



2-METHOXY-1,4-NAPHTHOQUINONE FIRST TIME REPORTED FROM THE AERIAL PARTS OF IMPATIENS SULCATA

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ABSTRACT

2-methoxy-1,4-naphthoquinones is a Principal compound of family balsaminaceae. 2-methoxy-1,4-naphthoquinone was isolated from the aerial parts of *Impatiens sulcata* and identified by the spectral technique (¹H NMR, ¹³C NMR, DEPT-135, HMBC and ESIMS spectra). The Plants was collected from district chamoli (Joshimath), Uttarakhand.

KEYWORD: 2-methoxy-1,4-naphthoquinones chamoli (Joshimath), Uttarakhand.

TAXONOMY AND DISTRIBUTION

Impatiens sulcata Wallich in Roxb. (Balsaminaceae) syn. *Impatiens gigantea* Edgew is an annual or biennial herb 50 to 250cm high, found in North-West Himalayas. It is hairless and similar to Himalayan balsam. Its leaves are generally rounded teeth and not acute as Himalayan balsam Fruit is linear where as it is club-shaped and flowers are pink, purple with darker spotted sac like lower sepal.

TRADITIONAL USES

Impatiens sulcata Wallich in Roxb. (Balsaminaceae) is a medicinal plant used in folk medicine for treatment of several ailments. In traditional medicine, most of the plants belong to the genus *Impatiens* has been used to treat a wide variety of ailments such as treatment of articular rheumatism, bruises, beriberi. It is used for antimicrobial, antirheumatic, antipruritic and antitumoural purposes as well as for the treatment of difficult labour and puerperal pain. The seeds of *Impatiens balsamina* have been used to treat difficult labour, to suppress puerperal pain, expectorant, to act as an emmenagogue, and as an antidote for poisoning from fish in some countries (Ching S et al., 1977; Perry LM et al., 1980). In Thailand, *Impatiens balsamina* has traditionally been used for the treatment of thorn or glass-puncture wounds, abscesses, ingrown nails and chronic ulcers caused by allergic reaction of detergents (Fransworth NR et al., 1992). The aerial parts of *Impatiens balsamina* are used in Chinese herbal medicine to treat articular rheumatism, beriberi, bruises pain and swelling (Su J et al., 1997).

EXTRACTION AND ISOLATION

The plant material was dried at room temperature (25°C), chopped and powdered into small pieces. The air dried powdered plant material was extracted with petroleum ether, ethyl acetate and methanol in Soxhlet extractor. The extracts were concentrated by rotary vacuum evaporator (40°C) and then air-dried. The concentrated ethyl acetate and methanolic extract obtained in the form of slurry was charged to gross chromatography over a column of silica gel and eluted with different proportion of chloroform-methanol isolated the compound 2-methoxy-1,4-naphthoquinone.

RESULT AND DISCUSSION

Yellow crystals (150mg); m.p. 181–183°C; Molecular weight 188; Molecular formula C₁₁H₈O₃; Elemental analysis: (found C, 70.21; H, 4.29; O, 25.51%; cald. for C₁₁H₈O₃: C, 83.24; H, 14.32; O, 2.44%); ESIMS 187 [M-H⁺] (100); UV (λ) MeOH nm 215, 241, 246, 275, 329; IR (KBr) γ_{max} 1122, 1268, 1669, 3456cm⁻¹; The ¹³C-NMR (CDCl₃, 300 MHz), ¹H-NMR CDCl₃, DEPT CDCl₃ and HMBC CDCl₃ δ: Its molecular formula was deduced as C₁₁H₈O₃ on the basis of its molecular ion peak at m/z 187 [M-H⁺] and elemental analysis. The ¹³C NMR and DEPT spectra showed 11 carbon signals consisting of one methyl, six methine and four quaternary carbons. The ¹H NMR spectrum showed two singlets δ 3.919, δ 6.188 and two multiplets δ 7.426 δ 8.1311. A highly downfield signal at δ 184.16 ppm for ketonic carbon and highly upfield signal at δ 56.46 ppm for methyl group was observed in ¹³C NMR spectra. Finally all these physical and spectral data were identical with the reported data of 2-methoxy-1, 4-naphthoquinone (Panichayupakaranant P et al., 1995; Fukumoto H et al.,

1996; Ishiguro K *et al.*, 1997; Ishiguro K *et al.*, 1998; Oku H *et al.*, 1999; Yang X *et al.*, 2001; Oku H *et al.*, 2002; Ding ZS *et al.* 2008; Mori N *et al.*, 2011; Wang YC *et al.*, 2012; Sakunphueak A *et al.*, 2013). On the basis of spectral data, the compound was identified as **2-methoxy-1,4-naphthoquinone**.

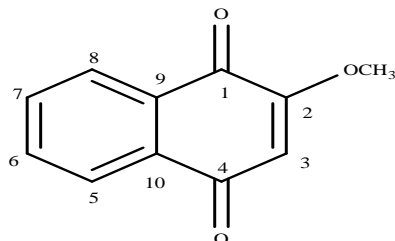


Figure 1: Molecular structure of 2-methoxy-1,4-naphthoquinone.

Table 1: ^{13}C (300 MHz), ^1H NMR, DEPT and HMBC in CDCl_3 .

