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Ex-vivo investigation of fractionated extracts of Ethiopian medicinal plant against *Leishmania* amastigote stage

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Leishmainasis is a group of diseases caused by protozoan parasites of the genus *Leishemania* and transmitted by female sandy fly. Recently, it was reported to be endemic in about 98 countries, mainly among the under-developed and developing countries including some countries in Europe. The disease causes significant mortality and morbidity in different countries. Globally, about 350 million people are at risk of infection, and an estimated 1.5 million to 2 million new cases occur annually. Current treatment depends solely upon chemotherapy as no efficient vaccine is available so far. However, there are few drugs for the treatment of the disease,but unfortunately,they are toxic, expensive and share a tendency to generate resistance and require long-term treatments, which would make the chemotherapy complicated. As a result, the disease contributes significantly to the propagation of poverty in developing countries because of the above mentioned problems. Herbal medicines are a source of different leads to anti-leishmanial drugs which can offer potential of therapeutic switch from chemotherapy and are becoming widely accepted by many authorities including the World Health Organization (WHO) as a viable treatment for various diseases. The *in vitro* study of medicinal plant against Promastigote stages of Leishmania bya research group of Ethiopian Public Health Institute (EPHI) and Addis Ababa University (AAU) indicated that the seed extract has got an anti-promastigote activity with low toxicity nearly compared to a control drug, amphotericin B. However, the promastigote stages are not the ideal stages for the discovery of drug efficacy as compared to amastigotes, the intercellular stage responsible for causing pathological diseases. Thus, this medicinal plant extract should further be tested using amastigotes stages of the parasite for the discovery of a lead molecule. Thus, this study will attempt to investigate the ex-vivo activity of the medicinal plant fractionated extract for its anti-amastigote activity. Determining the activity of the extract will be done by culturing the amastigote in experimentally isolated mouse macrophages in 8 wells chamber slides. The results will be expressed in terms of infection rate (IR) and the multiplication index (MI) and compared with the reference drug.

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In vitro interaction of amoxicillin with calcium chloride (fused) at pH 7.4 and pH 2.4

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This study was aimed to evaluate the *in vitro* complexation nature and strength of complex which may be formed due to interaction between Amoxicillin and Calcium Chloride (CaCl2). The interaction of amoxicillin and calcium chloride (fused) has been studied in aqueous systems at a fixed temperature (37±0.5)°C and under different pH (pH 7.4 and pH 2.4) by using some physical methods as Spectral observation, Job's method of continuous variation, Ardon's method. It was observed from spectrophotometric study thatamoxicillin gives a sharp peak at 272 nm. But when calcium chloride was mixed with amoxicillin in 1:1 ratio, the intensity of the peak of amoxicillin changed remarkably due to interaction. The Job's plot was obtained by plotting absorbance difference against the mole fraction of the each drug at pH 7.4 and pH 2.4. Amoxicillin forms strong 1:1 complex with calcium chloride and reverse V-shaped curves indicate the formation of 1:1 complexes of amoxicillin with calcium chloride. These may indicate strong kinetics of complexation between amoxicillin with calcium chloride. The value of stability constant for the complexation of amoxicillin with calcium chloride at pH 7.4 and pH 2.4 were obtained from the spectral data using Ardon's plot. The value of stability constant for the drug-metal system at pH 7.4 and pH 2.4 are 5.54 and 6.67 respectively. At pH 2.4 it is found that amoxicillin forms relatively stable complex with calcium chloride (stability constant 6.67)which is high in comparison to the stability at pH 7.4. It can, therefore, be concluded that a careful consideration is needed during concurrent administration of amoxicillin with calcium chloride.

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