*Egypt. J. Bot.***Vol. 57**, No.1, pp. 1-10 (2017)

Nutritive Values of Some Wetland Plants in the Deltaic Mediterranean Coast of Egypt

Elsayed, M.A. Nafea
Aquatic Environment Department, Faculty of Fish Resources, Suez University, Egypt.

THIS STUDY aims to investigate the nutritive values of some wild plants in the coastal Deltaic Mediterranean wetlands of Egypt for sustainable uses and management; these are : *Arthrocnemum macrostachyum* (Moric) Koch , *Atriplex portulacoides L., Bassia indica (Weight) A. J. Scott, Chenopodium album* L., *Halocnemum strobilaceum (*Pall.) M. Bieb (Chenopodiaceae) , Amaranthus *hybridus* L (Amaranthaceae), *Portulaca oleracea* L.*(*Portulacaceae), *Bolboschoenus glaucus* L.(Cyperaceae) , *Sesbania sesban* L. *(*Fabaceae) and *Pluchea dioscoroides* (L.) DC. (Asteraceae) as their over growth and domination cause many serious environmental problems, So it is urgent to suggest the possible economic uses of these plants as a tool in sustainable management. The mean values of the physicochemical characteristics of soil samples collected underneath the studied species were carried out to be considered during cultivation of these plants. The determination of lipid, crude protein, total phosphorus , total carbohydrates, crude fiber, ash content and dry weight, as well as Na^+, K^+ and Ca^+ cations in the dry mater showed noteable variation among the studied species. The highest mean carbohydrates content was recorded in *P. oleracea* and *A. hybridus* with values of 211.3 and 291 mg/g dry wt. , respectively. The relatively high contents of carbohydrates, lipids and proteins in some selected plant species qualify them as suitable candidates to be used as animal feed stalk and natural organic fertilizers with safe manner. The high contents of Na^+, K^+ and Ca^+ ions in the studied plants make them also as a good source of mineral salts in food formulas, and as a tool for desalinization in the salt affected lands in the coastal Egyptian wetland habitats.

Keywords : Nutritive values , Sustainable management, Lipids, Soil , Wetland plants.

The over increase of human populations in the world leads to excessive global demands for food, forage and industrial raw materials which in turn needs much more efforts to seek a new sources of foods with low costs (Zahran and El-Amier, 2013). The coastal Deltaic wetlands of Egypt are rich in the natural vegetation in most all habitats and their over growth and dominance may cause many serious environmental problems, especially in roads sides at the borders of aquacultures , in irrigation and drainage canal banks. Therefore many studies have been carried out in order to evaluate the nutritive composition and uses of the promising natural plants of Egypt and in the world. Mashaly *et al.* (2007)

E mail: drsayednafea2005@yahoo.com

and Dhellot *et al.* (2007) studied family Amaranthaceae, and they found that, this family has high contents of proteins and carbohydrates, as well as it is easy to be cultivated and naturalized, accordingly they recommended the use of some members of this family as food and feed supplements. Zahran and El-Amier (2013) studied the nutrient contents of six salt tolerant species growing naturally in the coastal wet salt marshes in Egypt, and they recommended the possibility of using these plant species as natural renewable resources of fodder. Also, they found that, *Bassia indica* is more palatable for animals, and it contains high contents of carbohydrates and proteins, while *Arthrocnemum macrostachyum* and *Halocnemum strobilaceum* are not palatable, but its high nutrient contents and its good vegetative yields qualify them as a suitable candidates as natural raw materials for fodder production. Gutteridge (1994) investigated the nutrients contents of *Sesbania sesban*, and he suggested the uses of seeds and leaves of this shrub as a fodder for animals due to its high mineral contents and nutritional values. *Portulaca oleracea* is an annual flowering species belonging to family Portulacaceae contains many biologically active components (oxalic acids, omega–3 fatty acids, coumarins, flavonoids and cardiac glycosides) which make it as a good nutritive source of omega-3 fatty acids (Palaniswamy, 2000) . On the other hand, the study of the Phytochemical composion of *Halocnemum strobilaceum* was carried out by Radwan and Shams (2007) who suggested the importance of this plant species as a source of mineral salt, especially sodium .Accordingly , the main aim of the present study was to select the most common plant species growing in the coastal Deltaic wetland habitats in Egypt, especially those are characterized by high biomass production to be used as natural renewable resources in the sustainable management of the study area. Ten selected plant species includes: *Arthrocnemum macrostachyum* (Moric.) Koch. , *Atriplex portulacoides* L, *Bassia indica (*Weight) A.J. Scott., *Chenopodium album* L, *Halocnemum strobilaceum (*Pall.) M. Bieb (Chenopodiaceae), *Amaranthus hybridus* L. (Amaranthaceae), *Portulaca oleracea* L. (Portulacaceae) , *Bolboschoenus glaucus* L. (Cyperaceae), *Sesbania sesban* L. (Fabaceae) and *Pluchea dioscoroidis* (L.) D C. (Asteraceae) for evaluation and determination of their nutrient contents (lipids , crude proteins, total N, total P, total carbohydrates, crude fiber, ash content and dry weight, as well as Na^+, K^+ and Ca^+ contents (mg/g dry wt.) .

