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Meeting of the Minds: Traditional Herbal Medicine in Multiethnic Suriname

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Additional information is available at the end of the chapter

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Abstract

The Republic of Suriname (South America) is located on the Guiana Shield, one of the regions with the highest biodiversity and the largest expanse of undisturbed tropical rain forest in the world. The population of almost 570,000 consists of a unique blend of ethnic groups and cultures from all continents. These include Indigenous Amerindians, the original inhabitants; Maroons, the descendants of runaway slaves who had been shipped from Africa between the seventeenth and the nineteenth century; Creoles, a generic term referring to mixed blacks and whites; the descendants from indentured workers from China, India, and Java (Indonesia) who arrived between the second half of the nineteenth and the first half of the twentieth century; as well as immigrants from various Middle Eastern, European, Caribbean, and South American countries. All these groups have made their own specific contribution to Suriname's traditional medicine, which has resulted in a myriad of remedies against many disorders, mainly employing a variety of plants. This chapter presents a brief history of Suriname, addresses the ethnopharmacological practices of Maroons and Creoles as well as Hindustanis and Javanese, and concludes with a few remarks on the provisions provided by the country's rich plant-based traditional medicine.

Keywords: Suriname, multiethnicity, Maroons and Creoles, Hindustanis, Javanese, traditional herbal medicine

1. Introduction

1.1. Suriname: general aspects

The Republic of Suriname is located on the northeast coast of South America, just north of the Amazon delta, and borders the Atlantic Ocean to the north, French Guiana to the east, Brazil

to the south, and Guyana to the west (**Figure 1**) [1]. Despite its location in South America, Suriname is culturally considered a Caribbean rather than a Latin American country and is a member of the Caribbean Community (CARICOM) [1]. The climate is tropical with abundant rainfall, a uniform temperature of on average 27°C, and a relative high humidity of 81% in the capital city of Paramaribo [2]. There are four seasons, namely the long rainy season (April–July), the long dry season (August–November), the short rainy season (December–January), and the short dry season (February–March) [2].

Suriname's land area of roughly 165,000 km² can be distinguished into a northern urban-coastal and a rural-coastal area as well as a southern rural interior (**Figure 1**) [2]. The urban-coastal area comprises Paramaribo and the Wanica district (**Figure 1**) and harbors approximately 80% of the population of almost 570,000 [2, 3]. The rural-coastal area comprises the districts of Marowijne, Commewijne, Saramacca, Coronie, and Nickerie (**Figure 1**) and is, together with the southern-rural districts of Para, Brokopondo, and Sipaliwini (**Figure 1**), home to the remaining 20% of Suriname's inhabitants [2, 3]. The latter part of the country is referred to as the hinterland, encompasses more than three-quarters of its land surface, and consists largely



Figure 1. Map of Suriname depicting the 10 administrative districts. The insert indicates the location of Suriname in South America.

of sparsely inhabited savanna and dense, pristine, and highly biodiverse tropical rain forest [2]. This makes Suriname comparatively one of the most forested countries in the world [2, 4].

The urban areas are characterized by a “western” lifestyle, modern health-care facilities, and an economy that is mainly based on commerce, services, and industry [5]. The rural societies have a more traditional way of living, lack comprehensive public health services, and have agriculture, forestry, crude oil drilling, bauxite and gold mining, as well as ecotourism as major economic activities [5]. These activities have been growing in scale and economic importance in recent years and are, together with agriculture and fisheries, the country’s most important means of support, contributing substantially to the gross domestic income in 2014 of U\$ 5.297 billion and an average per-capita income of U\$ 9583 [5, 6]. This positions Suriname on the World Bank’s list of upper-middle income economies [5, 6].

1.2. Suriname: people

Suriname’s population is among the most varied in the world, comprising the Indigenous Amerindians, the original inhabitants; descendants from enslaved Africans imported between the seventeenth and the nineteenth century (called Maroons and Creoles); descendants from contract workers from China, India (called Hindustanis), and the island of Java, Indonesia (called Javanese) attracted between the second half of the nineteenth century and the first half of the twentieth century; descendants from settlers from a number of European and Middle Eastern countries; and more recently, immigrants from various Latin American and Caribbean countries including Brazil, Guyana, French Guiana, Haiti, and Cuba [1, 3]. The largest ethnic groups are the Maroons and Creoles, as well as the Hindustanis and Javanese, comprising approximately 22 and 16%, and 27 and 14%, respectively, of the total population [3].

