Country/Product Spotlight

Chile & Prunes

This Country/Product Spotlight is the tenth in a series of industry and market overviews in *Nutfruit* magazine. This report provides a snapshot of the prune industry in Chile, with data, analysis and trends.

We would like to thank Chileprunes for their collaboration on this edition.

Industry Highlight

The Chilean Prune Industry in Numbers

12,500+ ha
planted

109,400 MT/year
processing capacity

590+
orchards

50+
processors

1,100+
employees

65,000 MT
annual production
(5-year average*)

33%
of global production
(5-year average*)

64,000 MT
annual exports
(5-year average**)

US$180 M
annual exports
(5-year average**)

Production

Chile's tradition of growing and processing fruit dates back to the colonial period, when these plants were brought over by the Spanish. Starting in the 16th century, European fruit trees were successfully adapted to Chilean soils and climates, making it possible to introduce the production process.[1] Moving into the 21st century, Chile's "fruit boom" of the 1970s was led by grapevines, apples and stone fruit trees.[2] Nowadays, Chile is a major producer and the top exporter of dried and fresh plums worldwide.

The main species grown in Chile are the Japanese plum (*Prunus salicina*), which is typically sold fresh, and the European plum (*Prunus domestica* L.), which is mainly used in the production of prunes (dehydrated plums). European plums are characterized by an elongated shape, a dark skin color and a pit that is easily separable from the pulp, making them the most appropriate type of plum for industrial processing. Within this group, D'Agen is the variety most commonly used for drying due to its high sugar content.

The fresh fruit is harvested in February and March and the processing season runs from April to December, due to the low perishability of the product. The ratio between fresh and dehydrated product ranges from 3 to 4 kilograms of fresh fruit per kilogram of dehydrated plum, depending on whether the pit is included or not.

In Chile, plums have traditionally been dehydrated by leaving the fruit under the sun in drying fields. This practice yields good results due to the climatic conditions of the production regions. However, a significant amount of product is dried in dehydration tunnels —a faster and more controlled drying method that results in a more homogenous quality. Once the product is dehydrated, it is calibrated, selected and washed to start the "tenderization" process, a heat treatment that restores a certain level of humidity, making the product softer for consumption.[3,4,5]

*Typical years; outlier seasons due to extreme weather disruption were not considered.
**2018-2022

1. Frutos secos en Chile y Cuyo. Nogales, almendros y castaños (2009). Aranda, M, Yuri, J.A., Castro San Carlos, A., Solar, M., Soto, N., Quinteros, K., Gaete, J., Rivas, J., Chávez; C. Lacoste, P.A. (coord.). HIB: revista de historia iberoamericana, Vol. 2, N.°. 2, pp. 38-51. **2.** Los aportes del INIA en el desarrollo y auge del nogal chilena. Gamalier, L.S. (2018). Available at: https://biblioteca.inia.cl/handle/123456789/5440. **3.** Ciruelas frescas y deshidratadas. Farías-Pérez, C. (2004). Oficina de Estudios y Políticas Agrarias, Ministerio de Agricultura, Gobierno de Chile. Available at: https://www.odepa.gob.cl/publicaciones/articulos/ciruelas-frescas-y-deshidratadas-2. **4.** Ciruelas secas: proyecciones de sobrestock y precios a la baja. Tapia-Cruz B. and González-Zagal, C. (2012). Oficina de Estudios y Políticas Agrarias, Ministerio de Agricultura, Gobierno de Chile. Available at: https://www.odepa.gob.cl/wp-content/uploads/2012/07/6647_ArtCiruelasSecas072012.pdf. **5.** Guía de Producción del Ciruelo Europeo (2020). Publicación CIREN N° 222. Centro de Información de Recursos Naturales, Ministerio de Agricultura, Gobierno de Chile.

According to the Odepa-Ciren fruit cadastre, the area planted with European plums in Chile is 2.6 times larger today than at the beginning of the 21st century. The planted hectarage increased by 70% in 2009 compared with 2008 and seems to have stabilized ever since (Figure 1). The total planted area is currently 12,530 hectares, of which 69% is located in the O'Higgins region, followed by the Metropolitan region with a 22% share and Maule with 8%. Of the total planted area, 96% consists of bearing trees and 99% of the trees are of the D'Agen variety (Table 1 and Figure 2). Of a total of 593 orchards, 87% have a size ranging from 1 to 50 hectares and all of them are irrigated, with drip irrigation being the predominant system.

