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## The market of *Ilex guayusa*. Products, stakeholders and trends in the Ecuadorian Amazon Region

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### Abstract.

*Ilex guayusa* is an important species for the economy of the Ecuadorian Amazon Region. The plant is well known as a traditional medicine and drink but is also a promising source of bioactive compounds for functional foods and cosmetic products. The aim of the study is to realize a review regarding the guayusa products, the involved companies and the future trends in the Ecuadorian Amazon Region. For this purpose have been analyzed 55 articles based on international and national studies. Relevant topics have been identified: innovation, energy drinks, sustainability, natural medicine and market. The study detected products and stakeholders. The new trend for *I. guayusa* is to develop innovative products with added value as phytocosmetics and nutraceuticals. Finally, to improve the *I. guayusa* value chain can enhance the incomes of local Amazonian communities of the Ecuadorian Amazon.

**Keywords:** *Ilex guayusa*, products, stakeholders, prototypes, trends

### Introduction

The Ecuadorian Amazon region (EAR) represents 48% of the surface of Ecuador and covers only 0.2% of the Earth's surface, but hosts 70% of the world's known biological species [1], therefore Ecuador belongs to the 17 defined countries Megadiverse. In Ecuador have been identified the 7% of known vascular plant species, the 20% of orchids and 11% of ferns, [2]. Other authors mentioned that Ecuadorian biodiversity involves 18% of bird species, including 50% of those in South America and 7% of amphibians [3]. This important biological diversity is linked to a great cultural richness, represented by 14 ethnic groups or nationalities, of which ten live in the Ecuadorian Amazonian

Region (RAE) [4]. Among the plants of potential economic value is the guayusa (*Ilex guayusa*). Its high caffeine content places it within this group of plants with potential for the application of energy drinks, such as guaraná (*Paullinia cupana*), tea (*Camelia sinensis*) and coffee (*Coffea arabica*). The communities of the SAR usually consume guayusa daily in the form of infusion; however it is also used as raw material for other elaborations. Because of this it is possible to diversify the production of finished products, to obtain greater value, and to provide other family income.

The *I. guayusa* species, with its traditional and ritual uses, clearly represents how biological diversity is expressed between different cultures and is a relevant part of local populations [5,6].

It should be noted that the socioeconomic processes anchored to the guayusa are representative of a species very present in the ethnobotanical tradition, but that only in the last decades is assuming an organized production character for sale [7]. Derivatives of *I. guayusa* (infusions and homemade soft drinks) are part of the diet and traditional medicine [8], but the production of "guayuseros" begins to assume the characteristics of a chain of continuous value, Planned and capable of mobilizing constant volumes of production. The contribution of guayusa to the economy of producer families still requires a systematization of existing data, and also implies an analysis of the Amazonian socio-productive model, with special emphasis on the concepts of economy and market from the perspective of the native communities. A first financial evaluation based on information related to the conditions of its producers, the minimum price to not lose the investment in the production of a guayusa yard should exceed US \$ 10.00, considering the sale of fresh leaves [9].

The objective of this article is to contribute to the improvement of the products of the *I. guayusa* value chain in the Ecuadorian Amazon, and its perspectives towards development.

## Materials and Methods

The present research combines a systematic review methodology and exploratory type research in a descriptive stage. Were used several techniques such as: interviews, document review and analysis of indexed databases.

The interviews have been organized in order to obtain data regarding: identification of the product origin, localization of companies and products classification. Review methodology was performed adopting the following electronic databases: SciFinder, PubMed, Google Scholar, SciElo, Taylor & Francis and Scopus. Data were independently extracted from four reviewers and the final paper selections were completed avoiding duplication of data. The following keywords and their combination were used as key words for the research: *Ilex guayusa*, guayusa products, guayusa market. The reviewers selected articles were in English and Spanish language and were excluded data from patents. The above mentioned criteria allowed selecting eligible articles; we also considered some additional key papers for introduction and result chapters.