Materials and Methods

The study area is a part of the Mediterranean coastal land of Egypt , including the Deltaic wetland habitats (Lake Manzala at the east , lake Burullus at the middle and lake Edku at the western part of the northern Egyptian Delta as shown in, Fig .1. The study area is rich in the natural plant species with about 197 to 255 species, (Mashaly, 1987; Nafea, 2005 ; Younis and Nafea, 2012 & 2015) .

Fig .1. Location map showing the study area.

Field trips were arranged during Spring-Autumn 2015 to visit the study area for collection of the selected plant species from different habitats and locations at random way with uniform sized of the vegetative part of ten plant species include; *Arthrocnemum macrostachyum, Atriplex portulacoides and Halocnemum strobilaceum from salt marshes, Bassia indica ,Chenopodium album , (*Chenopodiaceae), *Amaranthus hybridus.(* Amaranthaceae), *Portulaca oleraceae* (Portulacaceae) from roods sides *Bolboschoenus glaucus* (Cyperaceae) from reed swamps, *Sesbania sesban* seeds (Fabaceae) and *Pluchea dioscoroidis* (Asteraceae) from non cultivated lands. The shoot system of each species was cleaned , air dried in shade , ground to fine powders and preserved in well closed polyethylene bags for later chemical analyses, Triplicate samples from whole shoot (vegetative parts) of each species were used. Lipid and crude fiber contents were determined according to Maynard (1970). The total nitrogen was determined according to Keeney and Nelson (1982), while the total phosphorus (TP) was determined according to Bowman (1988).

The crude protein was calculated by multiplying the total nitrogen by the factor 6.25 (AOAC, 2000) . Estimation of total carbohydrates was according to Pakuiski and Nniji (1992). Total ash contents and laboratory dry matter by oven drying for 2 hr at 135°C was determined according to AOAC (2000). The cations were estimated by flame emission photometric method of Ca^{2+}, K^{+} and Na^{+} according to APHA (1998). The lipid contents , crude protein, total N, total P, total carbohydrates, crude fiber, ash contents and dry weight, as well as Na^{+}, K^{+} and Ca^{++} contents were determined in respect to mg/g dry wt. in the plant species. The mean value and standard deviation of the obtained results were calculated. The physicochemical variables of the soil samples collected underneath the studied plant species (for each species five soil samples were collected at depth10cm and mixed to form a composite sample used in analysis) were carried out according to Piper (1947) and Jackson (1967).

Results

The obtained results showed that the highest contents of lipid and crude protein were estimated in *Sesbania sesban* with values of 49.2, 239.2 mg/g dry wt., respectively, while the lowest contents were recorded in *Arthrocnemum macrostachyum* with values of 11.6 and 10.2 mg/g dry wt., respectively (Table 1). The highest carbohydrates contents were determined in *Amaranthus hybridu*s and *Portulaca oleracea* with values of 291 and 211.3 mg/g dry wt. , respectively. Total phosphorus exhibited the highest value (90.7 mg/g dry wt.) in *Bassia indica*, and the lowest value (0.1 mg/g dry wt.) in *Chenopodium album*. while crude fiber attained the highest value (271.1 mg/g dry wt.) in *Bolboschoenus glaucus* and the lowest value (82.4 mg/g dry wt.) in *Atriplex portulacoides*. The highest content of sodium (Na^+) ion was detected in *Arthrocnemum macrostachyum*, *Halocnemum strobilaceum* and *Atriplex portulacoides* with values of 210.2 , 172.3 and 101.3 mg/g dry wt., respectively . The mean value of potassium (K^+) ion content was recorded in different chosen plant species showed a flocculation from 51.3 mg/g dry wt. in *Portulaca oleracea* to 9.3 mg/g dry wt. in *Atriplex portulacoides* (Table 2) while the highest calcium (Ca^{++}) ion contents was recorded in *Atriplex portulacoides* with value of 32.1 mg/g dry wt.

