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Enek Pekmez Production from Juniper “Fruits” by Native People on the Taurus Mountains in Southern Turkey

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... Seeds from Juniper (Juniperus phoenicea) were abundant but they were only collected from the Early Neolithic B and C layers. In Tunisia and Turkey, the juniper fruits are still consumed after boiling and crushing them (Rivera-Núñez and Obón- de-Castro, 1991; Semiz et al., 2007). ...

... Fragments of the aerial rhizome of esparto or alfa grass (Stipa tenacissima) were the second most frequent macroremain. The leaves of this economically important grass are still extensively used for producing ropes, baskets, bags, clothes, nets, and so on in Northern Africa (Louis and Despois, 1986) and Spain (Alfaro-Giner, 1984; Sánchez-Sanz, 1982). ...

... Besides, some food plants yield seeds, such as acorns and juniper berries, which could be stored for later use during the winter. This has been a common practice in traditional Mediterranean communities until recently (Pereira-Sieso, 2010; Semiz et al., 2007). ...

The origins of agriculture in North-West Africa: Macro-botanical remains from Epipalaeolithic and Early Neolithic levels of Ifri Oudadane (Morocco)

Data Jan 2013

Jacob Morales · Guillem Pérez-Jordà · Leonor Peña-Chocarro · Jörg Linstädter

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... The table is organized alphabetically in accordance with the family the plant belongs to. The scientific, Turkish names, local names, and English names of the plants, the part of the plants that are used, for what purpose they are used and the other usages of the plants in Turkey are written in Table Özgökçe and Özçelik 2004, Özkan Gençler and Koyuncu 2005, Özturk et al. 2013, Öztürk and Dinç 2005, Öztürk and Özçelik 1991, Polat et al. 2013, Polat et al. 2015, Sadıkoğlu and Alpınar 2000, Sargın et al. 2013, Sargın 2015, Sargın et al. 2015a, Sargın et al. 2015b, Sayar et al. 1995 , Semiz et al. 2007 , Sezik et al. 1993, Sezik et al. 1997, Şenkardeş and Tuzlacı 2014, Şimşek et al. 2002, Tabata et al. 2009, Tetik et al. 2013, Tuzlacı and Erol, 1999, Türkan et al. 2006, Uysal et al. 2010, Vural et al. 1997, Yasa Aktaş 2013, Yeşil and Akalın 2010, Yeşilada et al. 1995. (Yeşilada et al. 1995) Woody plants that are used in architecture Abkhazians who settled in the region with the exile, have undergone cultural changes over time. ...

