

# Traditional Lebanese recipes based on wild plants: An answer to diet simplification?

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## Abstract

**Background.** *The challenge posed by the nutrition transition occurring throughout the world is enormous: rates of chronic disease, particularly overweight and obesity and cardiovascular disease, have reached alarming levels—often occurring in parallel with high levels of micronutrient deficiencies. Lebanon is no exception. And yet this Mediterranean country enjoys a rich biodiversity, with thousands of endemic species and an equally rich culinary history, largely based on its local biodiversity, including wild edible plants.*

**Objectives.** *To record traditional Lebanese recipes based on wild edible plants and to investigate their potential to contribute to a more diversified diet.*

**Methods.** *A series of nine focus group meetings was conducted with key informants knowledgeable in wild edible plant identification, harvesting, and use.*

**Results.** *Common recipes based on wild edible plants were collected and standardized from rural communities where collection of wild edible plants is common. Nutrient analysis and food-composition analysis were performed, including comparisons with processed dishes that are increasingly common in the Lebanese diet, revealing that the wild edible plant-based dishes offered a healthier alternative.*

**Conclusions.** *Since traditional recipes often use items from several food groups in one dish, they can be a good model for diet diversification. The promotion of the collection and use of wild edible plants and their derived products can lead to improved nutrition.*

## Background

Although overnutrition and noncommunicable diseases are commonly perceived as problems of rich countries, they are increasingly present even in countries where hunger is endemic. The levels of overweight in Mexico, Egypt, and South Africa, for instance, are equal to or greater than those in the United States; in urban and rural areas of Tanzania, stroke mortality rates are three times higher than in England and Wales [1]. In Lebanon, a middle-income country on the Eastern shore of the Mediterranean, overweight and obesity [2–4], cardiovascular disease [5–7] cancer [8, 9], and poor bone health [10–12] are the 21st-century health challenges.

Figures collected in 1997 indicate worrisome rates of overweight and obesity [4]: 60.4% of Lebanese men and 51.2% of women had a body mass index (BMI) greater than 25. Similar results were found among 6- to 9-year-old Lebanese children; 15% of children in private schools and 19.5% of those in public schools were found to be obese [3].

Lebanese restaurants have sprung up in Paris, London, New York, and Montreal under the banner of healthful, diversified, vegetable-rich food, yet the Lebanese in Lebanon have been undergoing a classic nutrition transition, not unlike that experienced by traditional societies all over the world, where the traditional healthful diet is being eroded in favor of a westernized low-fiber, high-fat, high-sugar diet. The change to the current Lebanese diet, which is characterized by a heavy reliance on refined grains and lacking in essential nutrients, has been accompanied by increases in the rates of various chronic diseases. Accurate nutritional information on the historical diet of the Lebanese is scarce, the available literature being mainly anthropological [13]. Traditional Lebanese cuisine, especially that practiced in rural areas, can be described as an example of the Mediterranean diet, focusing on fresh and local ingredients and using mainly starches (including legumes), vegetables, and fruit. Traditionally, animal fats were a luxury item

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and were only used sparingly in some desserts [13]. Garlic, lemon (or another source of sour flavor such as unripe grape juice, sour pomegranate concentrate, or powdered sumac berries), and olive oil are consumed at almost every meal and constitute a classic combination of flavors defining Lebanese dishes. Poultry is more commonly eaten than red meat, and, particularly in the mountainous rural areas, lamb and goat are the red meats of choice. Vegetables are eaten raw, pickled, or cooked. Foods are generally grilled, baked, or sautéed with olive oil. Examples of quintessential Lebanese dishes include *tabbouleh* (parsley and cracked wheat salad), *kibb * (an emulsified paste of fresh lamb and bulgur wheat), and *hummus*. Several recipes using wild plants are part of even the most urban cook's repertoire, such as cooked dandelion leaves with onions or thyme salad. Others are known only in rural areas.

