

Toxicological Analysis of Some Plant Combinations Used for the Treatment of Hypertension by Lay People in Northern Kwazulu-Natal, South Africa

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Abstract : The use of plant combinations to treat various medical conditions is not a new concept, and it is known that traditional people do not only rely on a single plant extract for efficacy but often combine various plant species for treatment. The knowledge of plant combinations is transferred from one generation to the other in the belief that combination therapy may enhance efficacy, reduce toxicity, decrease adverse effects, increase bioavailability and result in lower dosages. However, combination therapy may also be harmful when the interaction is antagonistic, since it may result in increasing toxicity. Although a fair amount of research has been done on the toxicity of medicinal plants, there is very little done on the toxicity of medicinal plants in combination. The aim of the study was to assess the toxicity potential of 19 plant combinations which have been documented as treatments of hypertension in northern KwaZulu-Natal by lay people. The aqueous extracts were assessed using two assays; the Brine shrimp assay (*Artemia franciscana*) and the Ames test (Mutagenicity). Only one plant combination (*Aloe marlothii* with *Hypoxis hemerocallidea*) in the current study has been previously assessed for toxicity. With the Brine shrimp assay, the plant combinations were tested in two concentrations (2 and 4 mg/ml), while for mutagenicity tests, they were tested at 5 mg/ml. The results showed that in the Brine shrimp assay, six combinations were toxic at 4 mg/ml. The combinations were *Albertisia delagoensis* with *Senecio serratuloides* (57%), *Aloe marlothii* with *Catharanthus roseus* (98%), *Catharanthus roseus* with *Hypoxis hemerocallidea* (66%), *Catharanthus roseus* with *Musa acuminata* (89%), *Catharanthus roseus* with *Momordica balsamina* (99%) and *Aloe marlothii* with *Trichilia emetica* and *Hyphaene coriacea* (50%). However when the concentration was reduced to 2 mg/ml, only three combinations were toxic which were *Aloe marlothii* with *Catharanthus roseus* (76%), *Catharanthus roseus* with *Musa acuminata* (66%) and *Catharanthus roseus* with *Momordica balsamina* (73%). For the mutagenicity assay, only the combinations between *Catharanthus roseus* with *Hypoxis hemerocallidea* and *Catharanthus roseus* with *Momordica balsamina* were mutagenic towards the *Salmonella typhimurium* strains TA98 and TA100. Most of the combinations which were toxic involve *C. roseus* which was also toxic when tested singularly. It is worth noting that *C. roseus* was one of the most frequently used plant species both to treat hypertension singularly and in combination and some of the individuals have been using this for the last 20 years. The mortality percentage of the Brine shrimp showed a significant correlation between dosage and toxicity thus toxicity was dosage dependant. A combination which is worth noting is the combination between *A. delagoensis* and *S. serratuloides*. Singularly these plants were non-toxic towards Brine shrimp, however their combination resulted in antagonism with the mortality rate of 57% at the total concentration of 4 mg/ml. Low toxicity was mostly observed, giving some validity to combined use, however the few combinations showing increased toxicity demonstrate the importance of analysing plant combinations.

Keywords : dosage, hypertension, plant combinations, toxicity

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