... et al. 2008), (2) (Akaydın et al. 2013), (3) (Altundağ and Öztürk 2011), (4) (Arı et al. 2015), (5) (Arıtuluk and Ezer 2012), (6) (Aslan et al. 2019), (7)(Bağcı 2000), (8)(Başer 1997), (9)(Baytop 1984), (10)(Cakilcioglu et al. 2011), (11) (Çakır 2017), (12)(Demirci and Özhatay 2012), (13)(Doğan et al. 2003), (14)(Doğan et al. 2004),(15)(Doğan et al. 2013), (16) (Doğan et al. 2015), (17) (Doğan and Tuzlacı), 2015, (18) (Durmuşkahya and Öztürk 2013), (19) (Ertuğ 1999), (20) (Ertuğ 2000), (21) (Ertuğ 2002), (22) (Everest and Öztürk 2005), (23) (Ezer and Arısan 2006), (24) (Ezer and Avcı 2004), (25) (Genç and Özhatay 2006), (26) (Gürbüz et al. 2019), (27) (Gürdal and Kültür 2014), (28) (Gürhan and Ezer 2004), (29) (Güzel et al. 2015), (30) (Han and Bulut 2015), (31) (Hayta et al. 2014), (32) (Irmak and Yılmaz 2008), (33) (Kahraman and Tatlı 2004), (34) (Kahveci et al. 2017), (35) (Kargıoğlu et al. 2008), (36) (Kaval et al. 2015), (37) (Kaya 2014), (38) (Kılıç and Bağcı 2013), (39) (Kızılarslan and Özhatay 2012), (40) (Kızılarslan and Sevgi 2013), (41) (Koca Doğru and Yıldırımlı 2010), (42) (Kocabaş et al. 2016), (43) (Koçak and Özhatay 2013), (44) (Kültür 2007), (45) (Kültür 2008), (46) (Mükemre et al. 2015), (47) (Özdemir and Alpınar 2015), (48)(Özgen et al. 2004), (49) (Özgökçe and Yılmaz 2003), (50)(Özgökçe and Özçelik 2004), (51)(Özhatay et al. 2006), (52)(Özkan Gençler and Koyuncu 2005), (53)(Özturk et al. 2013), (54)(Öztürk and Dinç 2005), (55)(Öztürk and Özçelik 1991), (56)(Polat et al. 2013), (57)(Polat et al. 2015), (58)(Sadıkoğlu and Alpınar 2000), (59)(Sargın 2015), (60)(Sargın et al. 2013), (61)(Sargın et al. 2015a), (62)(Sargın et al. 2015b), (63)(Sayar et al. 1995), (64) (Semiz et al. 2007), (65)(Sezik et al. 1993), (66)(Sezik et al. 1997), (67)(Şenkardeş and Tuzlacı 2014), (68)(Şimşek et al. 2002), (69)(Tabata et al. 2009), (70)(Tetik et al. 2013), (71)(Tuzlacı and Erol 1999), (72)(Türkan et al. 2006), (73)(Uysal et al. 2010), (74)(Vural et al. 1997), (75) (Yasa Aktaş 2013), (76)(Yeşil and Akalın 2010-2011), (77) ...

A Study on the traditional usages of woody plants. (Derdin Village, Düzce, Karadeniz Province)

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... Berries from junipers, relatively rich in carbohydrates (Debussche et al., 1987), have been gathered as human food until recently in traditional communities throughout the Mediterranean Basin (Rivera et al., 2011). In Turkey and Tunisia, the fruits are crushed and then boiled for several hours to obtain a high-energy liquid (Semiz et al., 2007; Rivera et al., 2011). Once boiled, the fruit fragments and seeds are discarded (Semiz et al., 2007). ...

... In Turkey and Tunisia, the fruits are crushed and then boiled for several hours to obtain a high-energy liquid (Semiz et al., 2007;Rivera et al., 2011). Once boiled, the fruit fragments and seeds are discarded (Semiz et al., 2007). ...

The contribution of botanical macro-remains to the study of wild plant consumption during the Later Stone Age and the Neolithic of north-western Africa

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... This has been a common practice in traditional Mediterranean communities until recently (Pereira-Sieso, 2010; Semiz et al., 2007). ...

The origins of agriculture in North-West Africa: macro-botanical remains from Epipalaeolithic and Early Neolithic levels of Ifri Oudadane (Morocco).

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... Juniperus drupacea Labill. is a member of the Cupressaceae family and native to Mediterraneanregions. The berry-like fleshy cones developed by the female tree normally contain three seeds, a nut-like shell and a fleshy part that cannot be consumed as fresh fruit but used to prepare "pekmez", a type of fruit juice concentrate (Semiz et al., 2007). Stonecrushed berries are soaked in drinking water for three days to extract water-soluble solids, and afterward, the filtered extract is boiled to a concentrate. ...

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... Additionally, the seed cones of Juniperus drupacea Labill. are used in Turkey for making traditional jam (Semiz, Isik, & Unal, 2007). The species Juniperus are also used in food production as a preserving agent (Mrabet et al., 2008). ...

Chemical characterisation and biological effects of Juniperus foetidissima Willd. 1806

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... Arceuthos drupacea Ant. et Kotschy (Davis 1965, Adams 2004)] is called in Turkish "Andız" (Baytop 1994) Ardıç, and "Enek" (Semiz et al. 2007). Essential oil contents of the leaves of J. drupacea from Greece (Adams, 1997), Crimea (Adams 1997) and the Turkish materials from Gözne (Mersin) (Sakar 1985) and Kahramanmaraş (Dönmez 2005) have previously been investigated. ...

