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Research Article

## Ethnobotanical survey on dandelion use in the western region of Algeria

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### ABSTRACT

**Introduction:** Dandelion (*Taraxacum officinale*) is an edible and medicinal plant. We use the leaves, flowers and roots. The objective of this study is to show interest in the use of dandelion as a natural remedy in the primary treatment of several pathologies.

**Methods:** An ethnobotanical survey of 1000 people in the western region of Algeria was conducted using a questionnaire.

**Results:** the obtained results from this study show that 60% of the population questioned prefer traditional medicine the majority of them use the plant in the medical field whose leaves and roots are most used. Infusion and maceration are the most usable methods for the preparation of the plant and administration is exclusively oral. Most users testify that the plant has significant efficacy with a percentage of 61%.

**Conclusion:** All this information constitutes a database to perform other research in vivo or in vitro to value this plant on the therapeutic level.

**Keywords:** *Taraxacum Officinale*, traditional medicine, leaves, ethnobotanical study.

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### INTRODUCTION

For centuries, medicinal plants have occupied a very important place to relieve and cure several diseases, indeed there are about 500.000 species of plants of which 80,000 contain medicinal properties <sup>1</sup>.

Many plants grow spontaneously in different regions which are ignored despite their benefits effects among those plants we quote the pisenlit. This is an edible plant used for a long time in alternative medicine for the treatment of several diseases <sup>2</sup>.

*Taraxacum officinale* is a plant known as « Dandelion » which means lion's tooth by leaning on the serrated foliage <sup>3</sup>.

It belongs to the Asteraceae family, of the subfamily Cichorioideae, of the Lactuceae tribe <sup>4</sup>.

This plant is easily recognizable, it is a perennial herbaceous acaule that is, no rod is produced, the leaves emerge from a single bud at ground level, measuring between 5 and 30 cm <sup>5</sup>.

Phytochemical studies have demonstrated that dandelion contains phenolic compounds, sugars and a complex of many vitamins, it is also rich in minerals <sup>6</sup>. It also contains alkaloids, tannins, flavonoids and proteins <sup>3</sup>.

The virtues of this plant encourage researchers to conduct studies in order to test the different activities it has. This research is mainly related to antioxidant, anti-inflammatory and antidiabetic.

A study that was conducted in rats rendered obese to test the effect of dandelion extract on the evolution of plasma and tissue lipid parameters has shown that this extract has beneficial effects in the regulation of dyslipidemia and blood sugar also in the treatment of obesity <sup>7</sup>.

On the other hand, Colle D and his collaborators point out that *Taraxacum Officinale* fruit extract has a high antioxidant activity which protects brain slices from SNP-induced cell death and this activity is due to the presence of phenolic compounds <sup>8</sup>.

In addition, another study highlights the antioxidant activity of meth extracts from dandelion leaves that have been fractionated into different solvents. The results of this study show that ethyl acetate and butanol fractions have high antioxidant activity for all tests, however, the hexane fraction had low activity <sup>9</sup>.

A group of researchers evaluated the anti-inflammatory activity of dandelion *in vitro*. They took as a reference for the measurement of this activity the inhibition of the lysis of the HRBC membrane induced by hypotonia, the results show that the extract has significant anti-inflammatory activity due to its content of alkaloids, flavonoids and terpenoids <sup>10</sup>.

Moreover, the results obtained by Mr. Emir and his collaborators reveal that the methanolic and aqueous dandelion extract has inhibitory properties of  $\alpha$  amylase and  $\alpha$  glucosidase <sup>11</sup>.

Pharmacology and biotechnology are the main a for exploiting the different therapeutic effects of the plant. Despite all the benefits that possess this plant it is still little used.