TABLE 1. The mean values and standard deviation of the Phytochemical analysis of the studied plant species.

No	Parameter species	Lipid content		Crude protein		Total Phosphorus		Total carbohydrates		Crude fiber	
		mg/g dry wt	±SD	mg/g dry wt	±SD	mg/g dry wt	±SD	mg/g dry wt	±SD	mg/g dry wt	±SD
1	*Arthrocnemum macrostachyum*	11.6	0.43	10.2	3.4	1.92	0.11	105.3	3.9	179.2	15.2
2	*Atriplex portulacoides*	18	0.001	71	2.1	1.63	0.022	104.6	0.71	82.4	2.37
3	*Bassia indica*	18.5	2.31	167.3	1.7	90.7	1.71	192.4	1.4	157.8	0.7
4	*Chenopodium album*	25.7	0.9	191.6	11.8	0.1	0.01	193.4	0.93	191.7	7.1
5	*Halocnemum strobilaceum*	14.2	3.1	89.7	0.8	1.92	0.09	83.9	0.33	90.1	2.31
6	*Amaranthus hybridus*	37.5	3.2	79.1	2.9	39.2	.92	291	5.3	117	11
7	*Portulaca oleracea*	39.1	3.9	97.3	7.71	2.61	0.51	211.3	4.9	110.1	9.7
8	*Bolboschoenus glaucus*	16	0.1	67.12	1.4	1.92	0.51	181.3	0.4	271.1	8.7
9	*Sesbania sesban* seeds	49.2	0.8	239.5	9.8	27.9	4.3	157.5	2.41	93.7	0.93
10	*Pluchea dioscoroidis*	22.13	1.1	104.1	7.1	4.11	1.1	143.12	2.1	236.2	0.92

TABLE 2. The mean value and standard deviation of some cations , Dry weight and Ash contents.

No	Parameter species	Na^+		K^+		Ca^{++}		Ash contents		Dry weight	
		mg/g dry wt	±SD	mg/g dry wt	±SD	mg/g dry wt	±SD	mg/g dry wt	±SD	mg/g dry wt	±SD
1	*Arthrocnemum macrostachyum*	210.2	9.3	11.3	1.5	7.2	0.63	453	5.6	963.4	3.2
2	*Atriplex portulacoides*	101.3	3.21	9.3	90.5	32.1	2.13	419.7	2.5	893.3	3.9
3	*Bassia indica*	37.1	1.3	22.9	2.1	18.1	4.1	163.7	1.2	906	1.8
4	*Chenopodium album*	9.51	0.93	36.11	7.5	12.31	2.8	190	8.2	871	8.2
5	*Halocnemum strobilaceum*	172.3	3.9	9.61	0.23	7.83	0.61	419.8	10.7	892.1	4.1
6	*Amaranthus hybridus*	10.1	0.91	16.2	1	27.4	2.3	281	1.5	947	3.2
7	*Portulaca oleraceae*	7.12	0.4	51.3	0.4	8.1	1.3	207	0.3	918.3	2.7
8	*Bolboschoenus glaucus*	0.31	o.21	12.7	0.42	7.12	76.91	115.3	9.7	911	2.7
9	*Sesbania sesban* seeds	3.1	0.3	18.12	1.5	2.34	o.6	45.2	0.8	961.3	2.1
10	*Pluchea dioscoroidis*	9.12	0.31	33.7	1.31	10.22	0.67	115.13	0.92	917	2.1

The results of soil analysis revealed that the mean pH was in general slightly alkaline and ranged between 7.8 to 8.5, while the mean salinity level graduated from 0.7 to 7.2 g/l. The organic carbon content was detected with comparable contents (1-1.4%). Calcium carbonate was observed with medium percentages and ranged between (12.5 to 27.3 %) as shown in Table 3.

TABLE 3. The mean values and standard error of some chemical variables in the soil of the selected plant species .