The last national study of dietary intake in Lebanon was conducted on 129 families in 1961 by the International Committee on Nutrition for National Defense [14–17]. Since then, scientific information on the dietary habits of the Lebanese population has come mainly from sporadic studies of populations in particular regions of the country. A review of food-consumption patterns in Lebanon from 1960 until 2001 found a decrease in cereal consumption (from 50% to 37.2% of total calories) and an increase in meat and poultry consumption (from 10.9% to 21.4%). Energy and protein availability improved over the period from 1960 to 2002. In fact, the net energy and protein supply per capita per day and the total calorie availability per capita per day increased from 2,396 kcal in 1961–63 to 3,196 kcal in 2002, and total proteins increased from 62.3 to 88.0 g [18, 19]. Moreover, the percentage of energy from fat increased from 22% to 26% and alarmingly to 38.9% in 2001, well over the 30% maximum recommended value. This change in food-consumption pattern is symptomatic of the fact that traditional Lebanese foods are slowly vanishing in favor of a more Western diet. For example, the phenomenon of American-style fast-food delivery at home is widespread and relatively inexpensive. This contributes to placing the Lebanese population at increased risk for cardiovascular diseases, obesity, and other noncommunicable diseases [15].

On the other side of the double burden, the rates of micronutrient deficiencies, which affect more than 2 billion people worldwide, by far exceed those of protein-energy malnutrition [20]. Lack of diversification in the diet and the focus on a few staple foods should be considered as contributing factors to micronutrient deficiencies; 80% of total energy intake worldwide is provided by 12 crops (barley, maize, millet, rice, rye, sorghum, sugarcane, wheat, cassava, potato, sweet potato, and yam) [21]. Four of those (wheat, maize, rice, and potato) provide over half the food-based calories in the human diet [22].

These changes are clearly demonstrated in Lebanon, where refined wheat has increasingly taken center stage in the diet: the average daily consumption of bread per capita was estimated to be 350 g in 1998 [23]. In the 1950s, when Lebanon's population was predominantly rural, much of the wheat consumed would have come from local production in the form of bread made from hard wheat or bulgur [16, 17]. At present, most of the wheat consumed is imported soft wheat that has been processed to achieve a lighter texture, thereby losing much of its nutritional value. It is consumed as Arabic (pita) bread or *manakeesh*, the cheese or thyme pizzas commonly eaten for breakfast or as a snack.

Dietary diversity “the number of different foods or food groups consumed over a given reference period” [24], has long been recognized as essential to high-quality diets [25, 26]. Dietary diversity can be an indicator of nutritional adequacy [27, 28] and correlates with better health outcomes (as indicated by rates of growth, cardiovascular disease, diabetes, etc.) [29–31]. Greater dietary variety has been associated, either directly or indirectly, through increased intake of micronutrients, with increased birthweight and reduced rates of cardiovascular disease and cancer among children [32]. It is the combination of micronutrient-rich foods and diversity within recipes or meals that makes traditional Lebanese cuisine, including wild edible plants, a practice worthy of preservation and promotion.

Solutions to the micronutrient problem must go beyond the kitchen door: the agricultural sector has a potentially large role to play in combating micronutrient deficiencies. Vegetables have been shown to be more cost-efficient than cereals as a source of micronutrients with respect to the area of land required and production costs. For instance, Chinese cabbage provided 13 times more iron on average per hectare per day than cereals and was 92% more cost efficient than beef after iron bioavailability was controlled for [20]. This phenomenon is likely to be even more pronounced when it comes to wild plants, since they are often nutrient dense, grow independently of human action, and are adapted to all kinds of habitats, including harsh environments.

The Mediterranean region is characterized by a high degree of plant diversity, with 25,000 to 30,000 species, many of which are endemic to the region [33]. This diversity stems from variation in ecological conditions, such as climate and soil type, that result in habitat diversity. According to Heywood [33], the Mediterranean region has 11 of the world's 231 most important centers of plant diversity. Lebanon has an estimated 2,600 plant species, representing 12% of those present in the Mediterranean region [34].

The diversity of edible wild plants is an integral component of the Mediterranean diet, in which they are consumed and used in various ways [35]. In Jordan, Tukan et al. [36] described different uses of common

edible wild plants such as sumac, chicory, Spanish thistle, wild lettuce, viper's grass, goat's beard, and gundelia. Roughly half of these plants can be consumed raw without any preliminary preparation other than cleaning and trimming. Many can also be consumed as snacks, providing important sources of nutrients absent in modern high-fat, high-sugar snacks. Tukan and coauthors also highlighted the numerous ways of consuming such plants in stews, as spices or seasonings, or even in hot drinks.