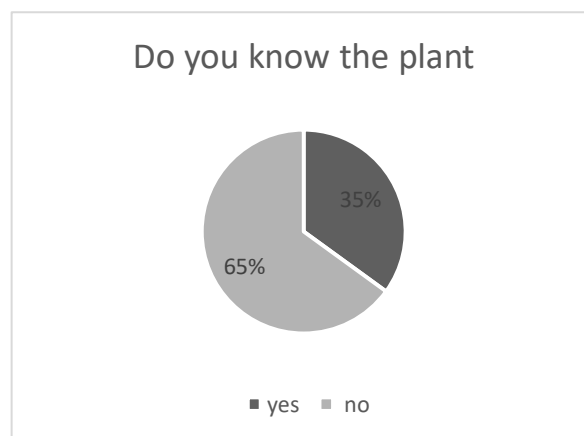
The objective of this study was to identify this plant and to determine how to value it on the therapeutic level in the western region of Algeria.

## MATERIELS AND METHODS

This is an ethnobotanical study that was carried out between July 2019 and March 2020 among 1000 people randomly interviewed in the Western region of Algeria with the objective of describing the use of dandelion in the treatment of different pathologies. This survey was carried out using a pre-determined questionnaire, The data collected are : sex, age, academic level, family status, place of residence and use of the plant.

All data was recorded and analyzed by IBM SPSS software version 25.

## RESULTS AND DISCUSSION



**Figure 1 : Distribution by plant Knowledge**

### Description of the population questioned

The use of dandelion is wide spread in all age groups with a peak for people between 20 and 40 years of age, the average age is 42 years with extremes ranging from 20 years to 89 years. On the other hand, in people over the age of 65 the use of the plant is very reduced. Men and women were affected by this survey, in fact 56% of those questioned were women, while 44% were men (Table N°1).

Moreover, the analysis of the data shows that the majority of people using the plant are academics with a percentage of 45.8% come next secondary, primary and illiterate levels with a low percentage of 4%.

71% of users of this plant were city dwellers while 29% were villagers, married people use the plant much more with a rate of 73% than single people who were 27%.

**Table 1: Distribution of the population questioned**

Parameter		Number	Percentage %
<b>Age</b>	20 à 40 ans	483	48,3
	40 à 60 ans	351	35,1
	Plus de 60 ans	166	16,6
<b>Sex</b>	Women	560	56
	Men	440	44
<b>Level of education</b>	Illiterate	40	4,0
	Primary	163	16,3
	Secondary	338	33,8
	University	458	45,8
<b>Place of residence</b>	City	710	71
	Town	290	29
<b>Distribution by family Situation</b>	Single	270	27
	Married	730	73

In our study area more than 50% of people prefer traditional medicine as well as women are more concerned with alternative medicine with a percentage of 60% (Figure 2).The plant is much more used in medicine and little used in the industrial and cosmetic field indeed the majority of studies focus on the different therapeutic effects (Figure N°3).

