

## Abstract of Presentation

**Note: This paper should be typed in “Times New Roman” of 12pt.**

Name (Underline the family name)

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Presentation Title(Should be no more than 20 words):

Biofilm formation and effective production of menaquinone-7 (Vitamin K2) by *Bacillus subtilis*: Lost of the world in environmental bacteria.

Abstract :

The Japan islands locate at temperate and subarctic zones in the Far East Asia, surrounded by oceans, and the annual humidity is high. Traditionally, Japanese people have been suffered from decay of foods and required to keep own life by developing sustainable techniques for food storages, from which Japanese food cultures have been represented by a variety of fermentation foods, such as shoyu (soy sause), miso, mirin, and so on. Fermentation refers to the conversion of carbohydrates into alcohols or organic acids under anaerobic conditions. This process is conducted by the action of microorganisms, thereby, managements of their activities are very important for successful food making. In this regard, it is said that ancient people had abundant knowledge to control microbial activities without notification.

Nowadays, benefits of fermentation foods have been reevaluated with regard to industrial and pharmaceutical significances. Nattō is a traditional Japanese food made from soybean fermented with *Bacillus subtilis*. After the steaming and cooling of soybean, spores of *B. subtilis* grow into aggregates on the surface of seed coat, by utilizing stored reserves of soybean. In addition to taste, flavor, and appearance, Japanese people, but not all, often eat Nattō in order to maintain their health. Supplemental effects have been claimed for Nattō in terms of preventions in blood clotting, osteoporosis, and lowering blood pressure.

We are rather interested in biofilm formation by *B. subtilis* in Nattō. Biofilm formation is a general strategy of bacteria to survive in nature. Biofilm cells are encased in extracellular polymeric substances and highly tolerable to physicochemical stresses. In addition, drastic changes in the cellular processes are observed in aiming to nutrient uptake, cell-to-cell communication, or elimination of potential competitors. This means that useful traits observed in Nattō should attribute to biofilm formation on the surface of soybean. Nattō contains a large amount of meniquinone-7 (Vitamin K2, >10 µg/g) that is produced by *B. subtilis*. We identified that the natural strain retains useful genotypes for biofilm formation, that is, almost missing in the laboratory strain. In this workshop, we will present potential abilities of *B. subtilis* to form biofilm and linked with the beneficial traits in Nattō with the reference to menaquinone-7 production.