Abstract

Overripe or over-fermented tempeh is fermented 2 – 5 days longer than normal tempeh and commonly used as flavour enhancement. Studies on microbial changes were limited to 24 and 72 hours, while limited studies were available for internal microbial growth factors that affecting over-fermentation process. Therefore, this study aims to evaluate the changes of microbial and internal microbial growth factors throughout over-fermentation process time points and to assess the correlation between the two changes observed. Over-fermented tempeh from two production conditions (modern [MP] and traditional [TP]) were analyzed for microbial enumeration and internal microbial growth factors in 6 sampling time points. Significant increments were observed in total viable bacteria (TVB) in MP and pH in TP throughout over-fermentation process. Generally, total lactic acid bacteria (TLAB) were decreased while total yeast and mold (TYM) remained relatively stable throughout over-fermentation process. The results showed that bacteria dominated the over-fermentation process. Generally, there might be different bacterial species other than LAB, which may responsible for pH increment during over-fermentation process. Temperature increment occurred in 0 – 48 hours and pH increased throughout over-fermentation process. Both changes of water activity and moisture content remained stable throughout over-fermentation process. No significant differences was observed in all internal microbial growth factors changes between tempeh samples. pH was observed as the leading controlling factors for microbial growth during over-fermentation process. Additionally, different LAB species may affect susceptibility to alkaline condition, thus affecting its dynamic during over-fermentation process.

Keywords: over-fermented tempeh, microbial changes, internal microbial growth factors changes