Although members of all ethnic groups are encountered throughout the country—particularly in Paramaribo—certain ethnic groups are clustered in relatively large numbers in certain areas of the country [2, 3]. For example, the district of Nickerie harbors predominantly Hindustanis, that of Para mostly Creoles, that of Commewijne mainly Javanese, while the Maroons and Indigenous peoples primarily populate the interior, living in villages along the major rivers [2, 3]. More importantly, the various ethnic groups have largely preserved their culture and identity, still practicing their original religion and speaking their original language in addition to Dutch, the official language of government, business, media, and education, as well as Surinamese or Sranan Tongo, the widely used English- and Portuguese-based lingua franca [1, 3].

The same holds true for their specific perceptions of health and disease and their ethnopharmacological traditions [7]. However, throughout time, considerable intercultural exchange has taken place about the knowledge and use of medicinal plants [7]. This paper first presents a brief historical overview of Suriname, then addresses the ethnopharmacological practices of the largest ethnic groups (the Maroons and the Creoles, as well as the Hindustanis and the Javanese), and concludes with a few remarks on the provisions provided by the various plant-based traditional medicinal practices.

2. Brief history of Suriname

2.1. The early days

Petroglyphs found at archeological sites in the western Corantijn basin and the eastern Marowijne basin of Suriname demonstrate that this region was inhabited by Indigenous peoples since at least 3000 BC, long before contact with Europeans [8]. The collection of 313 pre-Columbian pottery and charcoal fragments found in several caves at the Werephai site in the deep southwest of Suriname even dates human presence in Suriname as far back as 5000 before present [8]. It is possible that these peoples were nomadic tribes who roamed the Amazon area, and represent the ancestors of the present-day Akurio, Trio, Warrau, and Wayana, Indigenous tribes who still mainly populate the rainforest inland, but there is no documentation to support this assumption.

The Arawaks, a nomadic Indigenous tribe that lived at the coast from hunting and fishing, are generally believed to be Suriname's original inhabitants [9], but there are also no written documents to sustain this supposition. Around 1200 AD, the Caribs sailed to Suriname from their territory extending from the mouth of the Orinoco River in contemporary Venezuela to that of the Amazon River in present-day Brazil, and drove the Arawaks away from their lands [9]. The Arawaks moved to the savannas further land inward and the Caribs settled at the mouth of the Marowijne River in northeastern Suriname where they established, among others, the village of Galibi (from "Kupali Yumï," meaning "tree of the forefathers" in the Carib language) [9].

2.2. The first settlers

The first Europeans arrived in Suriname in the early 1600s. They were Spanish, English, French, and Dutch fortune hunters who were attracted by tales of a fantastical city of gold called El Dorado somewhere at South America's "Wild Coast" [10]. However, it were English settlers led by Captain John Marshall who first colonized the area in 1630 [10, 11]. They called the colony "Surinam" after the Surinen indigenous people who then inhabited the "land of many waters" in the fertile Guiana plains [11]. Encouraged by the successes in their colonies in Virginia and Barbados, the English established tobacco plantations at Marshall's Creek along the Suriname River, but this venture failed because of plummeting prices on the European market [11]. By 1645, Marshall's colony was abandoned [11], but "Marchallkreek" is marked on maps until today.

About 20 years later, in 1651, English troops commanded by Major Anthony Rowse succeeded in establishing the first permanent plantations in Suriname as well as a fort to defend the newly acquired asset [11]. The colony was named Willoughbyland in honor of their patron Lord Francis Willoughby, the then governor of Barbados [11]. Willoughby's intention was to establish a settlement for cultivating sugarcane, a cash crop that was fetching much higher prices in Europe than tobacco [11]. The much needed experience with sugarcane cultivation came from Dutch Jews who lived in Brazil and French Guiana but had to flee persecution by the Portuguese—the then owners of both regions—who were hostile to Protestantism and

Judaism [12]. The Jews mainly established sugarcane plantations in the savanna region which is still known today as the Jodensavanna (the “Jew’s savanna”) [12].

2.3. The plantation economy

Cheap labor was initially—in the 1650s—provided for by indentured servants from England, some Indigenous tribes people from the interior who had been captured by the coastal tribes and sold to the English colonists, as well as the relatively few black slaves who had directly been brought from Barbados by their owners or had been bought from the Dutch [11, 12]. However, because of the growing need of laborers on the sugarcane plantations, the British Royal Company of Adventurers occupied Dutch assets in Western Africa including centers for slave trading, initiating structured and government-sanctioned trans-Atlantic slave trade [11]. As a result, by 1663, most of the work on the approximately 50 plantations was done by over 3000 African slaves [11].

