat 33.1% of it, and the guinea pig 62.9% of it. In the case of potato starch, however, the rabbit digested 83.6%, and the albino rat 86.2% of it.

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- (8) Do. Do. Vol. 8, 90 (1932).

MISSPRINT CORRECTED.

- 1. First report of this investigation (this journal. Vol. 7, p. 35, 1931.).
14th line; 3029 calories, should be corrected to read as, 2552 calories.
- 2. Second report (this journal. Vol. 7, p. 41, 1931).
8~9th line; by 0.1%, 8~10 hours, should be corrected to read as, by 0.01%, 8~18 hours.

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On the Alcoholic Fermentation of the Amino-acids. Part I.

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It has been shown by F. Ehrlich in a series of famous researches that the alcohols contained in fusel oil come from the amino-acids which are formed by the hydrolysis of the proteins. But little is known about the fermentation products derived from some of the simpler amino-acids, especially of the normal type. Also it has not yet been clear about the origin of normal propyl alcohol though it is thought to be one of the usual constituents of fusel oil.

The author found with vanilline- H_2SO_4 reagent⁽¹⁾ that there was some

production of fusel oil in the fermented, modified Hayduck solution in which several amino-acids were used in place of asparagine; the quantity of produced fusel oil was ca. 0.03~0.1% when glycocoll, *d*-alanine, *d*-*l*-alanine, *d*-*l*- α -amino-*n*-butyric acid, *l*-leucine, *d*-*l*-leucine, *d*-*l*-valine and *d*-*l*-*n*-valine were used, while trace in cases of glutamic acid, asparagine, ammonium-phosphate, ammonium-sulphate, yeast-juice and sugar alone.

Vigorous fermentations were observed in cases of alanine, leucine, Am.-phosphate, Am.-sulphate, glutamic acid and asparagine, while glycocoll and valine were proved to be inadequate nitrogen nutriment for yeast, the last substance being the most inferior. The less the yeast inoculated is, the more fusel oil is obtained. Thus it is supposed that if the yeast is too much inoculated, the sugar may be consumed so quickly that no complete decomposition of amino-acid is expected.

Experimental.

1. Fusel oil produced by saké-yeast in the modified Hayduck solutions in which several amino-acids etc. were used in place of asparagine. Fusel oil was estimated with vanilline- H_2SO_4 reagent colorimetrically.

N-nutriments		Age of culture	Yeast	Products		
				Alcohol	Fusel oil	Total acid
Glycine	0.284%	8 days	1 platinum ear	3.85%	0.07%	0.2006
<i>d</i> -alanine	0.337%	6	"	4.75	0.07	0.1770
Asparagine	0.25%	6	"	4.85	0.02	0.1652
Glutamic acid-Na	0.64%	6	"	3.65	0.02	0.2596
Am-phosphate	0.25%	6	"	2.65	0	0.2360
Am-sulphate	0.5 %	6	"	4.85	0	0.3068
Sugar alone		7	bulk of a pea	1.975	0.003	
<i>r</i> -alanine	0.4%	6	1 platinum ear	5.4	0.10	
<i>r</i> -aminobutyric acid	0.4%	7	3 platinum ears	5.35	0.12	
<i>r</i> -valine	0.35%	18	bulk of a pea	4.5	0.035	
<i>r-n</i> -valine	0.34%	10	"	5.5	0.020	
<i>l</i> -leucine	0.34%	6	1 platinum ear	5.0	0.08	
<i>r</i> -leucine	0.34%	6	"	5.0	0.07	
Yeast water*		6	"	5.0	0	
" with cells		6	"	4.6	0	

* 5 g. of the dried saké-yeast is boiled with 100 c.c. of water for 1 h. and then divided into two parts.

2. The relation between yeast quantity and fusel oil formation.

N-nutrient		Age of culturs	Yeast	Products	
				Alcohol	Fusel oil
<i>r</i> -alanine	0.4%	7	1 platinum ear	4.3%	0.050%
"	"	4	3 peas of yeast mud	4.3	0.007
<i>l</i> -leucine	0.5%	7	1 platinum ear	4.3	0.075
"	"	4	3 peas of yeast mud	4.4	0.030

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On the Alcoholic Fermentation of the Amino-acids. Part II.

Alanine,

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F. Ehrlich obtained *l*-alanine from *r*-alanine when the latter was fermented with the sugar by yeast but did not described any volatile products⁽¹⁾. In that case O. E. Ashdown and J. T. Hewitt perceived that there was some increase of acetaldehyde formation⁽²⁾ which was now proved to be an ordinary phenomena—that is to say, contrary to their observation the acetaldehyde was not derived from alanine but from alcohol by means of secondary oxidation when yeast came in contact long with the fermented liquid after the alcoholic fermentation⁽³⁾. Though the aldehydes such as isobutylaldehyde or isovaleraldehyde have often been found in crude spirit and regarded as the intermediate product from amino-acid to higher alcohol in the so-called alcoholic fermentation of amino-acid, they come actually from the amino-acids by the reaction between amino-acid and sugar in the extractives when heating or distillation is carried out⁽⁴⁾. If alanine be also attacked by yeast according to Ehrlich's view, ethyl alcohol must be the resultant fermentation product. Now the modified Hayduck solution with pure *r*-alanine synthesized from pure ethyl alcohol in place of asparagine was fermented by saké or distillery yeast and the distillate containing some higher alcohols was obtained. Fusel oil fraction which boils over 100° consists mainly of isobutyl-alcohol and the smaller quantity of amyl alcohol. Thus if alanine be the mother substance