

### Fourth-order Derivative Spectrophotometric Method for Simultaneous Determination of Pseudoephedrine and Naproxen in Pharmaceutical Dosage Forms

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Naproxen is a non-steroidal anti-inflammatory, analgesic and antipyretic drug. Pseudoephedrine shows sympathomimetic activity and is used in the treatment of nasal congestion in cold and allergic rhinitis. Combination dosage forms of naproxen sodium and pseudoephedrine hydrochloride are used for symptomatic treatment of cold and sinus disorders. According to the literature, no spectrophotometric method has been reported for simultaneous determination of these drugs. As there is a large overlap between the zero order spectra of these drugs, first-order to fourth-order derivative spectra of the drugs were examined to find out suitable wavelengths for simultaneous determination. Fourth-order derivative spectra has been used for simultaneous determination of naproxen sodium and pseudoephedrine hydrochloride. The fourth-order derivative value at 316 nm and 221 nm were used for the determination of naproxen sodium and pseudoephedrine hydrochloride, respectively. The method was linear over the range of 2-28 µg/ml for pseudoephedrine hydrochloride and 4-200 µg/ml for naproxen sodium. The within-day and between-day coefficient of variation values were less than 5.8 and 2.5% for pseudoephedrine hydrochloride and naproxen sodium, respectively. The applicability of the proposed method for the simultaneous determination of naproxen and pseudoephedrine in dosage forms has been demonstrated without any special pretreatment.

### Antiherpetic Activity of *Mikania glomerata* Sprengel Extract

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*Mikania glomerata* Sprengel, popularly known as guaco, is a native plant of tropical America employed by Brazilian folk medicine for the treatment of respiratory tract diseases. The coumarin, 2H-1-benzopyran-2-one, is one of the major chemical constituents of *M. glomerata*, and apparently is involved in the pharmacological activity of this species. In the present study, the antiviral activity of *M. glomerata* extract and 2H-1-benzopyran-2-one against the herpes simplex virus is described. In order to evaluate the antiviral activity, the dried hydroalcoholic extract, and the isolated coumarin, 2H-1-benzopyran-2-one were assayed at the maximum non-toxic concentrations, which are unable to produce any morphological alterations on the Vero cells. Antiviral activity was determined by reduction of the HSV-1 and HSV-2 titres, and the results were expressed by Percentage of Inhibition (PI). The maximum non-toxic concentrations of both tested samples was 31.2 µg/mL. However, the extract presented higher cytotoxicity potential (101.0 µg/mL) when compared with the isolated coumarin (220.0 µg/mL). Regarding the antiviral effect, the extract showed inhibitory activity both for HSV-1 (PI = 87.7%) and HSV-2 (PI = 92.7%). The 2H-1-benzopyran-2-one was inactive against HSV-2 virus, but showed antiviral activity against HSV-1 (PI = 68.4%). The results showed an important activity of the extract against HSV-1, and especially against HSV-2. Additionally, the extract demonstrated higher antiviral activity than the isolated coumarin suggesting the presence of other metabolites in the extract which contributed to the increased activity of this extract against herpes simplex virus.

### *In vitro* Evaluation of a Natural Antiseptic Mouthwash Consisting of Two-phase Solution

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An antiseptic mouthwash two-phase solution composed by aqueous extracts and essential oils of *Eucalyptus globulus* and *Mentha arvensis*, and sesame oil has been studied. To evaluate the effects of the mouthwash, antimicrobial and antiadherence activities against oral microorganism were determined by *in vitro* methods. The sesame oil was analyzed by CG-MS to identify the main compounds. The anti-inflammatory activity and acute toxicity of sesame oil were performed by *in vivo* methods. The cell growth of *Streptococcus mutans* ATCC 25175 was prevented by 12.5 mg of *E. globulus* per mL and no microbial adherence were observed at same concentration. With *M. arvensis* aqueous extract, no antimicrobial activity was observed. Sesame oil showed antimicrobial and antiadherence activities showing MIC and MICA of 25.0 mg per mL. Two main compounds, oleic acid (41.51%) and palmitic acid (25.96%), were identified in the sesame oil. The anti-