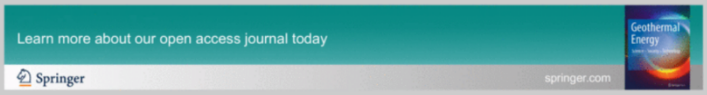
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Enek pekmez production from juniper "fruits" by native people on the taurus mountains in southern Turkey

Gürkan Semiz, Kani Isik & Orhan Unal

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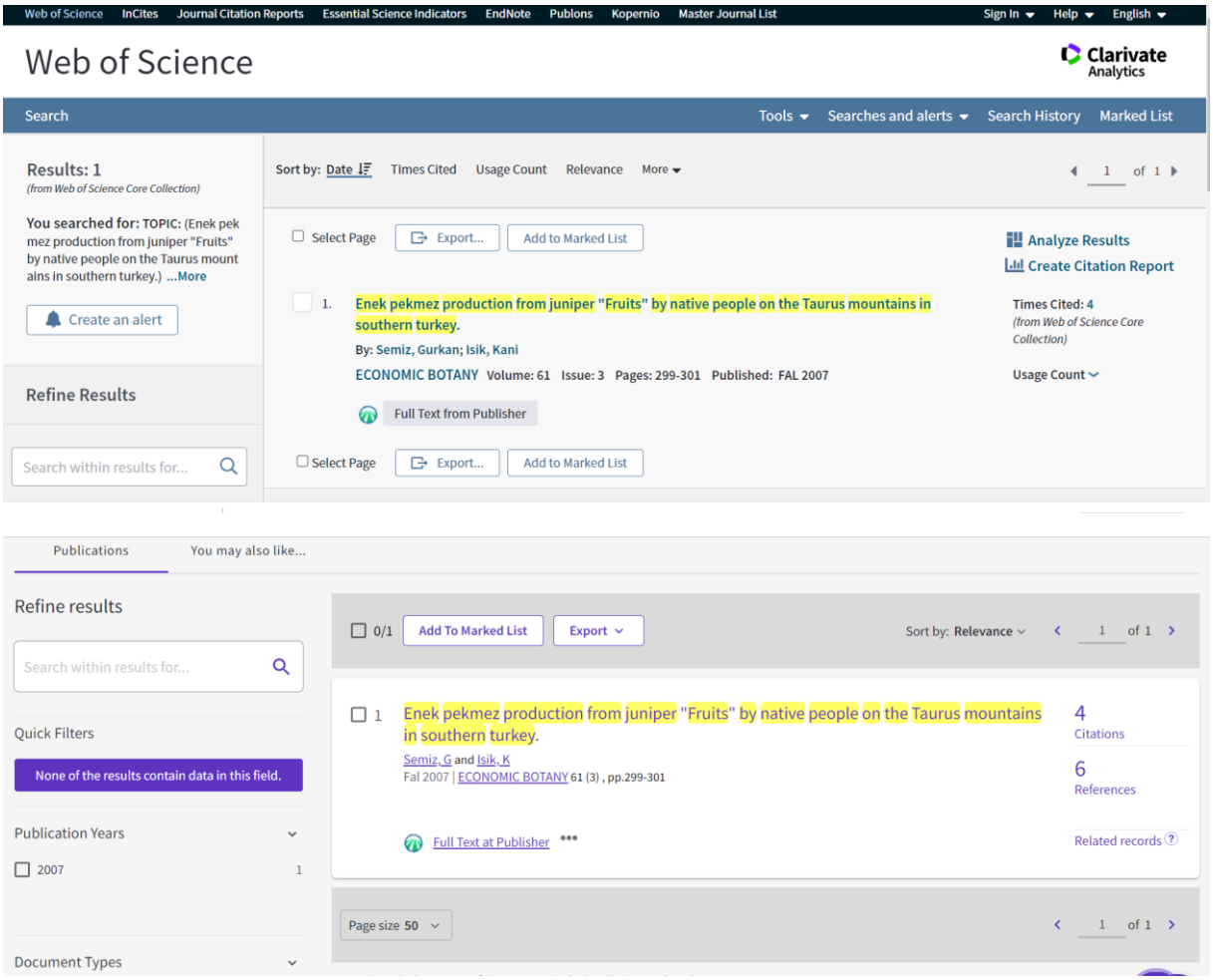
Enek Pekmez Production from Juniper "Fruits" by Native People on the Taurus Mountains in Southern Turkey.— Pekmez, a common and popular food in southern Turkey, is a fruit concentrate usually extracted from grapes (Vitis vinifera L.), fig (Ficus carica L.), mulberry (Morus alba L., M. nigra L.), and carob trees (Ceratonia siliqua L.). It also has been produced locally from the berry-like, fleshy cones of the enek tree (Juniperus drupacea Labill.). Pekmez has a high-energy content and is mainly... Expand

