VOL. 1, NO. 2, AUGUST 2006 ISSN 1990-6145
Journal of Agricultural and Biological Science

www.arpnjournals.com

WEEDS AS HUMAN FOOD- A CONQUEST FOR CHEAPER MINERAL SOURCES

Iftikhar Alam Khattak[1], Ijaz Ahmad Khan[2] and Wajahat Nazif[3]
[1]Department of Human Nutrition, NWFP Agricultural University, Peshawar, Pakistan
[2]Department of Weed Sciences, NWFP Agricultural University, Peshawar, Pakistan
[3]Department of Soil and Environmental Sciences, NWFP Agricultural University, Peshawar, Pakistan
E-mail: ialamk@yahoo.com

ABSTRACT

This study was conducted in April to September 2005 in Peshawar. The aim of the study was to analyze weeds, usually used as vegetables, for their mineral composition and to find out their consumption in the female subjects of the area. Two leafy weeds, used as non-conventional vegetables, were analyzed for selected mineral composition. Amarnath (*Amaranthus dubius)* and wild onion *(Brodiaea capitata)* appeared to have different levels of minerals. Amarnath had the highest iron content (34.2 mg/100 g) followed by wild onion leaves (6.9 mg/100g). The Ca, P, Mg, Mn, Cu, and Zn contents of amarnath were 721.2, 654.8, 812.5, 3.8, 1.1, and 4.3/100g, respectively. The contents of these minerals in wild onion leaves were 45.5, 56.9, 154.7, 0.56, 0.68, and 2.98, mg/100g, respectively. The poor families used these weeds abundantly during the season and also they dried them for off season use. Thus these contribute good part of the female RDA's for these minerals. The intake of these weeds by female subjects (n = 107, mean age =34.5±7.8) of the study show that these vegetables contributed 41 to 79 % of the RDA's of these minerals of the female subjects of the study locality. The conclusion of the study is that edible weeds can be proved to be good sources of nutrients for human consumption. Further work is needed on the chemical composition of all weeds used as human diet.

Keywords: weeds, human food, minerals, RDA.

INTRODUCTION

The ever-growing human population needs a search for less expensive nutritive sources of food. There are crops often ignored, although having good nutritive values and which can help in coping with the problem to balance the equation between population and food needs (Oyebiodum *et al*, 1983). Work on chemical composition of wild plants has bee extensively undertaken in poor countries like Nigeria (Eromosele *et al*, 1991; Eromosele *et al*, 1993). The conventional vegetables, grown in fields are expensive for most of the people. These wild crops can prove a good alternative for those expensive vegetables.

According to FAO's Production Yearbooks art of the old tradition is still maintained in some Latin American and eastern Asian countries. In Mexico, more than 20 "weeds" are used as food (Linares and Aguirre 1992). In Korean local markets 112 wild plants are sold at prices higher than those of cultivated species. Moreover, some weeds are exported to the U.S.A. and used to prepare Korean and Chinese typical dishes (Pemberton and Lee 1996). Similarly, Moroccan weeds are exported with the same purpose to the U.S.A., Spain, Italy and Greece (Tanji and Nassif 1995). The use of edible wild plants and weeds has been considered by several authors (Harris 1969, Kunkel 1984, Facciola 1990, Zurlo and Brandão 1990, Duke 1992, Linares and Aguirre, 1992). Clarke (1977), Michael (1980), and Linares and Aguirre (1992) have reported numerous weed based food recipes.

Amarnath is one of the weeds containing much more vitamin A precursor than cabbage and can help to prevent blindness. Amaranth has 13 times more iron than green cabbage, 9 times the calcium, and 57 times more vitamin A precursor. Wild onion is another weed commonly distributed in fields in winter season. It has many uses; particularly its leaves are cooked with maize cake in traditional *tandoors*. Its bulbs are best cooked, as by slow roasting in n hot ashes, which develops the sweetness. When boiled, this little root is palatable and somewhat resembles the taste of the common potato. The Indian method of preparing it, however, is the best, in which it is roasted on rocks in tandoors. The cooked mass obtained can be pressed into cakes and then dried in the sun, may be preserved for the future use.

