3.1. ANDROGRAPHLIDE: DRUG PROFILE

Andrographolide (AD) (Figure 7a) is a labdane diterpenoid, obtained from the herb *Andrographis paniculata* (Burm.f.) Nees. (Figure 7b), commonly known as Kalmegh, belongs to family Acanthaceae (Mishra et al., 2007; Ojha and Ahmad, 2010). Since the ancient times, *A. paniculata* is used in the traditional systems of medicine like Siddha, Ayurveda and Unani, and also in the tribal medicine in India for treating inflammation, diabetes, dysentery, enteritis, helminth infection, herpes and in liver diseases. Topically, it is used for skin infections and snake bite (Jarukamjorn and Nemoto, 2008). AD is the prime constituent extracted from the leaves of *A. paniculata* and has pharmacological properties including anti-cancer activity (Matsuda et al., 1994).

![Herb and Structure](image)

Figure 7: (a) Herb of *Andrographis paniculata* and (b) Structure of andrographolide

3.1.1. Physicochemical properties of AD

AD is a diterpene having $\alpha$, $\beta$-unsaturated $\gamma$-lactone ring connected to a decalin ring system via a saturated C$_2$ moiety. AD exhibits a major absorption band at 225 nm in UV and the infrared spectrum of AD shows absorption at 1727 cm$^{-1}$ corresponding to the $\alpha$, $\beta$-unsaturated $\gamma$-lactone ring and 1672 cm$^{-1}$ corresponding to conjugated C=C (Cava et al., 1962). The physicochemical properties of AD are summarized in Table 2. Although AD is the most important component in *A. paniculata* and has high therapeutic value, the effectiveness of the drug was hampered by its low aqueous solubility ($3.29 \pm 0.73 \mu$g mL$^{-1}$), high lipophilicity having log P value = 2.632 $\pm$ 0.135 and all these could limit its bioavailability (Chellampillai & Pawar, 2011).