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Notes on Economic Plants

Enek Pekmez Production from Juniper "Fruits" by Native People on the Taurus Mountains in Southern Turkey.—*Pekmez,* a common and popular food in southern Turkey, is a fruit concentrate usually extracted from grapes (*Vitis vinifera* L.), fig (*Ficus carica* L.), mulberry (*Morus alba* L., *M. nigra* L.), and carob trees (*Ceratonia siliqua* L.). It also has been produced locally from the berry-like, fleshy cones of the enek tree (*Juniperus drupacea* Labill.). Pekmez has a high-energy content and is mainly consumed in the winter months. This note describes the production and use of enek pekmez by the native people in southwestern Turkey.

Study Area. The study was carried out between 950 and 1,400 meters above sea level on Enekli Tepe, (i.e., the hill with Enek), the name of which is derived from a relatively dense population of enek trees in the area (Fig. 1A). Enekli Tepe is located on the upper Eynif plateau in the Bogazyurt district of Beydigin Village on the Taurus Mountains, in the upper watershed of the Manavgat River, Antalya province in southwestern Turkey.

The Plant Species. Enek, *Juniperus drupacea* Labill. [(Syn: *Arceuthos drupacea* (Labill.) Antoine & Kotschy, (Cupressaceae)] is distributed in the eastern Mediterranean region, mainly in southern Greece, southern Turkey, western Syria, Lebanon, and Israel. In southern Turkey, it typically grows in a mixture with other junipers and several other species, such as *Abies cilicica* (Ant. et Kotschy.) Carr. subsp. *isaurica* Coode & Cullen, *Cedrus libani* A. Rich., and *Pinus nigra* J. F. Arnold subsp. *nigra* var. *caramanica* (Loudon) Rehder. The optimum elevation above sea level for the species ranges from 600 to 1,500 meters *(1)*. Enek thrives mostly on lime terrains with plenty of sunshine.

Enek is an evergreen tree with a densely foliated canopy. A dioecious species, only the female trees develop cones, which are berry-like. Enek cones are the largest of any juniper species, reaching up to 25 millimeters (mm) in diameter *(2)*. Normally, each cone contains three seeds that are fused, forming a single, nut-like shell. The fleshy cone of enek is regarded as "fruit" by the local people (hereafter, the cones will be called "fruits").

In the winter months when alternative food sources are scarce, the smaller foliated branches of the males trees typically are pruned for use as domestic animal fodder. Because the female trees produce fruits, they are believed to be blessed and hence protected with respect and admiration by the villagers. The understory of the female enek trees usually is kept free from bushes and stones for three reasons. The "clean ground" (a) facilitates the collection of the fruit, (b) reduces competition for water and nutrients, and (c) helps to distinguish female trees from male trees in the winter time, thereby reducing the chances that female trees will be pruned. To date, no silvicultural or forest management practices have been used to increase fruit production, and no measures have been taken to favor either the number or biomass of female trees.

On occasion, the name "andiz" is mistakenly used as a common name for *J. drupacea*. According to the local people, "andɪz" is the common name of *Cupressus sempervirens* L. (also, called "servi"), another tree species in the same family as *J. drupacea* that has a similar cone size. Andiz only grows along the coastal zones in the region. Therefore, one must be very careful not to confuse the names "andiz" and "enek" when communicating with the local people.

