In vitro antioxidant activity of *Launaea nudicaulis* (*Asteraceae*) growing in Southwest of Algeria

Mebarka BELBOUKHARI[1,2], Abdelkrim CHERITI[1*] & Nasser BELBOUKHARI[3]
[1] *Phytochemistry & Organic Synthesis Laboratory*
Unviversity of Bechar, 08000, Bechar Algeria
[2] *Univ Ouargla, Fac. des Mathématiques et des Sciences de la Matière,*
Dépt. de Chimie, Ouargla 30 000 (Algérie)
[3] *Bioactive Molecules & Chiral Separation Laboratory*
Unviversity of Bechar, 08000, Bechar Algeria
*Email : karimcheriti@yahoo.com

ملخص : مضادات الأكسدة هي المواد الحيوية التي تمتلك القدرة على حماية الجسم من الأضرار الناجمة عن الجذور الحرة المسببة للأكسدة. تم العثور على مجموعة متنوعة من مضادات الأكسدة المزيحة للجذور الحرة في عدد من المصادر الغذائية. يرتكز الهدف الرئيسي لهذه الدراسة على فحص النشاطية المضادة للأكسدة للمستخلصات نبات *Launaea nudicaulis*. تم التحري عن النشاطية المختبرية المضادة للأكسدة باستعمال طريقة النشاطية الإزاحية تجاه الجذر الحر DPPH, بين التحليل الكمي لهذه النشاطية الإزاحية بأن مستخلصا n-BuOH و EtOAc هما أكثر المستخلصات نشاطا بنسب نشاطية مضادة للجذور 89.62% و 71.57% على التوالي .
الكلمات المفاتيح : *Launaea nudicaulis* , مضاد الأكسدة, جذر حر,DPPH

ABSTRACT: Antioxidants are vital substances, which possess the ability to protect the body from damages caused by free radical induced oxidative stress. A variety of free radical scavenging antioxidants is found in a number of dietary sources. The main objective of this study focused on the screening of antioxidant activity of *Launaea nudicaulis* (*Asteraceae*) extracts. The in vitro antioxidant activity was investigated with DPPH radical scavenging assay. The quantitative evaluation of DPPH scavenging activity showed that n-BuOH and EtOAc extracts are the most active extracts with a percentage of antiradical activity of 89,62% and 71,57% respectively.

KEY WORDS: *Launaea nudicaulis*, Antioxidant, Free radical, DPPH, Sahara

1. INTRODUCTION

Launaea Cass. is a small genus of the family Asteraceae (tribe Lactuceae, subtribe Sonchinae), consisting of 54 species, of which 9 are presented in the flora of Algeria and is mainly distributed in the South Mediterranean, Africa and SW Asia. Plants in the *Launaea* genus have been used ethnobotanically as bitter stomachic, for treating diarrhea, gastrointestinal tracts, as anti-inflammatory, for skin diseases, treatment of infected wounds, hepatic pains, children fever, as soporific, lactagogue, diuretic and as insecticidal [1-4].

Excess of free radicals that naturally occur in mammalian body through oxidative process is known to be involved in several human diseases such as Alzheimer, ageing process, cataracts, cardiovascular diseases, arteriosclerosis, nephritis diabetes mellitus, inflammatory process, rheumatism and DNA damage that can lead to carcinogenesis [5-7]. The level of these species produced by mitochondrial respiration, phagocytosis, redox cycles or radiation is maintained by neutralizing excess free radical species by nutritional trappers (vitamin C, E, carotenoids and polyphenols ...) or destruction by various enzyme systems like superoxide dismutases and glutathione peroxidases [5,8]. Antioxidants can interfere with the oxidation process by reacting with free radicals, chelating catalytic metals, acting as oxygen scavengers and prevent lipid auto oxidation [9-10]. Natural antioxidants as vitamin C, vitamin E, carotenoids and polyphenols like flavonoids are considered to be beneficial components from fruit and vegetables, they are responsible for the protective effects against different diseases [9, 11, 12].

On the other hand, triterpenoids and flavonoids chemio-characteristic of Asteraceae family, including the *Launaea* genus [13-15], have been reported to have antioxidant, cytoprotective, anti-

inflammatory activities, anti-hyperlipidemia, hepatoprotection, giving protection against cardiovascular disease and certain forms of cancer [1, 16, 17].