These practices are often culturally defined and vary according to food habits [37]. However, knowledge regarding the identification, conservation, and use of wild plants is not being actively disseminated, and the rapid urbanization in the region may be responsible for a break in the transmission of indigenous knowledge, which usually occurs through oral tradition and apprenticeship [12]. In the Mediterranean region, 4% of wild plants are edible but only 15 to 200 are currently being consumed by humans [38]. Studies in other parts of the world have shown that younger people have less knowledge of local edible wild plants than adults [37, 39, 40]. The loss of expertise in the sustainable use of such natural resources contributes to their extinction, for example, by overharvesting of plants or by neglecting to preserve the environments in which they thrive [41].

Although genetic resources, traditional and indigenous knowledge, and experience constitute a golden source for the exploration and collection of biological material for commercial utilization, humans are damaging biodiversity faster than nature can replenish it [42, 43]. Many plants have fallen into disuse or have been neglected by science, commerce, and medicine as a result of agricultural intensification and economic development, which have often marginalized the very communities that traditionally benefited from such resources.

There is an urgent need to preserve and develop neglected indigenous plant species as alternative crops both for sustainable development and for improved nutrition and health, especially for the poor and marginalized. The use of edible wild plants has the potential to mitigate the negative effect of an excessive reliance on refined cereals and empty calories in the diet of the poor. This approach is especially promising for countries located within major centers of diversity, including countries in the Middle East and North Africa region.

## Objectives

This study aimed to record traditional Lebanese recipes based on wild edible plants, investigate their potential to contribute to a more diversified diet, and identify health benefits traditionally associated with wild edible plants. The recipes were analyzed, standard-

ized, and disseminated back to the communities for use in the promotion of a more diversified diet while improving livelihoods through traditional product commercialization.

## Methods

Supported by the International Development Research Centre of Canada, a 2-year research and development project was initiated in Lebanon in 2004 with the aim of increasing dietary diversity in the urban and rural poor by promotion of the sustainable use of wild edible plants, ultimately improving general health status in the targeted communities. As part of the larger project, a series of focus group meetings was conducted in four rural areas where the project was implemented (fig. 1).

These focus group meetings aimed to investigate the potential of traditional Lebanese recipes based on wild edible plants to increase the diversity of nutrient intake and food security. They also served as a means to record the most popular biodiversity-based recipes for subsequent nutrient analysis of these recipes and inclusion in the repertoire of income-generating "healthy kitchens." Men and women who were key informants knowledgeable about traditional recipes using wild edible plants were interviewed, and the focus group meetings were divided into several parts (general information on the subjects, names of specific wild edible plants in the region, potential benefits and uses of wild edible plants, toxic effects, sources and mode

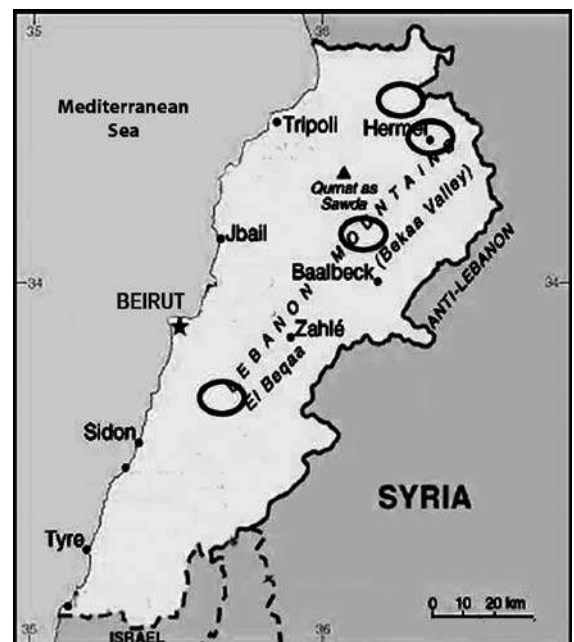


FIG. 1. Areas of data collection (circled)

of transmission of knowledge, recipe preparation, gathering process, and plant consumption pattern and acceptability levels). Subsequent meetings collected the recipes identified during the focus group meetings. Recipe demonstrations and tastings were also conducted in the communities. Standardization of the recipes and estimations of portion size were performed at the laboratories of the American University of Beirut. Proximate analysis of the wild plants used in the recipes and nutrient analysis of the wild plant-based dishes were performed.