The victorious days of the British did not last long. In February 1667, Dutch ships from Zeeland led by Abraham Crijnsen invaded Willoughbyland, captured Fort Willoughby, and renamed it Fort Zeelandia [11, 13, 14]. Five months later, the English and Dutch signed the Treaty of Breda that assigned Suriname to The Netherlands in exchange for New Amsterdam, the main city of the former Dutch colony of New Netherlands in North America [11, 13, 14]. This arrangement was made official in the Treaty of Westminster of 1674, after the British had recaptured and again lost Suriname in 1667 and the Dutch regained the colony in 1668 [11, 13]. The Dutch renamed Willoughbyland Dutch Guiana and the English renamed New Amsterdam New York after the Duke of York [11, 13, 14].

2.4. Enslaved and indentured laborers

In 1683, the newly acquired colony was managed by the city of Amsterdam, the family Van Aerssen van Sommelsdijck, and the Dutch West Indies Company united in the Society of Suriname [13, 14]. In order to obtain maximum profits, the Society relied ever more on slave labor, dominating the trans-Atlantic slave trade for a long time [13–15]. All and all, around 300,000 Africans have been shipped to Suriname. In addition to sugar, the plantations produced cocoa, cotton, and indigo, which were exported to Amsterdam and returned enormous revenues [15]. However, treatment of the enslaved Africans was notoriously brutal, and many escaped to the interior from the start where they formed large communities—collectively called Maroons—with independent settlements and preservation of their culture that would last until today [15, 16].

The British again ruled Suriname from 1799 through 1816 during the occupation of The Netherlands by France and put an end to slave trade in 1807 [11], but it took the Dutch until 1863 to abolish slavery [13, 14]. However, the slaves who had remained on the plantations were obliged to conduct ill-paid work and were only fully released in 1873 [13, 14]. As soon as they became truly free, the majority abandoned the plantations and settled in Paramaribo [17]. Many of them mixed with other races, particularly Dutch, becoming a separate ethnic group from the Maroons called Creoles [17]. This is an important reason for the somewhat

looser ties of Creoles with African traditions when compared to Maroons despite their common heritage [17]. Still, African-based traditional medicinal practices are deeply rooted in most Creoles [17].

In the meantime, as a plantation colony, Suriname still heavily depended on manual labor. To make up for the shortage after 1873, the Dutch arranged with the British to bring in indentured laborers from India [18, 19]. Around the turn of the twentieth century, in 1916, many workers were again imported, this time from the Dutch East Indies (modern Indonesia), especially from the island of Java [19, 20]. As mentioned above, these contract workers were the predecessors of the Hindustanis and Javanese, respectively, in Suriname. In addition, between 1850 and 1860, small numbers of (mostly male) laborers had been brought in from China and the Middle East [1, 21, 22].

2.5. The modern days

This history makes Suriname, notwithstanding its relatively small population, one of the ethnically most diverse countries in the world. It also provides an explanation for the large variety of traditional forms of medicine practiced in the country. Suriname received in 1954 the status of an autonomous constituent country of the Kingdom of The Netherlands, along with The Netherlands and the Netherlands Antilles [22]. In this construction, Suriname could elect its own government and manage its own administration, but The Netherlands retained control of its defense and foreign affairs [22]. Approximately 20 years later, in November 1975, the country became completely independent from The Netherlands [22].

However, fear of ethnic violence and disappointment about economic development led to massive migration of Surinamese to The Netherlands just before and after 1975, resulting in a Surinamese diaspora in that country of roughly 350,000 in 2008 [22]. To make matters worse, a group of soldiers led by Suriname's current president Desi Bouterse perpetrated a coup and took control of the country from February 25, 1980, on [22]. Absolute lows in that period were the execution on December 8, 1982, of 15 adversaries who were allegedly plotting a counter-coup, and the Interior War between a group of mostly Maroon anti-government insurgents led by Ronnie Brunswijk and Bouterse's army between 1986 and 1992 [22].

Fortunately, since then, peace and democracy have been restored [22]. Currently, Suriname is a constitutional democracy with a president elected by the unicameral National Assembly or by the larger United People's Assembly [22]. Despite many economic and political problems, this young democracy continues to serve as a unique example of genuine unity in diversity.