In Pakistan, there are numerous varieties of field grown vegetables. These vegetables are expensive and the poor have to look to the weeds for diet. The deficiencies of most of the vitamins present in vegetables are common in Pakistan. The use of these wild vegetables can help in combating these deficiencies. The only need is to explore the chemical composition of these vegetables and to include them in the daily menu planning. Our interest was to evaluate the mineral composition of these vegetables and their contribution in nutriets supply in female of rural areas.

MATERIALS AND METHODS

Sample collection:

Samples were collected from 34 various places of Peshawar rural outskirts. Young and tender leaves of Amaranthus dubiu and Brodiaea capitata were separated from their stalks. The leaves were washed thoroughly with de-ionized water and dried in sun. Then these leaves were dried in oven at 700°C. Leaves of the same

dried samples were then powdered with a hammer mill. The powder was kept in airtight poly-ethene bags and stored in freezer for further mineral analysis.

Mineral analysis:

The samples were digested using nitric acid and perchloric acid mixtures according to the methods of Pusphanjali and Santosh (1995). The samples were analyzed for Ca, P, Mg, Mn, Cu, and Zn contents by atomic absorption spectrometry according to the methods given in AOAC (2003). All analyses were carried out in triplicates.

Consumption of weeds:

The intake of these wild vegetables by the female subjects (age 20-45 yrs) of the localities were asked and recoded in a questionnaire. Data from 112 female subjects of 78 families was obtained. These weeds were cooked according to the ordinary cooking methods and made into a curry called SAAG.

RESULTS AND DISCUSSION

Mineral composition:

The mineral composition of *Amaranthus dubiu* and *Brodiaea capitatais* is given in Table-1. The mineral contents of these two edible weeds were different from each other. The Fe, Ca, P, Mg, Mn, Cu, and Zn contents of amarnath were 28.7, 721.2, 654.8, 812.5, 3.8, 1.1, and 4.3 per 100g dry weights, respectively. The contents of these minerals in wild onion leaves were 0.46, 45.5, 56.9, 154.7, 0.56, 0.68, and 2.98, mg per 100g dry weight, respectively. Amarnath was much richer in all mineral contents as compared to wild onions.

Table-1. Mineral contents of weeds.

Weed Type	Fe	Ca	P	Mg	Mn	Cu	Zn
Amaranthus dubiu **(Amarnath)**	28.7	721.2	654.8	812.5	3.8	1.1	4.3
Brodiaea capitatais **(Wild Onion)**	0.5	45.5	56.9	154.7	0.6	0.7	2.9

Average daily intakes:

The data regarding the average daily intake of these vegetables showed that the daily diet of female from the study area contained 150±4.5 g (100.3 ± 13.4g *amarnath* and 50.4 ±11.3 g *wild onion*) fresh leaves of these weeds. Converted into dry weight, 150.2 g fresh weight of these vegetables would yield 15.01 ± 2.4 g of dry weight. The total average of minerals (mg) provided by these vegetables calculated on their dry weight basis is given in Table-2 with the RDA's for these minerals. The percent adequacy for these minerals furnished by these vegetables is also presented in Table-2.

Table-2. Intake of minerals.

Minerals	RDA's	Intake	% Adequacy
Fe	15	2.8	19
Ca	800	73	9
P	800	69	9
Mg	280	79	28
Mn	5	0.41	8
Cu	2	0.15	8
Zn	12	2.0	17

From nutrition viewpoint, these vegetables may prove good sources of minerals, particularly Ca and Fe. Though Fe and Ca from plant sources are considered not enough well as they are poorly absorbed. It is, however, should be understand that if combined with some food from animal source, the efficiency of mineral absorption can be enhanced. Nevertheless, as these wild vegetables come for free, their importance as sources of cheaper mineral sources can not be overlooked. Calcium is necessary for bone and skeletal development and iron is essential for hemoglobin formation. The other minerals perform a varity of physical and physiological functions. In conclusion, wild vegetables are rich sources of minerals. Poor people, in particular, should benefit from them. In recommendations, there is a need to work out the nutritional composition of wild weeds. Thus they can be evaluated as foods for human consumption.

