Sirs:

In the course of a survey of the nutritional requirements of certain lactobacilli, an organism\(^1\) was encountered which failed to grow in a medium containing all of the known nutritional essentials for lactic acid bacteria plus glucose and added yeast extract. Heavy growth occurred in 16 to 24 hours when whey was added. Investigation showed the effective constituent of whey to be lactose. The growth response to added lactose in the presence and absence of glucose is shown in the table. In the presence of small amounts of lactose, glucose enhances growth, although glucose

\[
\begin{array}{|c|c|c|c|c|}
\hline
\text{Additions per 10 cc. medium* lactose} & \text{Culture turbidity} & \text{Additions per 10 cc. medium*} & \text{Culture turbidity} \\
\hline
\text{mg.} & \text{per cent incident light transmitted} & \text{Lactose} & \text{Glucose} & \text{per cent incident light transmitted} \\
\hline
0 & 96 & 0 & 100 & 96 \\
10 & 82 & 10 & 100 & 73 \\
20 & 67 & 50 & 100 & 56 \\
50 & 49 & 100 & 100 & 46 \\
100 & 44 & 100 & 100 & 44 \\
\hline
\end{array}
\]

* The basal medium contained, per 10 cc., tryptic casein digest,\(\dagger\) 50 mg.; asparagine, 1 mg.; cystine, 1 mg.; adenine, guanine, and uracil, 100 \(\gamma\) each; pyridoxal, thiamine, and \(p\)-aminobenzoic acid, 1 \(\gamma\) each; calcium pantothenate, riboflavin, and niacin, 2 \(\gamma\) each; folic acid, 0.05 \(\gamma\); biotin, 0.01 \(\gamma\); Salts A and B,\(\ddagger\) 0.05 cc. each; sodium acetate, 60 mg.; Tween 80,\(\S\) 10 mg.; and Difco yeast extract, 10 mg. 1 mg. of cysteine hydrochloride was added just before autoclaving. Autoclaved 6 minutes at 15 pounds pressure. Cooled and inoculated immediately. Incubated at 37° for 40 hours.


\(\S\) A non-toxic source of fatty acids; see Dubos, R. J., Proc. Soc. Exp. Biol. and Mod., 58, 301 (1945); 63, 56 (1946).

\(^*\) Supported in part by grants from Merck and Company, Inc., and the Research Fund of the University. Published with the approval of the Director of the Wisconsin Agricultural Experiment Station.

\(^1\) This organism was originally isolated from cow's milk, and has been carried since isolation (about 10 years) by monthly transfer in litmus milk containing calcium carbonate. Its general characteristics resemble those of Lactobacillus bulgaricus; closer examination may necessitate a change in species designation. We are indebted to Professor W. B. Sarles for a culture of the organism.
alone does not permit growth under the conditions used. A commercial sample of galactose was less than 3 per cent as active as lactose. Crude lactose, several times recrystallized lactose, and commercial β-lactose were equally effective, showing that the effect was not due to an impurity.

It has been assumed quite generally that only monosaccharides were directly fermented, while compound sugars were fermented only after preliminary hydrolysis to their component monosaccharides. These conclusions have been questioned by various investigators working with yeast, but until recently no convincing evidence to the contrary has been presented. Recently, however, Myrbäck and Vasseur have demonstrated that some yeasts (e.g. Saccharomyces fragilis and Torula lactosa) ferment lactose more rapidly than equimolecular mixtures of glucose and galactose. In no previous instance, however, have differences of the magnitude shown above been observed, nor has the phenomenon been previously observed with bacteria. The organism is being studied further.

Department of Biochemistry
College of Agriculture
University of Wisconsin
Madison

E. Hoff-Jørgensen
William L. Williams
Esmond E. Snell

Received for publication, March 21, 1947

3 Rockefeller Foundation Fellow.
PREFERENTIAL UTILIZATION OF LACTOSE BY A STRAIN OF LACTOBACILLUS BULGARICUS
E. Hoff-Jørgensen, William L. Williams and Esmond E. Snell


Access the most updated version of this article at http://www.jbc.org/content/168/2/773.citation

Alerts:
- When this article is cited
- When a correction for this article is posted

Click here to choose from all of JBC's e-mail alerts

This article cites 0 references, 0 of which can be accessed free at http://www.jbc.org/content/168/2/773.citation.full.html#ref-list-1