Photo courtesy of Chileprunes

Table 1. Distribution of European Plum (*Prunus domestica* L.) Planted Area in Chile, Number of Orchards and Trees, by Variety

Source: Odepa-Ciren fruit cadastre (2020-2022). Office of Agrarian Studies and Policies (Odepa) and Natural Resources Information Center (Ciren), Ministry of Agriculture, Government of Chile.

Region	Variety	No. of orchards	Non-bearing trees	Bearing trees (growing production)	Bearing trees (full production)	Bearing trees (declining production)	Total no. of trees	Planted area (hectares)
O'Higgins	*D'Agen*	*371*	*77,686*	*1,152,260*	*2,668,615*	*892,981*	*4,791,542*	*8,520*
O'Higgins	*D'Agen Improved*	*5*	*0*	*10,987*	*33,947*	*1,611*	*46,545*	*82*
O'Higgins	*no data*	*2*	*1,000*	*0*	*0*	*60*	*1,060*	*1*
O'Higgins (sub-total)		**378**	**78,686**	**1,163,247**	**2,702,562**	**894,652**	**4,839,147**	**8,602**
Metropolitana	D'Agen	156	0	231,989	787,191	481,195	1,500,375	2,719
Maule	*D'Agen*	*41*	*201,994*	*126,889*	*351,939*	*78,202*	*759,024*	*1,029*
Maule	*Imperial Epineuse*	*1*	*2,643*	*0*	*1,419*	*0*	*4,062*	*5*
Maule	*Emperor*	*1*	*500*	*0*	*0*	*0*	*500*	*0*
Maule	*President*	*1*	*0*	*0*	*4,733*	*0*	*4,733*	*7*
Maule (sub-total)		**44**	**205,137**	**126,889**	**358,091**	**78,202**	**768,319**	**1,041**
Valparaíso	D'Agen	13	0	37,391	42,161	5,694	85,246	143
Coquimbo	D'Agen	1	0	1,280	6,345	0	7,625	15
Araucanía	D'Agen	1	7,000	0	0	0	7,000	6
Ñuble	D'Agen	2	0	2,343	0	0	2,343	2
Los Lagos	D'Agen	1	2,213	0	0	0	2,213	2
Total Chile		**596**	**293,036**	**1,563,139**	**3,896,350**	**1,459,743**	**7,212,268**	**12,530**

Figure 1. Planted Area of European Plum (*Prunus domestica* L.) in Chile, 1999-Present, Hectares

Source: Odepa-Ciren fruit cadastre (2020-2022). Office of Agrarian Studies and Policies (Odepa) and Natural Resources Information Center (Ciren), Ministry of Agriculture, Government of Chile.