REFERENCES

Anonymous. 1991. Catálogo de especies vegetales consideradas malezas. Asoc. Mex. Ciencia de la Maleza, AMCM México, D.F. p. 92.

Bianco, C. A. and J. J. Cantero. 1992. Las plantas vasculares del suroeste de la Provincia de Córdoba. Iconografía. Facultad Agronomía y Veterinaria. Universidad Nacional Río Cuarto, Río Cuarto, Argentina. p. 229.

Boom, B. M. 1987. Ethnobotany of the Chácobo Indians, Beni, Bolivia. Adv. Econ. Bot. 4: 1-68.

Clarke, C. B. 1977. Edible and useful plants of California. University of California, Berkeley, California. p. 280.

Coley, P. D., J. P. Briant and F.S. Chapin. 1985. Resource availability and plant anti-herbivore defense. Science 230: 895-899.

Derksen, D. A., A. G. Thomas, G. P Lafond, H. A Loeppky and C. J. Swanton. 1993. Impact of agronomic

practices on weed communities: Fallow within tillage systems. Weed Sci. 42:184-194.

Domínguez Barradas, B. A. 1995. La vegetación vascular espontánea en calles y banquetas de la Ciudad de Xalapa, Veracruz. Tesis Licenciatura, Universidad Veracruzana, Facultad de Biología, Veracruz, México. p. 93.

Duke, J. A. 1992. Handbook of edible weeds. CRC, Boca Raton, Florida. p. 246.

Facciola, S. 1990. Cornucopia. A source book of edible plants. Kampong, Vista, California. p. 678.

FAO. 1987. Production yearbook. Food and Agriculture Organization, United Nations, Rome: 1-306.

Farji-Brener, A. G. 1996. Posibles vías de expansión de la hormiga cortadora de hojas Acromyrmex lobicornis hacia la Patagonia. Ecología Austral 6: 144-150.

Felger, R. S., and G. P. Nabhan. 1978. Agroecosystem diversity: A model from the Sonoran desert. AAAS (Am. Assoc. Adv. Sci.) Selected Symposia 10.

Franceschi, E. A. 1996. The ruderal vegetation of Rosario City, Argentina. Landscape Urb. Plann. 34: 11-18.

Frankton, C. & G.A. Mulligan. 1977. Weeds of Canada. Canada Deptartment of . Agriculture, Publication 948. p. 217.

Godwin, H. 1969. The history of weeds in Britain. p. 1-10. In: The biology of weeds. J. L. Harper (ed.). Blackwell, Oxford, U.K.

Gómez, C.M. and M. Soto. 1990. Climático del Municipio de Coatepec. Instituto de Ecología, Publ. No. 27, Xalapa, Veracruz, México.

Grigera, D., E. Bianchi, C. Brión, J. Puntieri and N. Rodríguez. 1989. Carta del medio ambiente y su dinámica de San Carlos de Bariloche, 1987. Universidad Nacional del Comahue, Bariloche, Argentina. p. 40.

Harris, B. C. 1969. Eat the weeds. Keats Publishing Inc., New Canaan, Connecticut, p. 254.

Holm, L. G., D. L. Plucknett, J. V. Pancho and J. P. Herberger. 1977. The world's worst weeds. University of Hawaii, Honolulu, Hawaii, p. 609.

King, L. W. 1966. Weeds of the world. Biology and Control. Leonard Hill, London. p. 526.

Kunkel, G. 1984. Plants for human consumption. Koeltz Scientific Books, Koenigsten, Germany. p. 393.

Kuznar, L. A. 1993. Mutualism between Chenopodium, herd animals, and herders in the south central Andes. Moun. Res. Dev. 13: 257-265.

