Comparison of antibacterial and antioxidant activities of homemade Thai rice vinegars
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Abstract: Solid-state fermentation of rice vinegar comprises 3 steps: saccharification, fermentation of alcohol and acetic acid production. In this research, 4 types of rice; polished rice, black fragrant rice, glutinous rice and black glutinous rice were separately used as raw materials for vinegar production by Acetobacter pasteurianus. After 3 days of saccharification, 7 days of alcohol fermentation and 29 days of acetic acid production, the highest amount of total acid, 2.98% (w/v) was observed in black glutinous rice vinegar, while the fermentation of polished rice, black fragrant rice and glutinous rice gave the total acid content of 2.14, 1.86 and 1.70% (w/v), respectively. These homemade rice vinegars were further examined for their antibacterial activity and antioxidant activity. It was found that black glutinous rice vinegar was the most effective vinegar to inhibit microbial growth of both gram-negative (Escherichia coli) and gram-positive bacteria (Staphylococcus aureus and Staphylococcus epidermidis). On the other hand, total phenolic content was also determined by Folin-ciocalteau method as it has been reported on its antioxidative activity against free radicals. It was found that, black fragrant rice vinegar exhibited the highest total phenolic content (0.630 mg/mL) followed by black glutinous rice, glutinous rice and polished rice (0.547, 0.494 and 0.356 mg/mL), respectively. This arrangement of the maximum to minimum of the total phenolic content value corresponded with the result of antioxidant activity detected by DPPH assay. Black fragrant rice vinegar showed the highest antioxidant activity by decreasing 50% of DPPH radical within 20 seconds.

Keywords: Rice vinegar; Fermentation; Antibacterial activity; Total phenolic compounds; Antioxidant activity