

Summary of the dossier: powder of Maquiberry (*Aristotelia chilensis*)

Applicant: South Am Freeze Dry S.A., Cerro El Plomo 5630 office 1704 Las Condes Santiago, Chile

The request concerns the authorisation of powder of Maquiberry (*Aristotelia chilensis*) as a traditional food from a third country

Over the past 10 years, the research interest on Maquiberry (*Aristotelia chilensis*) has increased due to the potential health benefits of the fruit, which are largely attributed to the high anthocyanin content and high antioxidant capacity. Furthermore, Maquiberry fruit has earned the name of 'superfruit', and several products based on the dehydrated fruit and Maquiberry juice are available on the international market. Although the Maquiberry fruit is not frequently consumed by the Chilean population from urban areas, its use is deeply rooted in rural and native cultures (Mapuche and Huilliche).

Maquiberry fruits are collected from wild populations between December and February because commercial plantations of this species do not yet exist. Therefore, fresh fruits are available primarily in local markets. According to the literature cited through the dossier, the earliest research on the Maquiberry plant focused on the validation of traditional uses of both the leaves and fruits. Afterwards, new biological properties and health effects of Maquiberry have been reported. And in the beginning of 2000, began the investigation in maqui domestication which is still in developing and until now domestic cultivation is still in progress.

Maquiberry, also known as 'clon', 'queldron' and 'maquei', is in the *Elaeocarpaceae* family, which includes 10 genera and 400 species worldwide. In Chile, two genera (*Crinodendron* and *Aristotelia*) and three species (*C. hookerianum*, *C. patagua* and *A. chilensis*) are represented by this family. Maquiberry is a dioecious species that grows naturally as an evergreen bush or tree from Limarí (30°S latitude, Coquimbo Region) to Aysén (45°S latitude, Aysén del General Carlos Ibañez del Campo Region), Chile, and from the coast to 2000m above sea level. It is also present in the Juan Fernández Archipelago. Maquiberry is also a native species of the Andean region of Argentina. In Chile, it is a pioneer species that colonises varied environments and has a great capacity for regeneration in pine forests of the central and southern regions, forming wild populations called 'macales'. In native forests in Central Chile, Maquiberry is a secondary species where populations of quillay (*Quillaja saponaria* Mol.), litre (*Lithrea caustica* [Mol.] Hook. et Arn.), and peumo (*Cryptocarya alba* [Mol.] Looser) are predominant.

Botanically, the Maquiberry fruit is a berry (5mm diameter) with three or four seeds that ripen in 1,100 growing degree-days (91 d after fruit set) in Central Chile. Once mature, deep-purple fruits have 18–19°Brix and a weight of 21–24 g per 100 berries. The ripening processes in Maquiberry fruit have a significant effect on the total anthocyanin content and corresponding antioxidant capacity. As it was mentioned above, the edible fruit is a dark blue-purple fleshy berry. These have been used for hundreds of years by the Mapuches as food and also due to their medicinal and nutritional benefits, being recorded in chronicles dating from the time of the conquest. The active principles of Maquiberry (alkaloids and tannins) give it anti-inflammatory, antispasmodic, astringent and analgesic properties. In folk medicine, the infusion of dry leaves is used to heal wounds, and this same preparation from fresh leaves is used to relieve fever, diarrhoea, dysentery, soothe pharyngeal and tonsil inflammation and relieve mouth ulcers; fresh leaf juice can also be used, either by consuming it or topically. Given the components found in the composition of the fruit, is that it is being associated as a healthy fruit food, since the results of studies have described it as a powerful antioxidant, as it contains high concentrations of polyphenols, anthocyanins and vitamin C. Scientific evidence has been carried out

in order to demonstrate its health benefits for consumers. (Vergara 2005, Rojo 2012, Jara 2014). Studies had been carried out in accordance with international standards, and have been approved and published in prestigious scientific journals, validating the studies.

The different studies and narratives reveal that Maquiberry fruit was consumed as food preferably in processed form, like dehydrated, jam or juice. There are clear reasons for this; the brief harvesting period and very short shelf life.