Native People. The ethnobotanical information and illustrations presented in this study were collected in September 2004, through visits, interviews, and observations of the villagers of Beydigin in their summer residential areas in the Bogazyurt district. The nomadic villagers move to higher elevations on the Taurus Mountains in the summer, returning to the lower elevations along the Mediterranean coast in the winter *(3)*. They subsist mainly on grazing animals and limited farming in the valleys and forest openings. They also produce honey, thyme (*Thymus* sp.), and snowdrop bulbs (*Galanthus* sp.) at higher elevations; laurel leaves (*Laurus nobilis* L.), carob fruits (*Ceratonia siliqua* L.), and other native plant products grown at the lower elevations.

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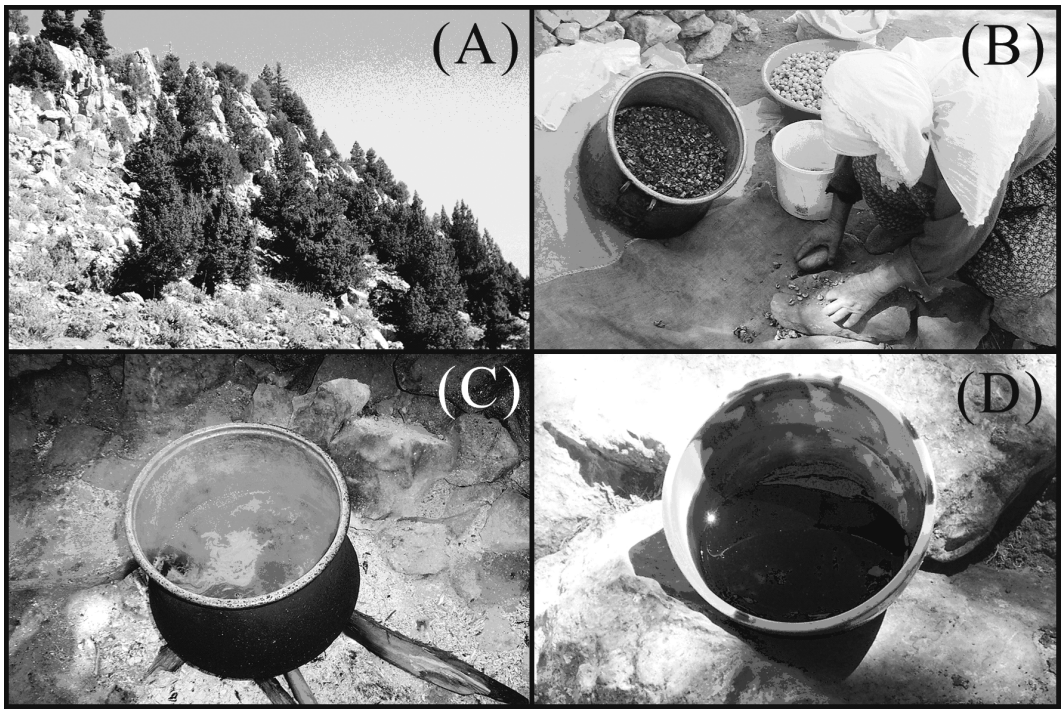


Fig. 1. A. *Juniperus drupacea* (enek) trees growing naturally on the western slopes of Enekli Tepe. B. A local woman in casual daily dress crushing enek fruits on a crushing stone. C. Boiling solutions in a cauldron on a fireplace. D. Enek pekmez, ready for storage and subsequent consumption.

Since the middle of the 20th century, the native people also have been involved in part-time work with the government Forest Service enterprises, mainly harvesting timber and building roads.

Fruit Harvest. The fleshy, nearly round fruits of enek become fully mature in two years, turning to a brownish or bluish-black color *(2)*. The ripened fruits are eaten by squirrels, goats (wild and domestic), sheep, wild boar, and bears. The local people harvest the ripened fruits in September and October to use for pekmez production. At harvest time, a large cloth or plastic cover is spread below the female trees bearing mature fruits. The tree and/or branches are shaken by hand so that ripened fruits fall from the canopy. Also, a long thin "harvest pole" is used to detach mature fruits from twigs. The fruits are then gathered in sacks and brought home for processing. They are storable without any apparent deterioration until the next harvest.