No	Parameters Species	pH	E C g/ l	OC %	$CaCO_3$ %
1	*Arthrocnemum macrostachyum*	8.3±1	6.2±5	1.2±1	27.3±17
2	*Atriplex portulacoides*	7.8±1	5.9±4	1.1±1	26.3±13
3	*Bassia indica*	8.4±1	0.8±0.6	1.4±1	14.3±5
4	*Chenopodium album*	8.2±1	0.7±0.4	1.2±1	16.3±6
5	*Halocnemum strobilaceum*	8.5±2	7.2±6	1.0±1	25.3±14
6	*Amaranthus hybridus*	8.1±1	3.1±6	1.1±1	27.3±15
7	*Portulaca oleracea*	8.1±2	4.1±6	1.1±1	23.7±12
8	*Bolboschoenus glaucus*	8.1±1	2.6±2	1.0±1	12.5±5
9	*Sesbania sesban seeds*	8.3±2	3.2±6	1.2±1	23.2±13
10	*Pluchea dioscoroidis*	8.0±2	4.2±6	1.1±1	26.1±11

Discussion

The over growth of wild plants in the coastal Deltaic wetland habitats in Egypt gives us a power for seeking about a new tools for management of these plants .So, the main aim of this study was to investigate the Phytochemical constituents of these plants for its useful economic uses and as a tool of management . The high crude fiber content of *Bolboschoenus glaucus* (271.12 mg/g dry wt.) make it a suitable source of fibers, as it can grow and flourish at canal banks , shallow ponds and swamps around the Deltaic lakes (Burullus , Idku and Manzala) located at the northern coastal wetlands of the Mediterranean region. This plant species has great ability to absorb and accumulate some primary compounds and nutrients element from the waste water (Nafea, 2005). Therefore, it can be cultivated at the irrigation and drainage canals, and it could be used in the formulation of the organic fertilizers which could be used in newly reclaimed lands, as well as source of fibers, this agrees with the findings of Mashaly (1987; 1993 & 2001); Nafea (2005 & 2016) ; Younis and Nafea (2012 and 2015) .

The Phytochemical composition of *Amaranthus hybridus* showed a relatively high carbohydrates content (291 mg/g dry wt.) , considerable amounts of lipids (37.5 mg/g dry wt.) and crude protein (79.1 mg/g dry wt.), as well as reasonable mineral salt concentrations with special reference to potassium (16.2 mg/g dry wt.) and calcium cation (27.4 mg/g dry wt.). So, it is considered as a promising source of feeding and organic fertilizers. On the other hand, this plant species showed a great abundance with dense growth and wide distribution in different habitats of the coastal wetlands that permit the easy and economic gathering processes, cultivation and production by high amounts without needing of fertilizers (Mashaly *et al*., 2007 and Nafea, 2005). In case of *Portulaca oleracea* it was revealed that this plant species can accumulate high amounts of potassium, therefore it could be used for phytoremediation and as new natural source of organic fertilizer. It attained also high carbohydrates and protein contents , so it could be as one of promising feedstock, this agrees with the finding of (Mubashir *et al*., 2011) who reported the use of *Portulaca oleracea* in medicinal treatment of inflammatory conditions and as antimicrobial agents against different pathogenic microbes. *Bassia indica* showed considerable contents of protein and carbohydrates, as well as relatively high mineral elements , thus it could be considered as promising raw materials in organic fertilizer and animal feedstock, this agrees more or less with the finding of Zahran and El-Amier (2013) and also it was confirmed by the finding of Younis and Nafea (2015). The relatively high mineral salts in *H. strobilaceum*, *A. macrostachyum* and *A. portulacoides* emphasized the uses of these obligate halophytes as promising tools for desalinization of the saline habitats and salt affected lands in the Deltaic wetlands of Egypt, this agrees more or less with the findings of El-Shourbagy *et al.* (1984), in the salt marshes of northern Egypt and Ramadani *et al.(*2001) in northern African wetland lakes .

The soil analysis give us evidence about the suitable condition for the growth and cultivation of the selected plant species.

Conclusion

It could be concluded that the studied plant species have considerable contents of crude protein, lipids and carbohydrates, as well as high content of sodium, calcium and potassium cations, so these species could be suggested as being a potentially promising supplementary feeding, and natural raw materials in organic fertilizer formulation as well as to be used as new tools for environmental management and sustainable development especially in the vast neglected salt-affected lands in the developing countries.

References

APHA (American Public Health Association), (1998) Standard Methods for the Examination of Water and Waste Water ed. 20th Water pollution Control Federation, Washington, D.C.