Position	δ_c ppm	δ_H ppm	DEPT	HMBC
1	180.16		C	
2	160.44		CH	
3	109.33	6.188 s (1H)	CH	
4	184.16		C	C6
5	126.75	7.426 m(1H)	CH	C6,C7
6	134.38	8.096 m (1H)	CH	C8
7	133.38	8.131 m (H)	CH	C8, C9
8	126.22	7.646 m (H)	CH	C9,C10
9	131.06		C	
10	132.04		C	
11	56.46	3.913 s (H)	CH3	

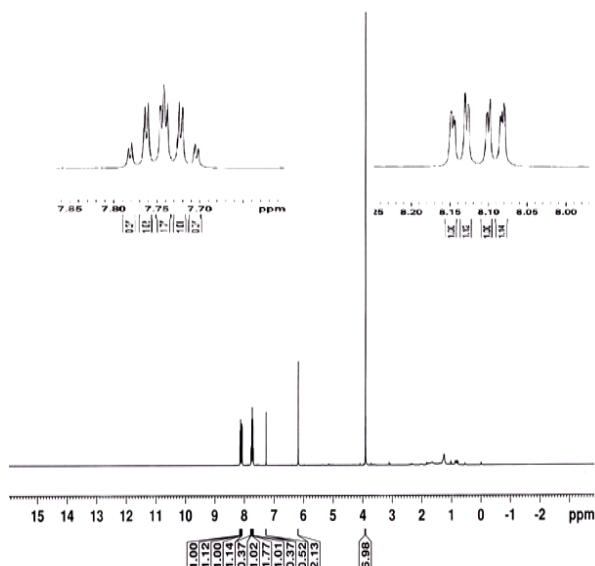


Figure 2: ^1H -NMR spectra of 2-methoxy-1,4-naphthoquinone.

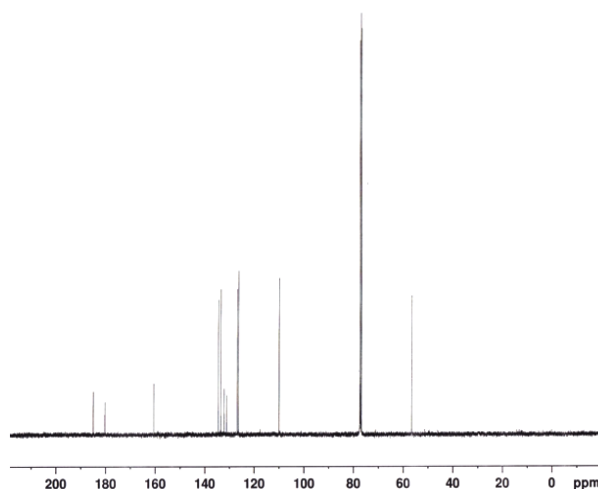


Figure 3: ^{13}C NMR spectra of 2-methoxy-1,4-naphthoquinone.

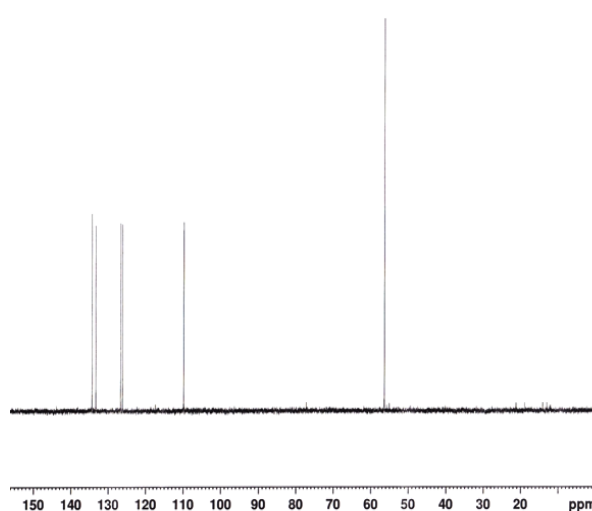


Figure 4: DEPT (135) of 2-methoxy-1,4-naphthoquinone.

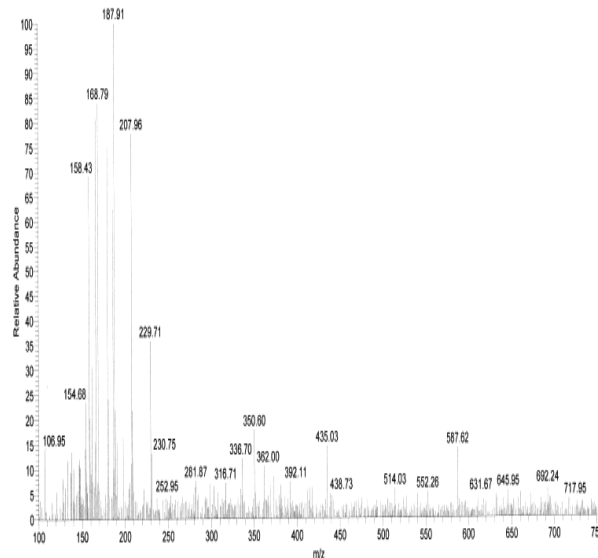


Figure 5 ESIMS spectrum of 2-methoxy-1,4-naphthoquinone.

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