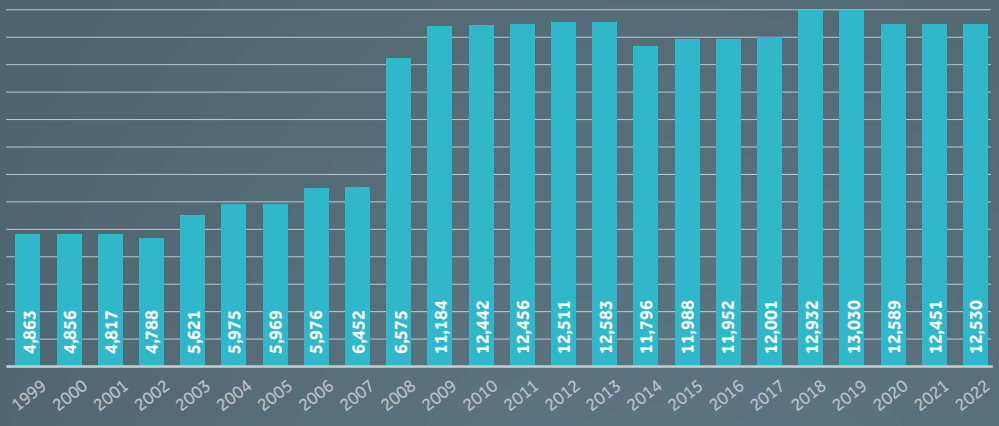
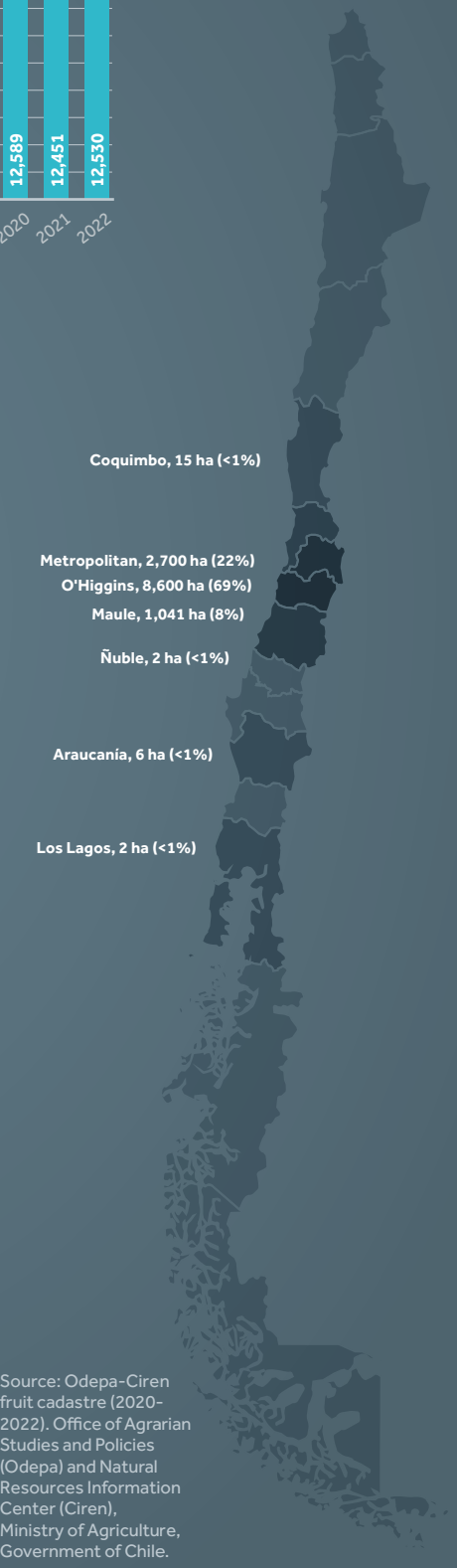


Figure 2. Distribution of European Plum (*Prunus domestica* L.) Planted Area in Chile



Source: Odepa-Ciren fruit cadastre (2020-2022). Office of Agrarian Studies and Policies (Odepa) and Natural Resources Information Center (Ciren), Ministry of Agriculture, Government of Chile.

As reported by Chileprunes, the Chilean association of processors and exporters of prunes, the total production of plums averages around 100,000 metric tons (MT) annually. Of this amount, about two thirds are used in the production of dehydrated plums, while around 20,000 MT go to the fresh Chinese market, following in the footsteps of the flourishing Chilean cherry industry in that market. The remaining 15,000 MT are used in concentrated juices and pulps, oils and other products. The juice and pulp demand is mainly concentrated in the United States, Canada, the United Kingdom and Australia.

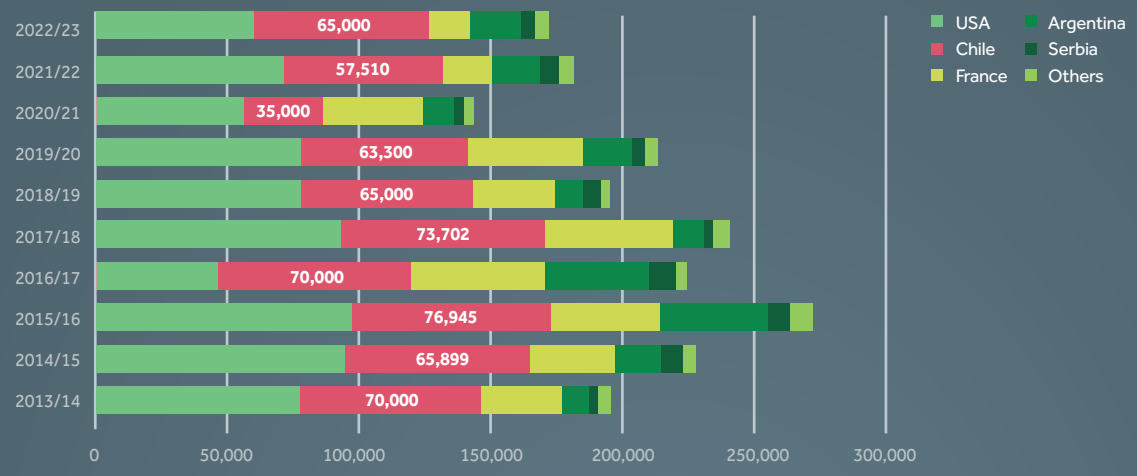
Chile is one of the world's top prune producers. Chilean production over the last decade ranged from 57,000 to 70,000 MT. Output during the 2020/21 season was unusually low due to an extreme drought that affected the producing regions. Production in 2022/23 is estimated at 65,000 MT (Figure 3). "The O'Higgins region, which is where the largest European plum plantations are located, did not suffer weather problems, so it has had an impeccable harvest," commented Pedro Pablo Díaz, President of Chileprunes. "Its fruits look good, with good sizes, volume and Brix content."