In a second stage, a survey was conducted of 799 people from the four communities during the period from June to August 2005. A random list of households was drawn in each community from municipal tax files. In each household, one man and one woman between the ages of 40 and 60 years were approached for interviewing. If more than one person met the age criterion, the person interviewed was the one considered to be the male or female head of the household. The survey used a questionnaire consisting of several sections (sociodemographic, income and food security, and dietary) and included questions on harvesting and use of wild edible plants. Participation was high, and the proportion of contacted households that did not participate because of refusal or lack of members who met the age criterion did not exceed 20%. Women comprised 48% of the participants and men 52%. Only results pertaining to wild edible plant collection are reported here from the larger study. Ethical approval was obtained from the American University of Beirut Institutional Review Board.

Nine focus group meetings including 52 persons (28 women and 24 men) were conducted. The key informants consisted of senior community members knowledgeable about wild edible plants and cooking methods. Information about recipes and cooking came mostly from women, whereas information about the benefits and methods of collection of plants came from both men and women.

### Results

The 10 most common recipes were collected and analyzed for nutrient content and reported potential health benefits (table 1). Information was also collected on other ways to use the wild edible plants included in the recipe.

Although many wild plants are often consumed raw without any additional preparation, sometimes at the site of collection together with bread and olives, several types of recipes emerged from the focus group meetings. In fresh salads, the simplest type of recipe, the added ingredients are few and are often used to add a sour taste (lemon juice, sumac powder, strained yogurt or *labneh*, or *kishk*, a preparation of bulgur

TABLE 1. The 10 most common wild plant recipes and health benefits attributed to the plants by the participants

Recipe name (Arabic name of plant in italics)	English name of plant	Scientific name of plant	Health benefits of plant	Other food uses for the plant
<i>Fatayer zaatar akhdar</i>	Wild thyme	<i>Origanum syriacum</i>	Antipoison effect Disinfectant Relieves stomachache	Dried for Lebanese pizza (manakeesh) mixture (dried thyme + sumac + salt), herbal infusion, salads  Leaves are eaten raw in salads, cooked in soups, and boiled as an infusion. Seeds and flowers are also edible
<i>Khubbayzeh</i> and <i>labneh</i> (strained yogurt)	Mallow	<i>Malva sylvestris</i>	Treatment of acne, anemia, constipation, diarrhea, stomachache, inflammation Natural antibiotic Fortifies blood Disinfectant High in minerals and vitamins	
<i>Kishk</i> (fermented bulgur and yogurt) and <i>mint</i>	Wild mint, horsemint, silver mint	<i>Mentha longifolia</i>	Treatment of chest problems, gallbladder diseases, inflammation, hypertension, stomachache, flatulence Beneficial for diabetics Facilitates digestion	Leaves are eaten raw in salads or cooked, but they can also be dried and used as a condiment. An infusion can be made from the dried or fresh leaves. An essential oil obtained from the leaves and flowering tips is used as a food flavoring in sweets

*continued*

TABLE 1. The 10 most common wild plant recipes and health benefits attributed to the plants by the participants (*continued*)

Recipe name (Arabic name of plant in italics)	English name of plant	Scientific name of plant	Health benefits of plant	Other food uses for the plant
<i>Farfahin</i> and yogurt	Green purslane	<i>Portulaca oleracea</i>	Easy to digest Treatment of constipation, stomachache Lowers cholesterol Beneficial for the heart	Leaves are eaten raw in salad and raw or dried as a filling for pies (fatayer)
Chickpeas and <i>Mishah</i>	Salsify	<i>Tragopogon buphtalmoides</i>	Nutritious High in vitamin C, fiber, iron Treatment of anemia	Cooked with bulgur or eggs
<i>Korsanneh</i> and tehineh (sesame seed paste)	Eryngo	<i>Eryngium creticum</i>	Anticancer properties Antipoison effect Treatment of allergies, asthma, digestive tract disorders, inflammation High in iron, vitamins	Leaves eaten raw in salads or cooked in olive oil with onions
Hariset <i>Akkoub</i> (wheat gruel with meat and tumbleweed)	Tumbleweed; gundelia	<i>Gundelia tournefortii</i>	Anticancer properties Treatment of urinary tract problems Nutritious like meat High in iron, protein, vitamins Improves appetite Treatment of kidney problems	Cooked as a stew with meat, chickpeas, or tomato sauce; fried; used in omelet; pickled
<i>Shumra</i> omelet	Fennel	<i>Foeniculum vulgare</i>	Facilitates digestion Treatment of constipation, inflammation, cellulite, indigestion, kidney stones Lowers blood cholesterol Helps in weight loss Decreases menstrual symptoms	Leaves can be eaten raw in salads or cooked; leaf stalks and flower heads can be eaten raw or cooked; aromatic seeds used as flavoring in cakes, bread, and stuffing; roots can be eaten cooked
<i>Hindbeh</i> salad	Chicory	<i>Cichorium intybus</i>	Treatment of anemia, constipation, gallbladder problems, kidney problems Beneficial for diabetics Diuretic effect High in iron, vitamin C	Leaves can be eaten raw in salads; used in yogurt salad; cooked (sauteed with onion)
<i>Korra</i> tabbouleh (salad with cracked wheat)	Watercress	<i>Nasturtium officinale</i>	Fortifies the blood Lowers fat in blood Beneficial for diabetics Facilitates digestion High in iodine, iron, protein Improves appetite	Leaves are eaten raw or cooked. Seeds can be sprouted and eaten in salads