## Results and Discussion

### 2.1. Investigation sources regarding *I. guayusa*

According to the result of the present research, the first article about *Ilex guayusa* was published in 1968 but there are bibliographic sources from missionaries and scientist which are dated on XVII and XVIII centuries. Due to the knowledge about chemical composition and properties [10], several studies were carried out from the above mentioned period in many different sectors, such as:

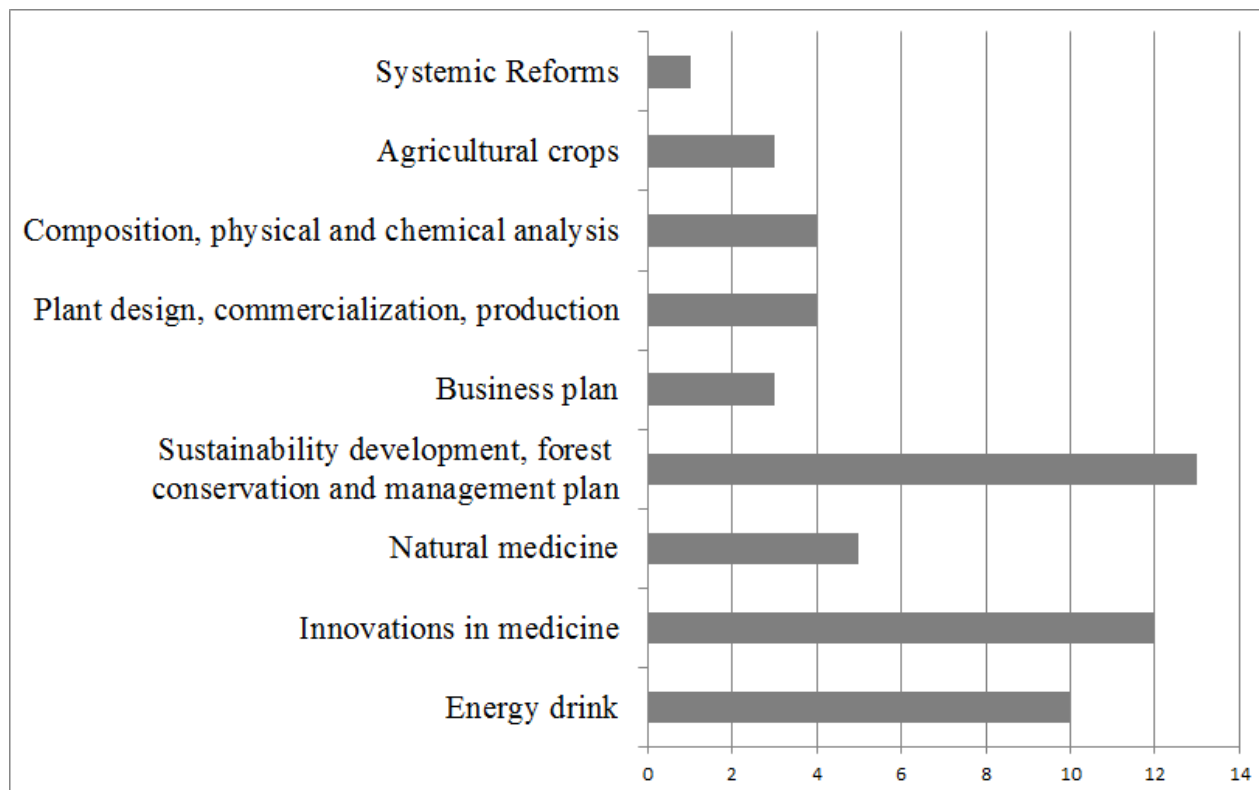
- ✓ Energizing drink (Use)
- ✓ Innovations in medicine (Use)
- ✓ Natural medicine (Use)
- ✓ Sustainability conservation of forests and management plan (Studies)
- ✓ Business Plan (Studies)
- ✓ Plant design, marketing, production (Studies)
- ✓ Composition, Physical and Chemical Analysis (Studies)
- ✓ Crops (Studies)

From this information [11-48] we quantify the number of studies and uses referents to these topics, **Figure 1**. It is evident that the most treated topic is the conservation and management plan of the species and not as a value-added and diversified product.

