Kidakarn Techochatchawal 2010: Development of Supplementary Calcium from the Bone of Nile Tilapia (*Tilapia nilotica*). Master of Science (Agro-Industrial Product Development), Major Field: Agro-Industrial Product Development, Department of Product Development. Thesis Advisor: Assistant Professor Nantawan Thredthai, Ph.D. 123 pages.

Fishbone of Nile Tilapia (*Tilapia nilotica*), waste from the frozen Nile Tilapia fillet factory, is one of calcium sources. In order to reduce the factory waste and increase the fishbone value, this study aimed to develop the supplementary calcium from the bone of Nile Tilapia. The fishbone was pretreated using various methods including boiling at 95°C for 10 minutes, soaking in 10 ppm sodium hypochlorite for 90 minutes and soaking in 0.8% sodium hydroxide for 90 minutes. Due to a better ability to remove fish tissue from the fishbone, sodium hydroxide was selected as the chemical solution for pretreatment. Then, the pretreated fishbone was heated under controlled pressure and dried using hot air drying. Increased heating time at 121°C from 30 to 90 minutes under high pressure (15 $lb.in^{-2}$) significantly increased lightness of fishbone ($p \leq 0.05$). In addition, from scanning electron micrograph (SEM) of dried fishbone, heating for 90 minutes yielded more porous structure than heating for 30 and 60 minutes. For drying process, increasing drying temperature from 50°C to 90°C showed the significantly increased kinetic rate constant. Therefore, the optimal process to develop supplementary calcium from Nile Tilapia was soaking in 0.8% sodium hydroxide for 90 minutes, heating at 121°C for 90 minutes and drying at 90°C for 60 minutes. The obtained supplementary calcium contained 25.01% calcium and its quality met the requirement of the supplementary calcium standard. During storage at 35, 45 and 55°C whereas C* value and Thiobarbituric acid number were increased L* value and h value were decreased. Rate of the changes could be presented by kinetic rate constant. In addition, changes of color and rancidity were enhanced by storage temperature. The influence of storage temperature could be explained by Arrhenius equation.

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