As per the latest Odepa-Ciren reports, with a capacity of 109,456 MT/year, the processing industry employs 1,177 people in 51 companies. O'Higgins accounts for 51% of the processing capacity, followed by the Metropolitan region with 47% and Maule with the remaining 2%.

Prune drying field. Photo courtesy of Chileprunes.

Figure 3. World Prune Production, Metric Tons

Sources: Chileprunes and INC Database.



Trade

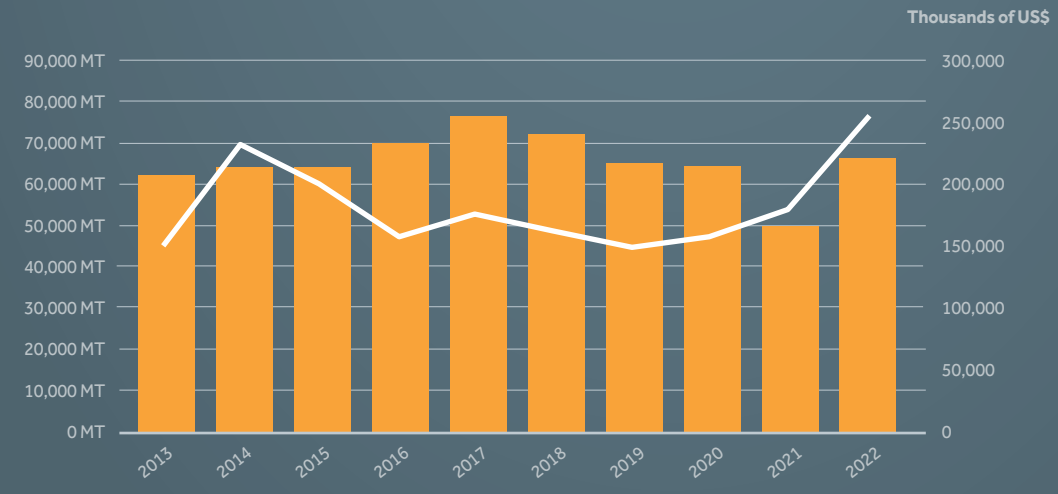
Accounting for a 33% share of trade globally,[6] Chile is the world's top prune exporting country. Annual international shipments amount, on average, to 63,700 MT and US$180 million (5-year average, 2018-2022).[7] As highlighted by Chileprunes, the quality of Chilean prunes —with organoleptic characteristics providing a distinctive acidity and sweetness equilibrium, a very good size and flavor, and a highly versatile supply— makes Chile the main global exporter, delivering product to more than 80 countries.

Over the last decade, exports have remained fairly stable, ranging from 62,000 MT to 76,000 MT; with the exception of shipments in 2021, which were unusually low as a result of the extreme drought that significantly impacted the 2020/21 season inventory. In turn, the value of total exports ranged from a minimum of US$145 million to a high of US$256 million in 2022 (Figure 4).

"Chile is the largest global exporter," commented Pedro Pablo Díaz, President of Chileprunes. "Last year's figures showed shipments for US$256 million, equivalent to 67,000 MT. In total, 81 countries imported prunes from Chile, the main destinations being China, Mexico, the United Kingdom, the United States, Poland, Germany, Italy, Brazil, Spain and the Netherlands."