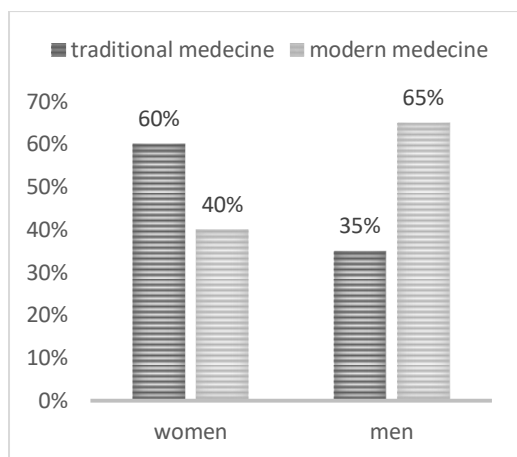


Figure 2: Frequency distribution between modern and traditional medicine

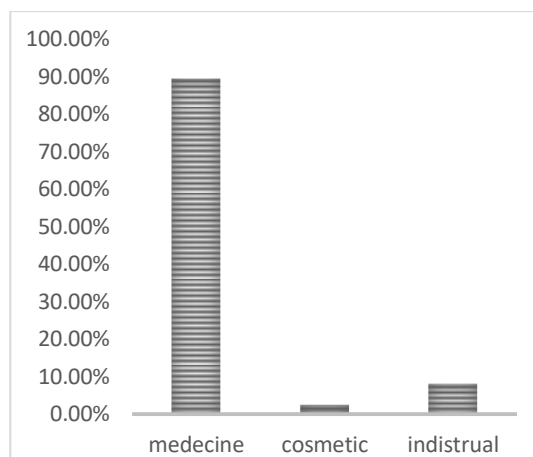


Figure 3: Distribution according to the domain of use

Description of how the plant used

Table 2 : Distribution by mode of use

		Number			Percentage %		
		Yes	No	Not wide spread	Yes	No	Not wide spread
<b>Part used</b>	Flowers	313	110	573	31	11	58
	Roots	273	160	567	27	16	57
	Seeds	189	233	578	19	23	58
<b>Condition of the plant</b>	Fresh	212	149	839	21	15	64
	Dry	293	151	550	29	16	55
<b>Mode of preparation</b>	Infusion	230	130	640	23	13	64
	Maceration	111	248	641	11	25	65
	Poultice	89	271	640	9	27	64
	Decoction	111	245	644	11	25	64
	Other	149	269	582	15	27	58
<b>Method of use</b>	Oral	281	79	640	28	08	64
	Inhalation	37	323	640	4	32	64
	Other	201	244	555	20	24	56
<b>Treated pathologies</b>	Dermatological	119	238	563	12	24	56
	Renal	114	245	641	11	25	64
	Reospiratory	75	284	680	8	28	68
	Hematological	219	139	642	22	14	64
	Metabolic	96	262	642	10	26	64
	Gastric	194	176	630	19	18	64

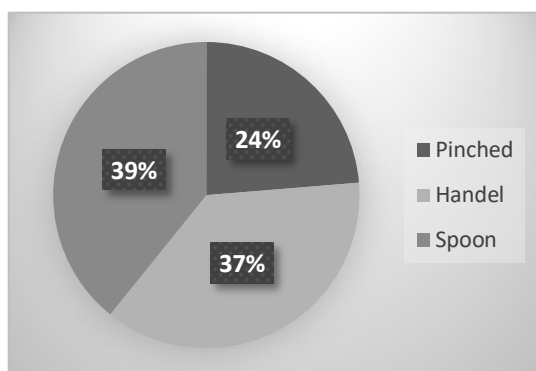


Figure 4 : Distribution according to the dose used

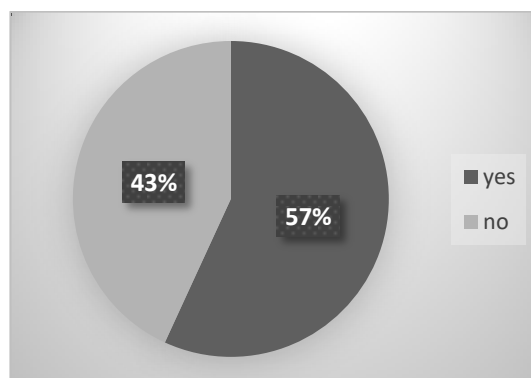


Figure 5: Distribution by Side Effect

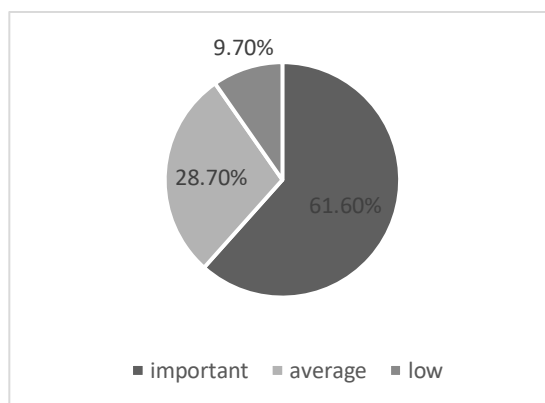


Figure 6: Distribution by plant efficacy

## DISCUSSION

Dandelion is a medicinal plant that has many benefits, the obtained results reveal a 65% of the respondents do not know the plant, despite it is a real nutritional bomb. However, this plant is unknown because it does not grow in our study area.

Medicinal plants are used as the main source of treatment in 80% of the population in developing countries <sup>12</sup>.