soaked in sour goat yogurt then dried and pulverized into a powder), as well as the omnipresent olive oil. Cooking methods can range from simply frying the plants in oil with some onions to preparing elaborate dishes with mixtures of legumes such as chickpeas and lentils, parboiled wheat, other vegetables, and meat. Omelets using wild edible plants, such as the wild fennel omelet, are prepared by mixing some plant leaves with eggs and frying them. Plants are also consumed in pies called *fatayer* in Arabic. The pies are pouches, usually triangle-shaped, made with dough prepared from whole grain, filled with wild plants, and baked in the oven.

Nutritional analysis of the recipes was performed using the only available food-composition tables for Lebanon [44]. The nutritional contents of the recipes were compared with those of popular equivalent Western dishes, and the results were presented to the participants and the communities at large during later contacts (tables 2–4). In general, the wild edible plant–based dishes offered a healthier alternative.

The participants in the focus group meetings reported that these traditional recipes contributed to dietary diversity and dietary quality, since they provided diversity within the same dish. The participants

were aware of the richness of wild plants in general, and these recipes in particular, in essential nutrients and in therapeutic and beneficial properties. In an effort to interpret the findings from the focus group meetings in a more scientific light, proximate analysis of the macronutrients was performed on these plants to determine their contents of moisture, ash, fat, protein, and carbohydrate. The contents of calcium, phosphorus, magnesium, potassium, sodium, and iron were also determined (table 5).

The importance of wild edible plants in these communities was later quantified and reconfirmed. In the large survey, nearly two-thirds (65.3%) of respondents (69% of women and 63% of men) reported collecting wild edible plants at least once a year. Half (49.4%) of those who collected plants did so less than 5 times per year, and 7.4% did so more than 10 times per year (fig. 2). The vast majority (99.8%) ate the plants they collected; 31.5% reported giving them to others, and only 2% sold them. Wild edible plants were unavailable in the public markets in the rural communities.

When asked about the possible contribution of these dishes to food security, the participants mentioned the fact that these dishes, and wild plants in general, are cheap, since wild plants are by definition free and

TABLE 2. Comparison of nutrient contents of wild fennel omelet and hamburger

Nutrient	Omelet (200 g) <sup>a</sup>	Hamburger (215 g)
Energy (kcal)	444	576
Carbohydrate (g)	27	39
Protein (g)	16	32
Fat (g)	30	33
Vitamin C (mg)	40	1
Vitamin E (mg)	3	0
Iron (mg)	6	5
Calcium (mg)	136	90

a. Wild fennel (*Foeniculum vulgare*) omelet (main dish).

TABLE 3. Comparison of nutrient contents of purslane and cole slaw

Nutrient	Purslane (300 g) <sup>a</sup>	Cole slaw (300 g)
Energy (kcal)	162	444
Carbohydrate (g)	14	39
Protein (g)	9	4
Fat (g)	8	33
Vitamin C (mg)	12	25
Retinol (μg)	68	66
Iron (mg)	1.2	2
Calcium (mg)	338	102

a. *Farfahine* (purslane, *Portulaca oleracea*) and yogurt (side dish).