Figure 4. Chilean Prune Exports, Metric Tons and Thousands of US$

Sources: Office of Agrarian Studies and Policies (Odepa), Foreign Trade Database.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Quantity (MT)	65,684	64,451	64,279	70,044	76,319	71,973	65,249	64,282	49,716	67,095
Thousands US$	151,033	233,018	200,557	158,080	174,763	163,177	145,416	159,611	175,714	255,822

6. INC Database, 5-year average, 2017-2021. **7.** Office of Agrarian Studies and Policies (Odepa), Foreign Trade Database.

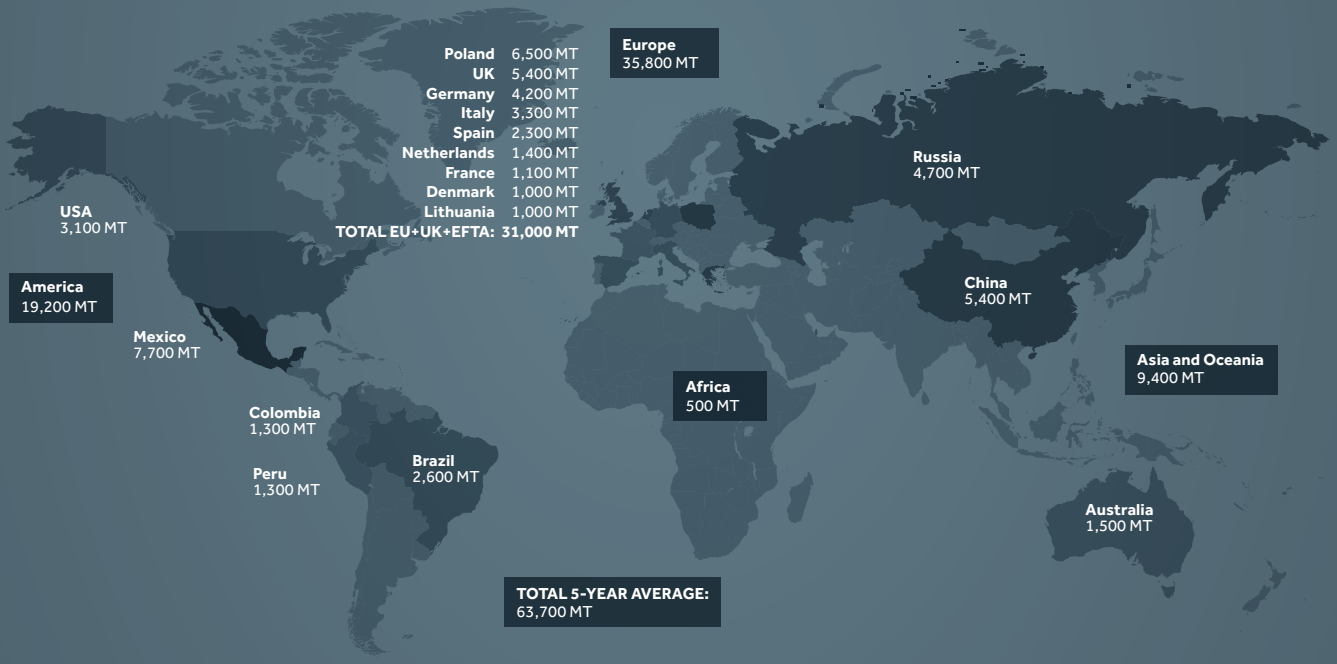
Considering the last five years of international shipments, the top markets were the European Union (plus the United Kingdom and the countries of the European Free Trade Association), which accounted for an average share of 49%, followed by Mexico (12%), China (9%), Russia (7%) and the United States (5%) (Figure 5).

The Chinese market for Chilean prunes saw spectacular growth in 2022. Last year, with a total of 11,800 MT imported, China ranked first as an importer for the first time, with volumes nine times higher than ten years ago and six times higher than in 2021. Similarly, the US and Australian markets reached 5,100 MT and 1,600 MT, up by 120% and 46% over 2021, respectively.

"China comes in as an interesting market for prunes," commented Pedro Pablo Díaz, President of Chileprunes. "It is a very mature destination for fresh plums. In 2022, for the first time, China was the number one importer of Chilean prunes and has sought to purchase small sizes, which has favored the prune export sector. Of course, it remains to be seen if this purchase behavior will reflect a longer-term trend."

Figure 5. Chilean Prune Exports by Destination, Metric Tons, 5-Year Average (2018-2022)

Source: Office of Agrarian Studies and Policies (Odepa), Foreign Trade Database.