AOAC (Association of Official Analytical Chemistry) (2000) Official Method Protein(crude protein) in Animal Feed, Forages (Plant Tissue) Grains and Oil Seeds. Block Digestion Method**.**

Bowman, R.A. (1988) A rapid methods for determining total phosphorus in soil . *Soil Science, American Journal* , **52**, 1301-1304.

Dhellot, J., Matouba, R., Maloumbi, E., Nzikou, N., Safou, N.D., Linder, G., Desobry, M. and Parmentier, M. (2007) Extraction, chemical composition and nutrional characterization of vegetable oils : case of *Amaranthus hybridus* (var 1 and 2) of Congo Brazzaville. *African Journal of Biotechnology***, 5** (11), 1095-1101.

El-Shourbagy, M.N., Ahmed, A.M., Osman, M.E. and Hamada, E.M. (1984) Adjustment of different halophytes to mediterranean salt marshes of North Egypt. *Phyton*. (Austria), **24**, 101-112 .

Gutteridge, R.C. (1994) The Perennial *Sesbania* Species. In: "*Forage Tree Legumes in Tropical Agriculture*" Gutteridge, R.C. and Shelton, H.M. (Eds). 49-64.

Jackson, M. L. (1967) "*Soil Chemical Analysis Constable and Co-LTD*". London.

Keeney, D.R. and Nelson, D.W. (1982) Nitrogen-Inorganic Forms. 234. "*Methods of Soil Analysis*". Part 2. 2nd (ed):643- 698 .

Mashaly, I.A. (1987) Ecological and Floristic Studies of Dakahlya- Damietta Region. *Ph.D. Thesis*, Fac. Sci. Mansoura Univ., Egypt.

Mashaly, I.A. (1993) Comparative ecological studies on two halophytes: *Juncus subulatus* and *Diplachne fusca,* deltaic mediterranean coast of Egypt. *Journal of Environmental science Mansoura Univ.*, **5**, 281-197.

Mashaly, I.A. (2001) Contribution to the ecology of the Deltaic Mediterranean coast , Egypt. *On line Journal of Biological Sciences*,**1** (7), 628-635.

Mashaly, I.A., Abu-Ziada, M.E., El-Halawany, E.F. and Masoud, G.F. (2007) Autecological and phytochemical studies on genus *Amaranthus* in Nile Delta, Egypt. *Catrina*, **3** (1), 81-91.

Maynard, A.J. (Ed.) (1970) "*Methods in Food Analysis*". Academic Press , New York .

Mubashir, H.M., Bahar, A., Showkat, R.M., Bilal, A.Z. and Nahida, T. (2011) An review of *Portulaca oleracea* L.. *Journal of Pharmacy Research*, **4** (9) , 3044-3048.

Nafea, E.M.A. (2005) On the ecology and sustainable development of the Northern Delta Lakes, Egypt. *Ph.D. Thesis* , Fac. Sci. Mans. Univ. Damietta Branch ..

Nafea, E.M. (2016) Characterization of environmental conditions required for production of livestock and fish fodder from duckweed (*Lemna gibba* L.). Journal of Mediterranean Ecology, **14**, 5-11.

Pakuiski,, J.D. and Nniji, R.B. (1992) An improved method for the hydrolysis and MBTH analysis of dissolved and particulate carbohydrates in seawater. *Mar. Chem*., **40,** 143-l 60.

Palaniswamy, U. (2000) Omega-3 fatty acid concentration in *Portulaca oleracea* is altered by nitrogen source in hydroponic solution. *Journal of American Society Horticulture Science*, **125**, 190-194.

Patrick, T. (2001) North African Wetland Lakes: Characterization of Nine Sites Included in the CASSARINA Project. *Aquatic Ecology*, **35,** 281-302 .

Piper, C.S. (1947) Soil and Plant analysis. Inter. Sci. Pub. Int. New York.

Radwan, H.M. and Shams, K.A. (2007) : Phytochemical and biological investigations on *Halocnemum strobilaceum* (Chenopodiaceae). *Planta Medica,* **73**, 10: 1055.

Ramadani , R., Flower, R., El-Khiativ, N., Kraiem, M., Fathi , A., Younis., A.M. and Nafea, E.M. (2012) Impact of environmental conditions on the biodiversity of Mediterranean Sea lagoon, Burullus Protected Area, Egypt. *World Applied Science Jounal*, **19** (10), 1423-1430.

