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Identification of the best plant ratios for a polyherbal tea mix to obtain optimum antioxidant, antidiabetic, and β -glucuronidase inhibition activities

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ABSTRACT

The influence of plant types and their ratios on the effectiveness of polyherbal formulations is a crucial yet underexplored area of research. This study aimed to identify the optimal ratios of *Phyllanthus debilis* (PW), *Osbeckia octandra* (HB), and *Artrocarpus heterophyllus* (WR) leaf powders for a polyherbal tea to achieve the best functional properties. A three-level factorial design was used to examine the combined effect of three independent variables (PW, WR, and HB) on antioxidant, antidiabetic, and β -glucuronidase inhibitory activities. The variables were coded at three levels (-1, 0, +1), resulting in 10 experimental runs, with responses tested in triplicates. The highest antioxidant activity was observed in mixture 4 (PW: WR: HB = 4:1:1) for most assays. *P. debilis* exhibited the lowest IC_{50} values for α -glucosidase and β -glucuronidase inhibition, while *O. octandra* showed the lowest IC_{50} value for α -amylase inhibition compared to the mixtures. ANOVA indicated that the models and model terms of the mixture design are statistically significant ($P \leq 0.05$) and the responses are well-fitted to the models ($R^2 = 0.8484$ to 0.9993). The aqueous extractability of the polyherbal mixtures was higher than that of the individual herbs. These study revealed that polyherbal formulations exhibit both synergistic and antagonistic effects on therapeutic efficacy. Mixtures 4 (PW: WR: HB = 4:1:1), 5 (PW: HB = 1:1), and 7 (PW: WR: HB = 1:1:1) were screened as the polyherbal mixtures having optimum values for selected functional properties. These combinations, along with individual herbal extracts, will undergo further testing to develop a tri-herbal tea formulation.

Keywords: Antidiabetic; Antioxidant; Polyherbal mix; Plant ratios

About the Journal

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Anti-dengue viral activity of *Glycyrrhiza glabra* roots in Vero cells

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ABSTRACT

Despite being a global public health problem, there are no antiviral agents for dengue. Plants are the sources of most approved drugs and many phytochemicals have exhibited in vitro antiviral activity. We explored the antiviral potential of the aqueous extract of *Glycyrrhiza glabra* roots (GGaq) on dengue viruses. Plaque reduction antiviral assay for half maximal inhibitory concentrations (IC_{50}) was done in Vero cells infected with dengue serotypes 1–4 and exposed to varying concentrations of GGaq. Half-maximal cytotoxic concentration (CC_{50}) of the GGaq was 651.9 $\mu\text{g/mL}$. The IC_{50} of the four dengue serotypes (10–50 $\mu\text{g/mL}$) indicated moderate inhibition by GGaq. 98–100% inhibition of all dengue serotypes was seen with GGaq at the maximum nontoxic dose. Preparative thin layer chromatography of GGaq, isolated sub fractions E and F which had low to moderate antiviral activity (IC_{50} 12.65–85.95 and IC_{50} 13.14–69.27 respectively). They exhibited good therapeutic potential only for dengue serotype-4. Virus adsorption to cells was significantly inhibited by GG (50%) and sub fraction E (24.9%). Chloroquine diphosphate was used as the positive control in all assays. The aqueous extract of GG was non-toxic and had better antiviral activity than sub fractions E and F.

Keywords: Dengue; Antiviral; *Glycyrrhiza glabra*; Vero cell; Fractionation

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