In terms of trading, evidence of the use of Maquiberry as a dye is shown throughout the dossier. There is information on exports to Europe in the past centuries, but exports of Maquiberry pulp were recorded (Data of National Customs Service) in the early 90 years. Since 2000 processing and exporting industry have been improving and it had developed new formats for Maquiberry fruits such a powder and juice concentrate. These products have been well accepted in demanding markets like United States, Korea, Japan and even in some countries of European Union can be found some products of Maquiberry.

According to historical analysis of Maquiberry's composition, 100g of powder contains on average a total of 5g of polyphenols. Taking that into consideration, the proposed intake for a single portion is 1.5 - 2g (1/2 teaspoon) of Maquiberry powder.

The proposed maximum intakes for Maquiberry powder as raw materials is indicated in Table N° 1.

Table N° 1

Food product	Intake (g of Maqui berry powder /100g of product)
Dairy products and their analogues	
Flavoured fermented milk products including heat-treated products	5g/100g
Dehydrated milk as defined by Directive 2001/114/EC	10g/100g
Edible ices	5g/100g
Jam, jellies and marmalades and similar products	30g/100g
Extra jam and extra jelly as defined by Directive 2001/113/EC	30g/100g
Confectionery	
Includes all cocoa and chocolate products (5.1), other confectionery products that may or may not contain cocoa (5.2), chewing gum (5.3), decorations and icings (05.4).	5g/100g
Cocoa and chocolate products as covered by Directive 2000/36/E	-
Other confectionery including breath freshening micro-sweets	2g/100g
Chewing gum	3g/100g
Decorations, coatings and fillings, except fruit-based fillings covered by category 4.2.4	2g/100g
Cereals and cereal products	
Breakfast cereals	30g/100g
Pasta	-
Bakery wares	20g/100g
Bread and rolls	15g/100g
Fine bakery wares	15g/100g
Dietary foods for weight control diets intended to replace total daily food intake or an individual meal (the whole or part of the total daily diet)	30g/100g
Foods suitable for people intolerant to gluten as defined by Commission Regulation (EC) No 41/2009	-
Beverages	

Non-alcoholic beverages	5g/100ml
Fruit juices as defined by Directive 2001/112/EC and vegetable juices	5g/100ml
Fruit nectars as defined by Directive 2001/112/EC and vegetable nectars and similar products	5g/100ml
Flavoured drinks	5g/100ml
Coffee, coffee and chicory extracts, tea, herbal- and fruit-infusions; coffee substitutes, coffee mixes and mixes for 'hot beverages'	5g/100ml
14.1.5.2 Other	
Alcoholic beverages, including alcohol-free and low-alcohol counterparts	5g/100ml
Aromatised wine-based drinks	2g/100ml
Aromatised wine-product cocktails	2g/100ml
Other alcoholic drinks including mixtures of alcoholic drinks with non-alcoholic drinks and spirits with less than 15 % of alcohol	2g/100ml
Ready-to-eat savouries and snacks	
Desserts excluding products covered in categories 1, 3 and 4	15g/100g

One part of the wild harvesting is certified as organic. Among the certifications most commonly used by companies are: IMO Swiss, USDA organic, Producto Orgánico Chile. HACCP is also implemented during the process of production and other certifications like BRC Global Standards, Öko Garantie BCS, and BRC foods certificated are implemented in exports companies. As part of the compliance of these standards and quality assurance programs, companies perform chemical and microbiological analyses in all of their production batches keeping its respective results recorded. Analysis are carried out in their internal laboratories as well in national laboratories or international laboratories of recognized prestige and accreditation. Among the laboratories related to the antioxidant capacity, Brunswick Laboratories can be named as a provider in analysis of Maquiberry. Having this type of certification allows consumers to validate the evidence that what is being consumed is safe for human consumption from a recognized and independent source or what is indicated on the label corresponds effectively to the components of the product and does not lead to confusion for users. In the case of national laboratories, these are certified by the National Standards Institute (Instituto Nacional de Normalización), ensuring that they comply with national requirements.

Maqui is a safe food that has been consumed by the Mapuche people for hundreds of years, considered as a healthy food capable of curing symptoms of diseases. Today it is known that it has a high antioxidant power, which is why it would be a highly valued food for the European consumer.