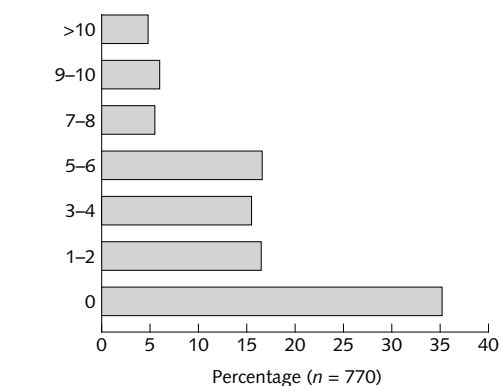


FIG. 2. Frequency of collection of wild edible plants per year

TABLE 4. Comparison of nutrient contents of wild mint and *kishk* and potatoes au gratin

Nutrient	Wild mint and <i>kishk</i> (300 g) <sup>a</sup>	Potatoes au gratin (300 g)
Energy (kcal)	417	396
Carbohydrate (g)	34	34
Protein (g)	12	15
Fat (g)	27	23
Fiber (g)	13	5
Vitamin C (mg)	22	30
Iron (mg)	20	2
Calcium (mg)	560	357

a. Main dish, vegetarian.

TABLE 5. Nutrient composition of wild edible plants per 100-g fresh sample

Family	Scientific name	English name	Arabic name	Ash (g)	Mois- ture (g)	Protein (g)	Fat (g)	Carbo- hydrate (g)	Ca (mg)	P (mg)	Mg (mg)	K (mg)	Na (mg)	Fe (mg)
Apiaceae	<i>Apium nodiflorum</i>	Watercress	Korraah	2.55	89.05	3.62	0.46	4.62	28.09	35.24	97.05	526.7	341.5	6.65
Apiaceae	<i>Foeniculum vulgare</i>	Fennel	Shumar	2.11	85.92	6.7	0.81	4.46	18.44	42.26	308.5	413.4	788	3.17
Compositae	<i>Chicorium intybus</i>	Chicory	Hindbeh	2.58	87.64	4.7	0.12	4.96	128.15	42.51	394.0	783	525.9	10
Compositae	<i>Gundelia tournefortii</i>	Gundelia	Akoub	1.24	87.75	1.64	0.16	9.21	12.3	70.23	167.62	427	215.1	1.83
Laminaceae	<i>Mentha longifolia</i>	Wild mint	Naana Barri	3.54	67.74	9.85	2.09	16.78	57.55	84.24	256.2	739	174.61	7.19
Laminaceae	<i>Origanum syriacum</i>	Thyme	Zaatar	2.98	60.11	8.19	3.22	25.5	49.59	34.08	481.2	815.4	535	0.19
Malvaceae	<i>Malva sylvestris</i>	Mallow	Khubbayzeh	2.91	81.50	6.5	0.67	8.42	334.68	37.38	355.0	1127.7	174	12.8
Umbelliferae	<i>Eryngium creticum</i>	Button snakeroot	Korsanneh	3.00	85.72	3.12	0.22	7.94	36.47	32.08	752.0	544.7	526	18.2

are rarely sold in conventional vegetable markets. The plants can also be preserved as pickles or dried powders to be consumed during the winter months. Interestingly, they are perceived to be a good substitute for meat, particularly during periods of scarcity and during the Christian Lent, which coincides with the season of greatest availability of the plants in the early spring. One wild plant in particular (*Gundelia tournefortii*) was deemed to be a good replacement for meat during times of want because of its perceived richness in protein and iron. Our chemical analysis did not, however, corroborate these perceptions in the particular case of *G. tournefortii* (table 5).

There seems to be a pressing need for promotion of traditional food systems, as knowledge about plant identification, methods of collection, and methods of consumption, including recipes, is eroding rapidly. The average age of the participants in the focus group meetings was 58 years. Several participants bemoaned the fact that younger people are not interested in learning about these old recipes and do not have the time to spend on acquiring the skills associated with identifying and collecting the plants used in them. This traditional knowledge is typically transmitted by a form of apprenticeship in which the young person learns the characteristics of the plant in the field and in the kitchen from a knowledgeable elder. Time pressure and the emergence of new interests seem to hinder this cross-generational transfer.

### Conclusions

While Lebanon is experiencing the nutrition transition, with its known consequences of increased rates of chronic diseases and their risk factors, an exploration of the rich traditional food system of the country, with emphasis on wild plant-based dishes, sheds light on the potential of traditional recipes for improving dietary diversity and population health outcomes. Promoting a diet rich in flavonoids, fiber, and essential minerals and low in saturated fat and energy, such as the recipes collected in this study, could be beneficial as part of a long-term strategy for combating the “diseases of civilization” faced by the Lebanese. Wild edible plants also constitute a possible source of income and a vehicle for community development through proper processing and marketing. The promotion of the propagation, harvesting, and use of these plants and their derived products could lead to improved livelihoods and nutrition in the targeted communities, as well as increased awareness of the dangers of diet simplification.

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