"Chile is experiencing turbulent times," commented Pedro Pablo Díaz, President of Chileprunes. "In 2022, annual inflation reached 12.8%, the highest rate since 1991, and all signs suggest that it will tend to normalize in 2023. The exchange rate has fluctuated, causing uncertainty for the exporters. As for activities more typical of the industry, agrochemical prices have skyrocketed, and labor, though available, is scarce."

"Another challenge for Chileprunes is to further strengthen the Food Export Council, an institution of which we are members," added Díaz. "We believe in the fundamental role of this association in promoting Chile's food exports —the country's second most important sector after mining." Founded in 2005, the members of Chileprunes today account for 70% of the country's prune exports.

A New Sustainability Standard for the Prunes Industry: A Design by Chileprunes

PEDRO ACUÑA
AGRONOMIST AND MBA
EXECUTIVE DIRECTOR OF CHILEPRUNES

In 2022, the Association of Processors and Exporters of Prunes of Chile (Chileprunes) kicked off the development of a new sustainability standard for the prunes industry. Responding to new trends in international markets, this project involves the development and implementation of a standard that will be widely acknowledged by industry stakeholders. The goal is for a team of specialists and technicians to produce the aforementioned standard within a time frame of 28 months. In parallel, an audit and a training process will be held for companies throughout Chile.

Institutional Cooperation and Systematization

Among the most crucial factors in the success of this project is the creation of public-private collaboration networks. Another key factor is the participation of the Inter-American Institute for Cooperation on Agriculture (IICA), which has fostered a dynamic of systematized coordination. In particular, the Institute has enhanced cooperation between stakeholders by organizing assembly-style interactions with innovative and participatory work methodologies.

Several actions and arrangements are currently being made to get the project underway. None of them would be possible without the encouragement and support of the Foundation for Agrarian Innovation (FIA) under the Ministry of Agriculture of Chile. It also should be noted that both the Agency of Sustainability and Climate Change (ASCC), which depends on the Ministry of Economy, and the Office of Agrarian Studies and Policies (ODEPA) of the Ministry of Agriculture have provided key support on the execution of this initiative. As official bodies, they have contributed with their experience and knowledge in the development of standards for other industries.

Stages of a Highly Participatory Design

The development of the standard by means of an interactive meeting method is expected to take 28 months. In addition to the main purpose of this process, we are also committed to cultivating a participatory dynamic each step of the way. Hence, the first stage of the project is a sectoral diagnosis, in which the industry's companies will be identified and characterized, the various actors will be mapped and the main stakeholders will be identified.

After the diagnosis, we will conduct a comparative analysis of similar standards at the national and international levels to serve as a benchmark for the development of a list of good practices consistent with the local reality, which will subsequently be incorporated into the standard.

In order to identify the main technical gaps of the companies in the industry, an audit process will be conducted over a period of four months. These gaps will be addressed during the third stage of the project: a training process wherein technical material will be made available to all companies nationwide that wish to subscribe to the standard.

The project has now been underway for six months. In this time, we have begun the diagnosis of the sector and identified a total of 635 actors. In addition, we have defined the topics and dimensions that the standard will address, which cover the environmental, social, ethical, qualitative and management fields.

Photo courtesy of Chileprunes

Each aspect included in the standard was validated and prioritized by the main stakeholders as a part of the process of benchmarking against national and international standards. Based on the analysis carried out thus far, we can safely affirm that this venture is the first of its kind for the prunes industry globally.

The core of these innovations is the goal of reaching all companies in the industry nationwide, since the material generated by the project will be made available as a public good to all actors involved in Chile's agricultural field.

On completion of the validation and training process for companies, the standard will obtain the Chile Conscious Origin distinction. This certificate is expected to be validated internationally and be included in the Standards Map platform.

This project, which is dependent on the International Trade Center (ITC) and the United Nations, not only identifies, compares and supervises different sustainability standards at the international level, but also enables different actors to make informed decisions. Promoting and boosting the visibility of the standard worldwide will helps us gain a better understanding of the landscape with regard to sustainability initiatives and connect with like-minded business partners.

> *"This venture is the first of its kind for the prunes industry globally."*

Health Benefits of Prunes

Prunes aren't just delicious; they're also nutritious! This tasty dried fruit is high in fiber, potassium, vitamin A and vitamin K, and also a source of copper. Recent research has highlighted the association between prunes and bone health, digestive health and the reduction of certain risk factors for cardiovascular disease.