Ladio, A. H., E. Raffaele, L. Ghermandi, M. E. Díaz-Betancourt, I. López-Moreno and E. H. Rapoport. 1998. Las malezas en las ciudades de S.C. de Bariloche y Coatepec y su potencial oferta alimentaria. Actas XIII Congr. Latinoam. Malezas, Buenos Aires, Argentina.

Lema, O. W. 1988. Catálogo ilustrado de la flora de Salto Grande. Introducción a su estudio. Tomo I. Comisión Técnica Mixta de Salto Grande, Argentina-Uruguay. p. 312.

Linares, E. and J. Aguirre (eds.) 1992. Los quelites, un tesoro culinario. Universidad Autónoma de México & Instituto Nacional de la Nutrición "Salvador Zubirán", México. p. 141.

Michael, P. 1980. All good things around us. A cookbook and guide to wild plants and herbs. Holt, Rinehart and Winston, New York, p. 240.

Martínez-Crovetto, R. 1968. Estudios etnobotánicos. IV. Nombres de plantas y su utilidad, según los indios onas de Tierra del Fuego. Etnobiologica 3: 12-19.

Marzocca, A., O. J. V. Márgico and O. Del Puerto. 1976. Manual de malezas. Hemisferio Sur, Buenos Aires, Argentina. p. 564.

Misra, J., H. N. Pandey, R. S. Tripathi and U. K. Sahoo. 1992. Weed population dynamics under 'jhum' (slash and burn agriculture) and terrace cultivation in northeast India. Agric., Ecosyst. Env. 41: 285-295.

Pemberton, R. W. and N. S. Lee. 1996. Wild food plants in South Korea: market presence, new crops, and exports to the United States. Econ. Bot. 50: 57-70.

Peters, C. M., A. H. Gentry and R. O. Mendelsohn. 1989. Valuation of an Amazonian rainforest. Nature 339: 655-656.

Rapoport, E.H., and C. Brión. 1991. Malezas exóticas y plantas escapadas de cultivo en el noroeste patagónico. Segunda Aproximación. Cuadernos de Alter Natura No. 1, Bariloche, Argentina. p. 19.

Rapoport, E. H., L. S. Margutti and E. H. Sanz. 1997. Plantas silvestres comestibles de la Patagonia Andina. Parte I. Exóticas. Programa Extensión Universitaria, Univ. Nac. del Comahue, Depto. Ecología, CRUB, Bariloche, Argentina. p. 51.

Rapoport, E. H., E. Raffaele, L. Ghermandi and L. Margutti. 1995. Edible weeds: A scarcely used resource. Bull. Ecol. Soc. Amer. 76: 163-166.

Rudloff, W. 1981. World-Climates. Wissenschaftliche Verlagsgesellschaft, Stuttgart, Germany. p. 632.

Sánchez, P. and H. Huranga. 1990. Malezas importantes de Cuba. Instituto de Investigación Fundamental de Agricultura Tropical A. de Humboldt, Ministerio de Agricultura, Cuba. p. 63.

Tanji, A. and Nassif, F. 1995. Edible weeds in Morocco. Weed Technol. 9: 617-620.

Trzcinska-Tacik, H. and K. Wasylikowa. 1982. History of the synanthropic changes of flora and vegetation of Poland. Mem. Zool. 37: 47-69.

UNC. 1983. Cartas de precipitación de las provincias de Río Negro y Neuquén. Facultad Ciencias Agrarias, Universidad Nacional del Comahue, Cinco Saltos, Argentina.

Vavilov, N.I. 1938. Los centros genético-geográficos de las plantas cultivadas. Rev. Fac. Agron. Univ. Nac. La Plata 22: 65-94.

Wilkinson, R. E. and H. E Jaques. 1979. How to know the weeds. W.C. Brown, Dubuque, Iowa p. 230.

Zurlo, C. and M. Brandão. 1990. As ervas comestíveis. Globo, São Paulo, Brazil. p. 167.