As a part of our works on medicinal plants of Algerian Sahara, recently we have reported the antibacterial activity of extracts from *Launaea Arborescens, L. Nudicaulis, Limoniastrum feei* and the antioxidant activity of *Warionia saharae* which are widely distributed in the south west of Algeria [2, 8, 18-20]. In the present work, we investigate the antioxidant activity of *Launeae nudicaulis* (Vernacular name: Reghama) extracts, a specie of the Asteraaceae family which is endemic in north Africa [21-23]. The aerial part of this plant was used in Sahara folk medicine for treating gastrointestinal tracts, burns, pain of stomach, constipation, to relieve fever in children, in the treatment of itches of skin and eczema [1, 2, 4, 22].

The antioxidant activity of *Launaea nudicaulis* extracts was evaluated by using 1,1-diphenyl -2- picrylhydrazyl (DPPH), which is a free radical and shows a characteristics absorption at 517 nm (purple). The purple color rapidly faded when DPPH encountered any proton radical scavengers [24, 25].

2. EXPERIMENTAL

2.1 Plant material

The leaves of *Launaea nudicaulis* were harvested in December 2010 from Bechar (South West Algeria). Voucher specimen is kept in the herbarium of POSL (Phytochemistry & Organic Synthesis Laboratory) under the number CA 02/02. Plant samples were dried at room temperature during three weeks, than finely ground with an electric grinder.

2.2 Preparation of the extracts

Dried and powdered leaves (50g) of *Launaea nudicaulis* were extracted over three hours with different solvent (250ml) of increasing polarity: Ether, $CHCl_3$, EtOAc and n-BuOH, the residue was concentrated after removing of solvent under reduced pressure.

2.3 DPPH radical scavenging activity

DPPH stable free radical method is an easy, rapid and sensitive way to survey the antioxidant activity of a specific compound or plant extracts [25]. The antioxidant activity of the crude extracts was assessed by the mean of 1,1-diphenyl-2-picrylhydrazyl (DPPH) colorometric method [8, 25, 26]. This method depends on the reduction of purple DPPH to a yellow color diphenyl picrylhydrazine which showed maximum absorption at 517nm. About 2ml of 0,2Mm DPPH methanolic solution were added to 1ml of methanolic solution of each extract. A mixture of 2ml of DPPH and 1ml of methanol served as control. The mixture was shaken vigorously then incubated for 30 min in darkness at room temperature.

Absorbance was measured at 517nm. Methanol was used as blank; each experiment was performed in triplicate. The DPPH Radical scavenging activity was calculated according to the following equation:

$$I(\%) = [\ 1\text{-}Ab_s/Ab_c\ ]x100$$

Where Ab_s is the absorbance of the plant extracts containing DPPH and Ab_c is the absorbance of blank solution of DPPH without the sample.

3. RESULTS AND DISCUSSION

The scavenging activity of $DPPH^{\cdot}$ Radical has been widely used to determine the free radical scavenging activity. $DPPH^{\cdot}$ is a stable free radical that is dissolved in methanol and its color shows a characteristic absorption at 517nm. Antioxidant molecules scavenge the free radical by hydrogen donation and the color from the $DPPH^{\cdot}$ assay solution becomes light yellow resulting in a decrease in absorbance.

In this present study, we investigate the antioxidant activity of different organic extracts from *Launaea nudicaulis* (Asteraceae). As shown in Table 1, n-BuOH extract present a high radical scavenging activity with 89,62 % and EtOAc extract with 71,57 %.

The other extracts showed lower activity, $CHCl_3$ extract with 33,96 % and Ether with no activity.

Table 1: DPPH radical scavenging activity of *Launaea nudicaulis* extracts

Extract	DPPH radical scavenging activity (%)
Ether	0
$CHCl_3$	33, 96
EtOAc	71,57
n-BuOH	89,62

The polar extracts are especially rich in soluble chemical substances. The radical scavenging activity demonstrated by this method may be mainly due to the presence of phenolic compounds in these polar extracts. Thus, in a recent study, the phytochemical study of *Launaea nudicaulis* showed that these specie rich in tannins and flavonoids , in addition ethyl acetate soluble fraction of methanolic extract of *Launaea nudicaulis* was subjected to chromatographic purification to get four new compounds including a quinic acid derivative Cholistaquinate, a pentahydroxy acetylene analog: Trideca-12-ene-4,6-diyne-2,8,9,10,11-pentaol, a flavone glycoside Cholistaflaside and a sesquiterpene lactone nudicholoid [27]. Finally it is well know that the presence of polyphenolic compounds increases the antioxidant activities [25].

