109. On a New Species of Cellulose Decomposing Bacteria, Cellvibrio calida n. sp.

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In the course of our investigation on the cellulose decomposing bacteria in the soil at this institute, an organism of the following description was isolated from the dry-farm soil and was identified as a new species so that it is proposed to name it, Cellvibrio calida n. sp.

Description of Cellvibrio calida n. sp.:

Cells are differentiated; metachromatic granules are present; in the old culture, filamentous cells, 4–16μ are found; no endospore is formed; young vegetative cells are 0.4–0.5 × 1.5–2.0μ in size, slightly curved rods with round ends; negative to Gram's stain; actively motile with polar monotrichous flagellum which 1.5–2.0 times long as the cell and slightly undulated. On starch synthetic agar medium, rapidly produces slightly lamon-yellow colony, 1–2 mm in diameter with an enzymic zone; meager growth in meat extract peptone broth; no liquefaction of gelatin; grows on potato of a slightly alkaline reaction only; acid coagulation of milk is produced but no peptonization; reduces nitrate to nitrite in cellulose synthetic liquid culture and also produces nitrite in Dunham’s solution but no ammonia is produced; no indol is produced in both nutrient broth and Dunham’s solution; the presence of catalase is detected in cellulose synthetic liquid culture; ferments xylose, glucose, fructose, maltose, galactose, lactose, sucrose and starch but mannite is not fermented. The optimum hydrogen ion concentration for cellulose decomposition tested in cellulose synthetic liquid culture was pH 7.8–8.1, and the action is hindered at pH 6.8 and at pH 6.2 no cellulose is fermented. As the nitrogen source, prefers organic compounds such as yeast-extract, asparagine and beef-extract to inorganic nitrogenous compounds, namely sodium nitrates, ammonium nitrate and ammonium sulfate except peptone which is detrimental to its cellulose decomposing power. As the intermediate metabolic products in the cellulose decomposition, oxycellulose and some substance which reduce Fehling’s solution are produced under the
sealed condition. It is killed in five minutes at 55°C, and the favorable temperature for its growth lies between 30–37°C, which is rather high, and for this reason the specie name, calida was chosen.

Explanation of figures: (Photo. by Arakawa.)

Fig. 1. Cellvibrio calida n.sp.; incubated for 4 days at 28°C, in cellulose synthetic solution; stained with aqueous aniline fuchsin. (×1,000)

Fig. 2. Same as Fig. 1 but 90 days old culture, showing various forms.

Fig. 3. Showing flagellum of Cellvibrio calida n.sp.; treated as in Fig. 1 and stained after Gray's method. (×1,000)