Information about *I. guayusa* is available in: Ecuador, Perú, Argentina, Colombia, Bolivia, Brazil, Italy, México and Spain, as reported in **Figure 2**.

Finally, the *I. guayusa* supply chain can be observed in the **Figure 3**.

**Figure 1.** Uses and researches about *I. guayusa*.



Fuente:

**Figure 2.** Origin of information about *I. guayusa*.

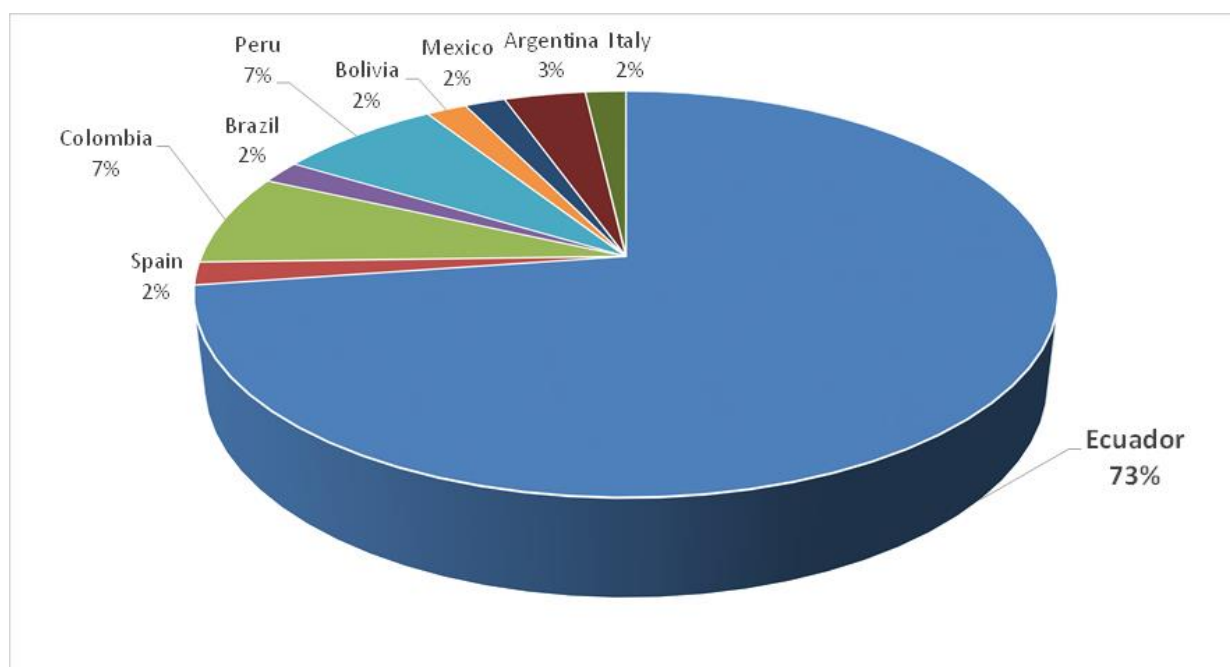
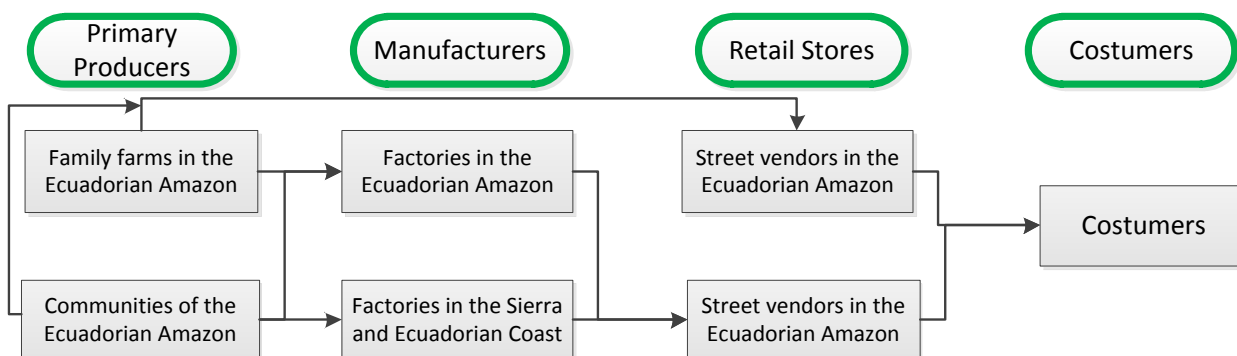