Pekmez Production by the Local People. Fruits are manually crushed with a pair of "crushing stones"; the larger stone (about $30 \times 30 \times 10$ cm) is placed on the floor and is slightly concave in the center to hold the fruits. The smaller stone fits into the palm of a hand (Fig. 1B). Only one or two fruits are placed at a time on the larger stone, and the smaller stone is used to gently crush the fleshy parts of the intact fruit. The crushed fruits are placed in large cauldrons and soaked in drinking water for one to three days. During this time, all water-soluble materials are expected to separate from the fruit. The water is then strained through fine cloth filters and saved for further processing. The organic residue is discarded, usually to a suitable place in the backyard. The village children gather and have a great feast as they eat the delicious "seeds" (botanically, the seeds are embryos), still intact within the broken nuts. When the children are finished, various bird species, including domestic fowl, visit the piles to feed on the remaining seeds. Finally, the remaining fleshy parts of the organic pile are eaten by domestic animals such as goats, sheep, horses, and donkeys.

Meanwhile, the strained solution is simmered

slowly over a wood fire for about 6 to 10 hours (Fig. 1C). Initially, some foam and associated air bubbles form at the surface of the boiling solution. Occasionally, the foam is separated out by a skimmer. Over time, most of the excess water is evaporated, leaving a relatively thick extract in the cauldron—this is enek pekmez (Fig. 1D). To determine whether the pekmez is ready or not, the following "plate method" is used. When a scoop of solution is placed in a shallow plate, the plate is shaken gently side to side and back and forth. If the solution moves slowly and visibly stains the plate, then the pekmez is ready. Otherwise, simmering is continued until the desired thickness is reached. It usually takes 6 kilograms (kg) of fruit to produce 1 kg of enek pekmez; there are no other ingredients. The limited yearly product is mostly consumed during the winter months following extraction, and for this reason we do not know how long pekmez can be stored without spoiling.

Nutritional Properties. Chemical analyses of enek pekmez have been carried out by Akinci et al. *(4)* on samples collected from the same region (about 30 km east of Bogazyurt). Enek pekmez has a high energy content; it is rich in sugar (22.3 g /100 g) and in various mineral elements (K, Ca, P, Mg, Na, and Zn among others) *(4)*. Its mineral content is richer than the types of pekmez obtained from grape, fig, and carob. With the development of an efficient production technique, enek has a high potential as a major source of pekmez in the forest villages on the Taurus Mountains.

Traditional Consumption. Elderly and "wise" persons in the village told us that people of Beydigin use enek pekmez in several ways. For instance, they use it as a dessert, much the same way other pekmez types are consumed. A dessert called "halva" is prepared by browning flour in butter and then adding pekmez. In addition, enek pekmez is believed to help strengthen weak individuals and to cure various diseases. Akinci et al. *(4)* and Gurhan and Ezer *(5)* reported that enek pekmez is useful for curing and/or relieving diseases such as asthma and hemorrhoids. Native people also use enek pekmez for curing sick and unhealthy domestic animals by feeding them with halva or pouring the pekmez directly into the mouths of the animals. Furthermore, people in the region use the seeds, fruits, and pekmez of enek for treating coughs, abdominal pains, and conditions such as common colds and diarrhea *(6)*.

Overall, the local people believe that female enek trees have tremendous vigor and fertility, and that this vigor and fertility are transferred by means of its pekmez to weak and unhealthy people and animals.

Acknowledgments. This study was partially supported by the Scientific Research Fund of Akdeniz University, Antalya, Turkey. We thank the native people of Beydigin Village who shared their knowledge (and, indeed, the taste) of enek pekmez with us. We also thank Roy Turkington (University of British Columbia, Vancouver, Canada) for reviewing the English language of the text.

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