

## ABSTRACT

Antioxidants play an important role in neutralizing free radicals, which can cause oxidative stress, immune system decline, and degenerative diseases. Three herb plants Java ginseng (*Talinum paniculatum*), temulawak (*Curcuma xanthorrhiza*), and pegagan (*Centella asiatica*) are known to contain bioactive compounds from the phenolic and flavonoid groups, including curcumin, the main phenolic compound in temulawak. Effervescent formulations based on a combination of these three plants have not been reported in standardized preparations based on physical and chemical quality parameters according to BPOM regulations. This study aims to develop a multiextract effervescent powder that meets physical quality criteria and exhibits high antioxidant activity. The primary contribution of this research is the design of a new formula based on three herb extracts, using an integrated analytical approach with HPTLC and HPLC to ensure the content and stability of active compounds. The study began with extraction using maceration with 96% ethanol, followed by physical characterization and phytochemical screening. Total phenolics and flavonoids were analyzed by UV-Vis spectrophotometry. Four effervescent powder formulas were developed and tested for physical quality parameters including organoleptic properties, pH, moisture content, dissolution time, and flow rate. The best formula was analyzed for curcumin content using HPTLC, while interactions between active ingredients and additives were evaluated by HPLC. Antioxidant activity was assessed using the DPPH method with  $IC_{50}$  values determined for individual extracts, mixtures, and the effervescent formula. The results showed that the combination of the three extracts provided a synergistic effect, enhancing the phenolic and flavonoid content, as well as antioxidant activity, compared to the single extracts. Formula III was selected as the best formula because it met all physical quality parameters and exhibited an  $IC_{50}$  value of 66.13 ppm with a curcumin content of 0.11%. HPLC results showed that there were no interactions that could reduce the effectiveness of the active compounds from each extract. This research resulted in a stable, standardized herb effervescent formulation with the potential for further development as an evidence-based health supplement.

**Keywords:** Effervescent, Flavonoid, Phenolic, Antioxidant, Curcumin.