Figure 3. *I. guayusa* supply chain.



2.2 *I. guayusa* products and markets.

Regarding derived products, *I. guayusa* supply chain shows three essential links: primary produces, merchants and sellers; because the big market is focused on raw material.

The local market of *I. guayusa* is still based on traditional consumption as home-made infusion. Nevertheless, in the last decade several products have been developed including *I. guayusa* as raw material, as showed in Table 1. These products are manufactured in Ecuador. The data show that in Ecuador the varieties of *I. guayusa* products focus on tea, soft drinks and chocolate.

Regarding the national and the international market, Table 2 shows which countries where actually the destination of sales activities.

Table 1. High add value products developed from *I. guayusa*.

Company	Product	Business area	Ref.
AROMAS DEL TUNGURAHUA	“Te de guayusa”	Tea	[43]
ECOCAMPO	“Guayusa TE”	Soft drink	[44]
FUNDACION CHANKUAP	“Infusión de Guayusa e Ishpink”	Tea	[45]
	“Infusión de Hierba Luisa, Guayusa, Ishpink y Jengibre”		
GUAYUSA FRESH	“Bebida refrescante GUAYUSA FRESH”	Soft drink	[46]
PACARI	“Barra de chocolate PACARI con guayusa”	Flavored Chocolate	[47]
RUNA TARPUNA	“Runa Guayusa Amazónica Orgánica Original”	Tea	[48]
	“Runa Guayusa Amazónica Orgánica + Canela + Hierba Luisa”		
	“Runa Guayusa Amazónica Con Flor De Jamaica Y Naranja”		
	“Runa Guayusa Amazónica Orgánica con limón y menta verde”		
WAYKANA	“Hoja triturada de Té de Guayusa Verde”	Tea	[49]
WAJUKO	“Guayusa clásica”	Tea	[50]

**Table 2.** *I. guayusa* Markets

Company	Country	Ref.
AROMAS DEL TUNGURAHUA	Ecuador	[43]
ECOCAMPO	Ecuador	[44]
FUNDACION CHANKUAP	Ecuador	[45]
GUAYUSA FRESH	Ecuador	[46]
PACARI	U.S.A., Europe, Latin America	[47]
RUNA TARPUNA	Canadá, Colombia, Ecuador, Germany, Italy, U.S.A., U.K.	[48]
WAYKANA	Ecuador	[49]
WAJUKO	Ecuador	[50]

### Conclusions

*I. guayusa* is a traditional plant from the Amazon region which represents a very important source of incomes for local communities. Beyond a socio economic impact on local communities, *I. guayusa* can be sustainable crop of Amazonian region but at the moment the supply chain presents a low level of integration and weakness of performance. The present systematic review highlights the need to promote innovative products which guarantee a higher return and an improvement in customer satisfaction.

### Author Contributions

All the authors contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

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### Conflicts of Interest

The authors declare no conflict of interest.

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