Younis., A.M. and Nafea, E.M. (2015) Heavy metals and nutritional composition of some naturally growing macrophytes of Northern Egyptian Lakes. *Journal of Biodiversity and Environmental Sciences* , **6**, 16-23.

Zahran, M.A.Z. and El-Amier, Y.A. (2013) Non-traditional fodders from the halophytic vegetation of the Deltaic Mediterranean coastal desert, Egypt. *Pakistan Journal of Biological Sciences* **, 16** , 239-247.

(*Received* 26/8/2016 ;
accepted 8/11/2016)

تقدير القيمة الغذائية لبعض نباتات الأراضي الرطبة بساحل الدلتا لمصر

السيد محمد علي نافع
قسم البيئة المائية - كلية الثروة السمكية - جامعة السويس - السويس- مصر.

تهدف هذه الدراسة إلي تقدير القيمة الغذائية لبعض النباتات التي تنمو بريا بساحل الدلتا بمصر بهدف الإدارة المستدامة لهذه المنطقة وبها النباتات التي يمثل تواجدها ونموها بصورة كبيرة مشكلة بيئية كبري ولذا فقد تم اختيار عدد عشرة نباتات تنتمي إلي عائلات نباتية مختلفة وهي كالأتي :نبات الهمد (*Arthrocnemum macrostachyum*) ونبات القطف *(Atriplex portulacoides)* ونبات الكوخيا *(Bassia indica)* ونبات الزربيح الأبيض *(Chenopodium album)* ونبات الحطب *(Halocnemum strobilaceum)* وجميعهم ينتمي إلي العائلة الرمرامية (Chenopodiaceae) ونبات عرف الديك *(Amaranthus hybridus)* والذي ينتمي إلي عائلة الامارنطون (Amaranthaceae) ونبات الرجلة (*Portulaca oleracea*) والذي ينتمي إلي العائلة (Portulacaceae) الرجلة وكذلك نبات السعد (*Bolboschoenus glaucus*) الذي ينتمي إلي العائلة السعدية (Cyperaceae) وبذور نبات السيسبان *(Sesbania sesban)* والذي ينتمي إلي عائلة البقوليات (Fabaceae) ونبات البر نوف *(Pluchea dioscoroidis)* والذي ينتمي إلي العائلة المركبة (Asteraceae) حيث إن نمو هذه النباتات يمثل مشاكل بيئية كثيرة ولذا فان هذا البحث يهدف إلي اقتراح استخدام اقتصادي أمثل كأحد فروض الإدارة المستدامة للمناطق الملحية المهملة .

قد تم دراسة خصائص التربة التي تنمو بها تلك النباتات وذلك لمعرفة الظروف البيئية التي تنمو بها هذه النباتات كما تم تقدير نسبة البروتينات والدهون والنشويات

بالإضافة إلي النيتروجين والفسفور الكلي بتلك النباتات بالإضافة إلي تعيين عناصر والبوتاسيوم والكالسيوم والصوديوم بها .

أوضحت هذه الدراسة إن أعلي متوسط لمحتوى الدهون كان (٤٩,٢ و ٣٩,٣ مجم /جم وزن جاف) حيث سجل في نبات السيسبان والرجلة علي التوالي ، وكان أعلي نسبة للبروتينات قد سجلت في نباتي السيسبان و الزربيح (٢٣٩,٥ و١٩١,٦ مجم /جم وزن جاف علي التوالي) . ومن ناحية أخري فقد سجل اعلي محتوى للنشويات (٢١١,٣ و٢٩٠ مجم /جم وزن جاف) في نباتي الرجلة وعرف الديك علي التوالي ، حيث إن المحتوى العالي من الدهون والبروتينات والكربوهيدرات في هذه النباتات قد يجعلها تستخدم في أعلاف الحيوانات والمخصبات العضوية بطريقة أمنة وبخاصة في الأراضي المستصلحة حديثا ، كما أن وجود نسب عالية من الصوديوم والبوتاسيوم والكالسيوم في تلك النباتات قد يجعلها تستخدم كمصادر طبيعية لتلك العناصر وكطرق حيوية لامتصاص تلك الأملاح من التربة كأحد طرق إعادة التأهيل الحيوي للتربة ونزع الملوحة منها كنوع من التنمية المستدامة في المناطق الملحية المهملة وخاصة في البلدان النامية .