Develop Whey Protein-based Safe Liquid Paper Glue

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Liquid paper glue products are widely used in households, offices and schools. Commercially available paper glues are formulated with synthetic materials, and may contain toxic compounds. In the present study, a prototype safe liquid paper glue was developed using whey protein isolate (WPI) and polyvinylpyrrolidone K90 (PVP) as major binders. WPI was dissolved in distilled water, heated at 83℃ for 30 min, cooled down to room temperature, and then mixed thoroughly with PVP and other ingredients, The final product was bottled. The new liquid paper glue was analyzed for bonding strength, viscosity, and total solids in comparison with a commercial liquid paper glue as a control. There was no significant difference ($P > 0.05$) in bonding strength between the prototype (235.99±9.04 N) and the control (241.67±13.38 N). The bonding strength remained stable after three months of storage at 23℃ or at an elevated temperature (40℃). Viscosity of the prototype (1917±21 mPas) was lower ($P < 0.05$) than that of the commercial product (2618±229 mPas). The content of total solids of the prototype was 14.88±0.30%, compared with 13.38±0.02% for the control. There was no mold and yeast found in the liquid glue after three months of storage even at the elevated temperature (40 ℃). Results showed that the whey protein-based safe liquid paper glue was comparable to the commercial control in bonding strength and application properties. Continued shelf life tests will be studied to determine storage stability of the product.

Key words: whey protein, liquid paper glue, safe