In this edible plant all is used flowers, roots and leaves. Dandelion leaves are rich in minerals, multiple vitamins, flavonoids, terpenoids, choline, bitter glucosides, beta-carotene and xanthophylla, on the other hand, the roots are rich in bitter glucosides, tannins, sterols, volatile oils, taraxacin, taraxacerin, triterpenes, asparagine and insulin <sup>13</sup>.

Preparations may contain a single compound or a mixture of all three. Examination of the data showed that the majority of people using the plant use flowers and roots, but few people use the leaves. However, there are various ways to consume and conserve plants. The majority of studies focus on the evaluation of leaf and root extracts <sup>10</sup>. The survey shows that the plant is used after drying.

In order to facilitate the administration of the active ingredient, different methods are used for the preparation of dandelion. Infusion is the most used followed by maceration, decoction and poultice. Other users consume fresh leaves in salads.

Plant users in our area use the plant with inaccurate doses, of which 39.20% per spoon, 37.10% per handle and 23.70% per pinch.

Since ancient times many people use dandelion for these healing properties especially in Chinese medicine or it is used for treating liver diseases <sup>14</sup>.

Health authorities such as the WHO, the EMA, the European Commission or the ESCOP, recognize the traditional use of

this plant for certain indications such as: increased diuresis in urinary tract conditions, relief of symptoms related to mild digestive disorders, antioxidant, anti-inflammatory, anti-diabetic and full of other therapeutic and diuretic effects <sup>15; 16</sup>.

Dandelion has been used for centuries to stimulate digestion <sup>17</sup>. In other parts, a group of patients with colitis used dandelion roots in combination with other plants, the results obtained show a reduction in pain in 96% of the patients <sup>18</sup>. The study of Jeon et al found that the etheric extracts from the aerial parts reduce the rate of inflammation. In addition, other studies suggest that this activity is due to the presence of phenylpropanoids <sup>19; 20</sup>.

A literature review published in 2020 also highlights that dandelion has hepatoprotective effects against chemical agents due to its antioxidant and anti-inflammatory effects <sup>21</sup>.

Results obtained by Funke et al show that the aqueous extract of the aerial parts of *Taraxacum Offinale* inhibits the action of  $\alpha$ -amylase in 20-40% <sup>22</sup>. Similar results were found by Emir et al which showed that the aqueous and methanolic dandelion extract has inhibitory activities of  $\alpha$  amylase and  $\alpha$  glucosidase <sup>11</sup>.

Research carried out by Racz-Kotilla et al on mice shows that a consumption of 2 g/kg of dandelion leaves has diuretic activity as long as dandelion is rich in potassium <sup>23</sup>.

Moreover, the German Commission E confirms the use of dandelion as a diuretic and also for the treatment of anorexia, dyspepsia and biliary abnormalities <sup>24</sup>.

Statistical analysis shows the difference in opinions regarding the side effects of the plant. Indeed 43% say that the plant has no side effects whereas 57% of people using the plant testify that the plant has adverse effects.

Toxicological studies on dandelion are very limited. However, depending the chemical composition and the use of the plant, there are no adverse effects. To date, no side effects have been reported. The only element reported is the possibility of dermatitis in contact with dandelion latex <sup>15; 4</sup>. On the other hand, a study carried out by Akhtar MS et al in rats evaluated a rate of 3-6g/l for whole plant consumption <sup>25</sup>.

Moreover, a study in wistar rats showed that dandelion root extract is slightly toxic with an LD50 of 500 to 5000 mg/kg <sup>26</sup>.

Statistical analysis shows the difference in opinions regarding the side effects of the plant. Indeed 43% say that the plant has no side effects whereas 57% of people using the plant testify that the plant has adverse effects.

## CONCLUSION

Dandelion is a plant whose benefits have been discovered since ancient times, this plant forgotten nowadays, yet is an excellent medicinal plant with exceptional virtues. This survey revealed a multitude of results on the parts used, mode of preparation as well as the diseases treated.

The analysis of the results shows that academics predominate with a percentage of 45.8%, leaves and roots are the most used parts. This study also shows that the plant is used to treat hematological conditions in the first position followed by gastric pathologies. This information provides a database for further in vivo or in vitro research to improve the use of this plant.

**Conflicts of Interest:** No potential conflicts of interest reported by the authors

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