4. CONCLUSION

The antioxidant activity of *Launaea nudicaulis* extracts evaluated in this present work by the mean of DPPH radical scavenging method showed that n-BuOH and EtOAc extracts present a high antioxidant activity, the strong free radical scavenging activity of *Launaea nudicaulis* shown in this study encourages further studies for the isolation and identification of active compounds present in these extracts.

5. REFERENCES

[1] A. Cheriti, M. Belboukhari, N. Belboukhari, H. Djeradi; *Current Topics in Phytochem.*; **11**: 67 (2012)
[2] N. Belboukhari, A. Cheriti; *Elec. J. Environ. Agron. Food Chem.*; **7**(14), 2749 (2008).
[3] N. Belboukhari, A. Cheriti, C. Roussel; *eCAM*; **4**(S1), 55 (2007).
[4] a) A. Cheriti, N. Belboukhari, K. Sekkoum, S. Hacini*; J. Alg. Reg. Arides*; **5**, 7 (2006).
b) Y. Bourmita, N. Belboukhari, A. Cheriti, M. D. Ould El Hadj; *Alg. J. Arid Env.*; **3**(1), 98 (2013).
[5] A. Tibiri, R. Sawadogo, N. Ouedraogo, J. Banzouzi; *Res. J. Med. Sci.*; **4**, 81 (2010).
[6] S. E. Atawodi; *Afr. J. Biotech.*; **4**, 128 (2005).
[7] A. Kassab, S. Laradi, S. Ferchicgi, J. Banzouzi; *Im. Anal. Biol. Spec.*; **18**, 79 (2003).
[8] M. Belboukhari, A. Cheriti, N. Belboukhari; *Nat. Prod. Ind. J.*; **7(3)**, 147 (2011).
[9] O. M. Atrooz, R. Sawadogo; *Pak. J. Bio. Sci.*; **12**, 1063 (2009).
[10] V. Bondet, W. B. William, C. Breset; *Leb. Wiss.Techn.*; **31**, 609 (1997).
[11] R. Peto, R. Doll, J. D. Buckley; *Nature*; **290**, 201 (1981).
[12] G. Block, B. Patterson, A. Subar; *Nutr. Cancer*; **18**, 1 (1992).
[13] N. Belboukhari, A. Cheriti, C. Roussel, N. Vanthuyne ; *Nat. Prod. Res.*; **24**(7), 669 (2010).
[14] A. Zellagui, N. Gherraf, S. Ladjel, S. Hameurlaine; *Org. Med. Chem. Let.*; **2**, 2 (2012).
[15] N. Gherraf, A. A. El-Bassuony, A. Zellagui, S. Rhouati, A. A. Ahmed, M. R. Ouahrani; *Asian. J. Chem.*; **18**, 2348 (2006).
[16] J. Lie ; *J. Ethnopharma.*; **49**, 57 (1995).

[17] A. Cheriti, A. Babadjamian, G. Balansard; *J. Nat. Prod.*; **57**, 1160 (1994).
[18] N. Belboukhari, A. Cheriti; *Pak. J. Bio. Sci.*; **9**(1), 1 (2006).
[19] N. Boulenouar, A. Marouf, A. Cheriti, N. Belboukhari; *J. Agr. Sci. Tech.*; **14**(3), 659 (2012).
[20] a) N. Belboukhari, A. Cheriti; *Asian J. Plant Sci.*; **4**, 496 (2005).
b) S. Rahmani, N. Belboukhari, A. Cheriti; *PhytoChem & BioSub J.*; **6** (2), 83(2012).
[21] P. Ozenda; *'Flore du Sahara'*, 2ed Ed. CNRS, Paris, (1983).
[22] A. Cheriti; '*Plantes Médicinales de la Région de Bechar, Sud Ouest Algérie: Etude Ethnopharmacologique*'; Rapport CRSTRA, Alger (2000)
[23] A. Chehma ; '*Catalogue des plantes spontanées du Sahara septentrional Algérien'*; Ed. Dar ElHouda, Ain Mila, Algeria (2006).
[24] T. Takao, F. Kitatani, N. Watanabe; *Biosci. Biotech. Biochem.*; **58**, 1780 (1994).
[25] M. Belboukhari, A. Cheriti, N. Belboukhari; *Asian J. Chem.*; **25**(11), (2013) under press.
[26] S. Tennyson, K. Balaraju, K. Park; *Asian Pac. J. Trop. Disease*; S712 (2012).
[27] M. Saleem, S. Parveen, N. Riaz, T. Nawaz, M. Ashraf, I. Afzal, M. Shaiq Ali, A. Malik, A. Jabbar; *Phytochem. Let.*; **5**(4) 793 (2012).