Bone Health

Numerous studies have found links between consuming prunes and the prevention and reverse of bone loss, especially in postmenopausal women.[1-5] Recent research suggests that prune intake may have beneficial effects on bones in adult men, as well.

In a study published in *Nutrients*[6] in 2022, 35 men aged 55 to 80 years were split into three groups, consuming 100 g, 50 g and 0 g of prunes daily, respectively. The researchers found that those who consumed 100 g of prunes daily saw a significant decrease in serum osteocalcin. Those eating 50 g of prunes daily saw significant decreases in serum osteoprotegerin and serum osteocalcin, while they experienced an increase in the OPG:RANKL ratio, which is a determinant of bone mass and skeletal integrity. The researchers concluded that consuming either 100 g or 50 g of prunes regularly for three months may be beneficial to bone biomarkers in men.

Reduction of Cardiovascular Risk

Recent research suggests that prunes may improve cardiovascular risk factors in postmenopausal women.[7] In 2021, the *Journal of Medicinal Food* published a clinical trial with 48 postmenopausal women. Each participant was randomly assigned to one of three groups that consumed either 0 g, 50 g or 100 g of prunes per day. At the conclusion of the six-month intervention, it was found that the total cholesterol in those individuals consuming 100 g per day and the high-density lipoprotein ("good") cholesterol in those consuming 50 g per day were significantly improved compared to those consuming no prunes.

Furthermore, improvements in the inflammatory biomarkers interleukin and tumor necrosis factor were observed in the 50 g/day group and this group also saw their antioxidant capacity increased.

Digestive Health

Prunes are also associated with digestive health, having been shown to help manage constipation and increase stool weight. In 2012, the European Commission approved the health claim that consuming 100 g a day of prunes contributes to normal bowel function.

KEY FACTS

DIGESTIVE HEALTH
The EU approved health claim is that consuming 100 g of prunes per day contributes to normal bowel function.

HEALTHY BONES
Research has linked prunes to the prevention and reversal of bone loss, especially in postmenopausal women and adult men.

REDUCTION OF CARDIOVASCULAR RISK
Research suggests that prunes may improve cardiovascular risk factors in postmenopausal women.

HIGH IN:
Fiber, potassium, vitamin A and K

References:
1. Al-Dashti, Y.A., et al. (2019). Effects of Short-Term Dried Plum (Prune) Intake on Markers of Bone Resorption and Vascular Function in Healthy Postmenopausal Women: A Randomized Crossover Trial. *Journal of Medicinal Food*, 22(10), 982-992. **2.** Hooshmand, S., et al. (2011). Comparative effects of dried plum and dried apple on bone in postmenopausal women. *British Journal of Nutrition*, 106(6), 923. **3.** Franklin, M., et al. (2006). Dried plum prevents bone loss in a male osteoporosis model via IGF-I and the RANK pathway. *Bone*, 39(6), 1331-1342. **4.** Rendina, E., et al. (2013). Dried plum's unique capacity to reverse bone loss and alter bone metabolism in postmenopausal osteoporosis model. *PloS One*, 8(3), e60569. **5.** Strock, N.C., et al. (2021). Dried plum consumption improves bone mineral density in osteopenic postmenopausal woman: A case report. *Bone Reports*, 14, 101094. **6.** George, K. S., et al. (2022). The Short-Term Effect of Prunes in Improving Bone in Men. *Nutrients*, 14(2), 276. **7.** Hong, M.Y., et al. (2021). Dried Plum Consumption Improves Total Cholesterol and Antioxidant Capacity and Reduces Inflammation in Healthy Postmenopausal Women. *Journal of Medicinal Food*, 24(11), 1161-1168. **8.** Lever, E., et al. (2019). The effect of prunes on stool output, gut transit time and gastrointestinal microbiota: A randomised controlled trial. *Clinical Nutrition*, 38(1), 165-173. **9.** Commission Regulation (EU) No 432/2012 of 16 May 2012.

Strawberry, Cashew and Prune Smoothie

Ingredients (1 serving):

- 40 g prunes (pitted)
- 100 ml almond drink
- 250 g strawberries (washed, stems removed)
- 30 g raw cashews
- 1 tbsp lemon juice

Preparation:

1. Add the ingredients to a blender jar
2. Process until smooth
3. Serve immediately