

Ethnomedicinal study of *Bryonia dioica*, a plant used as anti-breast cancer herbal therapy in North West Algeria

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ABSTRACT

Bryonia dioica (Cucurbitaceae), a climbing perennial herb, is widely used in traditional medicine in Algeria. The present study aimed to record the ethnomedicinal uses of the plant in North West Algeria. Our results showed that *B. dioica* is widely used to treat several ailments such as cancer (26%), hypercholesterolemia (22%), and diabetes (18%). *B. dioica* roots are taken orally, alone or mixed with different ingredients of non-plant origin such as water or honey. Breast cancer was the most frequent disease reported to be treated with *B. dioica*. These findings suggest that *B. dioica* could be considered as a promising source for developing novel therapeutics against breast cancer.

KEY WORDS: *Bryonia dioica*; Breast cancer; Algeria; Ethnobotany

INTRODUCTION

Cancer has become a major public health concern in Algeria. In a recent retrospective study, we have found that the age-standardized incidence for all cancers in women was 27.8 per 100,000 and that for males was 23.6 per 100,000. Moreover, we have reported that breast cancer was the most frequent malignancy in North West Algerian women (36.9% of the total female cancers) (Benarba *et al.*, 2014a). In another study, we found that about 80% of Algerian breast cancer postmenopausal women enrolled into the study had used medicinal plants to manage and/or treat their illness (Benarba *et al.*, 2014b). Although this reality, few studies have been undertaken to study the ethnomedicinal uses of medicinal plants used as anticancer treatments in Algeria.

Bryonia dioica Jacq. is a climbing perennial herb with tuberous roots. The plant, locally named in Algeria “Fachira,” is widely used in Algeria to treat several diseases. The roots of *B. dioica* are characterized by the presence of some bioactive compounds such as cucurbitacins and flavonols are possessing anticancer activities (Seo *et al.*, 2014).

The present study aimed to document the ethnomedicinal uses of *B. dioica* in Mascara (North West Algeria).

MATERIALS AND METHODS

The ethnobotanical investigation was carried out in Mascara Province. Mascara (5941 km²) is located in the north west of Algeria, (at 360 km of Algiers) with Mediterranean climate and mean annual precipitations of about 450 mm. In 2010, the total population was 826334, with male/female ratio of about 1.04 (Benarba *et al.*, 2014). Ethnomedicinal uses of *B. dioica* information were collected and documented through casual conversations and semi-structured interview technique (Rajakumar and Shivanna, 2009) with local herbal practitioners and knowledgeable residents of the study area. The main focus was to collect the oral information about the ethnomedicinal uses of *B. dioica* by the local population.

RESULTS

The ethnobotanical survey we conducted to document the ethnomedicinal uses of *B. dioica* by the local population of Mascara province revealed that almost all of the respondents knew and/or used *B. dioica* for medicinal purposes.

Roots the only plant part used locally are used to treat cancer (26%), hypercholesterolemia (22%), diabetes

(18%), fertility disorders (14%), and other ailments [Figure 1]. From all cancers, the plant is mainly prescribed to treat breast cancer (92%). Some data (unverified) reported several cases of “total healing.”

With regard to the method of preparation [Figure 2], *B. dioica* roots are taken orally, alone or mixed with different ingredients of non-plant origin such as water or honey to treat internal ailments such as cancer, diabetes, or fertility disorders. Roots are also applied externally for rheumatism.

DISCUSSION

Ethnopharmacological knowledge is beneficial in guiding which plants may have potentials to be used as source of anticancer products (Siriwatanametanon *et al.*, 2010). Although local populations in Africa still use medicinal plants to treat cancers, ethnopharmacological studies from African medicinal plants has not been realized as fully as from other traditional societies such as India and China (Ashidi *et al.*, 2010).

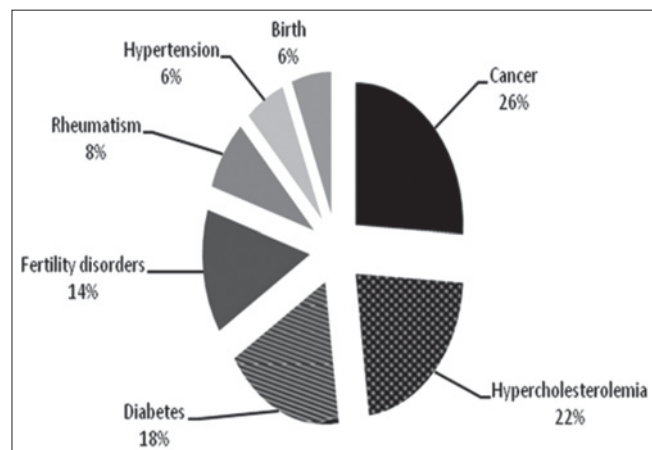


Figure 1: Ailments treated with *Bryonia dioica*

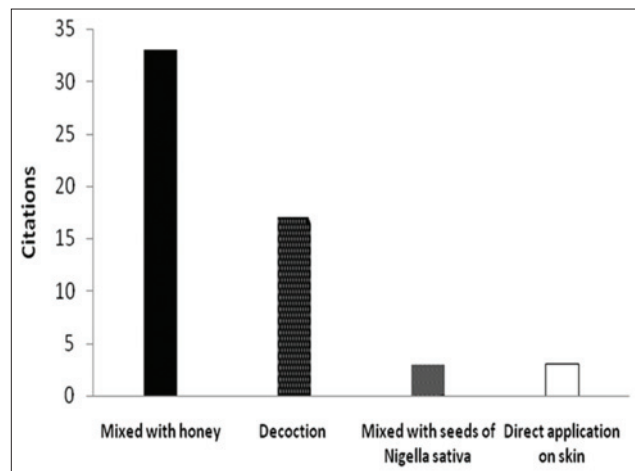


Figure 2: Preparation methods

The purpose of the present study was to record the ethnomedicinal uses of *B. dioica*. The latter is widely used in Algeria to treat several pathologies. Our results showed that the first ailment treated by the local population in mascara province using *B. dioica* was the breast cancer. On the other hand, roots of *B. dioica* are considered as antidiabetic in local “phytotherapy.” The plant is similarly used in Jordan (Mahasneh and El-Oqlah, 1999) and in Armenia (Karageuzyan *et al.*, 1998). Fruits of *B. dioica* are not used by local population because of their toxicity, mainly due to triterpene glucosides and calcium oxalate crystals (Barreira *et al.*, 2013). We have demonstrated that an aqueous extract of *B. dioica* roots was able to induce cell death in two aggressive breast cancer cell lines: MDA-MB-231 and HBL-100 (data not published). The cell death was accompanied apoptosis induction and cell cycle arrest at G2/M phase. Previously, we have reported that *B. dioica* aqueous extract induced apoptosis through the intrinsic (mitochondrial) pathway in Burkitt’s lymphoma BL51 cell line (Benarba *et al.*, 2012). The use of *B. dioica* roots as an anti-breast cancer treatment by local populations in North West Algeria may be attributed to its major bioactive compound: Kempferol 3, 7-di-O-rhamnoside (Barros *et al.*, 2011). Indeed, it has been reported that kempferol and kempferol glycosides induced cell death and apoptosis of breast cancer cell lines (Ibrahim *et al.*, 2008; Diantini *et al.*, 2012).

CONCLUSION

We present evidence that *B. dioica* is widely used by the local populations of mascara province (West Algeria) to treat several ailments such as cancer and diabetes. Breast cancer remains the first disease to be treated with *B. dioica*. Roots of the plant are commonly used mixed with honey.

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