3. Ethnopharmacological practices of Maroons and Creoles

3.1. The Maroon and Creole community in Suriname

The Maroons (from the Spanish expression “cimarrón” for “runaway”) are the descendants from enslaved Africans who escaped from the plantations in coastal Suriname to the hinterland between the mid-seventeenth and the late eighteenth centuries [14, 15, 23, 24]. The

slaves had mostly been imported from present-day Ghana, Benin, and Loango, but also from many other parts of West Africa such as Gambia, Guinea, Senegal, and Ivory Coast [14, 15]. The runaway slaves regrouped into small bands, settled in the forest, and established various small communities [23, 24]. Finding themselves in new and unfamiliar environments and in constant danger of recapture, they relied on the Indigenous peoples living in the adjoining rain forests to gradually develop means of subsistence and defense [25, 26].

They soon formed resistance groups in the interior and often raided the plantations to recruit new members and capture women as well as to acquire weapons, food, and supplies [16, 23, 24, 27]. The authorities retaliated, often with the help of militia consisting of the colonial army, mercenaries, and groups of urban slaves called Redi Musus (“those wearing red hats”) and had occasional victories [16, 23, 24, 27]. However, accustomed to open-field army-to-army battle in Europe, they were no match for the Maroon guerilla warfare in the treacherous tropical jungle [16, 27]. After more than half a century of vicious combat, the Maroons’ independence was recognized by the signing of a peace treaty with the Dutch colonial administration in the 1760s [16]. This allowed them to occupy a large part of the interior where they preserved much of their cultural concepts of health and illness and much of their traditional medicinal practices [28].

The new and unique Maroon culture was highly successful and several independent tribes developed [23, 24]. These currently include the Saramaka, the Paramaka, the Aukan, the Kwinti, the Aluku or Boni, and the Matawai, each with its own language and cultural characteristics [23, 24]. However, all groups maintain a strict hierarchical authority system organized along matriarchal lines, and all are headed by a paramount chief (the granman) who is chosen by a combination of descent and divination [23, 24]. The granman is assisted by several village captains (the kapitens) who are locally appointed. Important decisions about issues affecting the entire village are taken during lengthy gatherings called krutus [23, 24]. This system is acknowledged and respected by the central government in Paramaribo [23, 24].

The enslaved Africans who did not join the Maroons and continued to work on the plantations were granted their formal freedom on July 1, 1863, and their actual freedom on July 1, 1973 [13, 14, 17]. Many remained in Suriname’s coastal area and mixed with Europeans, particularly Dutch but also members from other ethnic groups [17]. These Creoles were economically and politically highly successful and were the first non-Whites to hold public offices in Suriname from 1954 on, when the country received partial autonomy from The Netherlands [1, 17]. They widely adopted Christianity and Catholicism, but retained their affiliation with their African heritage and still adhere to various African traditions [17]. For instance, the generally appreciated call-and-response Creole kaseko and kawina songs supported by percussion can directly be traced to age-old African forms of music [1, 17]. This also holds true for many Creole perceptions of health and disease as well as the use of various plant-based medications which they refer to as *oso dresis* (“home-made medicines”) [1, 17, 29].

3.2. Traditional African medicine

Many of the Maroon and Creole traditions have their roots in the early period of African dominance and Egyptian leadership before 3200 BC, when North Africa was home to many skilled

practitioners who had developed a comprehensive medicinal system [30]. This holistic discipline was—and still is—mostly based on a large variety of medicinal plants and spirituality, spread throughout the continent, and was carried to Suriname by the enslaved Africans [28]. Traditional African medicine assumes that disease results from imbalances in social circumstances and spiritual perceptions. This would hold true for “physiological” diseases ranging from venereal diseases to cancer and even Ebola, but also for psychiatric disorders such as depression and anxiety [28]. The diagnosis is often reached through spiritual means, and the treatment is usually derived from the comprehensive herbal pharmacopeia and would accomplish both physical and spiritual healing [28]. Due to the relatively small number of university-trained physicians and the relatively high costs of allopathic medicines, as much as 86% of the inhabitants of Sub-Saharan Africa rely on traditional African medications [31]. For this reason, many African countries have expressed the commitment to develop safe, efficacious, quality, and affordable traditional medicines accessible to the majority of their inhabitants [32].

Based on these ancient African medicinal concepts, Afro-Surinamese have developed Winti (“wind” or “spirit”), a nature-oriented religion in which the spiritual world is consulted by music, singing, trances, and rituals in order to create and maintain a harmonious balance between humans and the visible and invisible powers of nature [29, 33, 34]. Winti is one of the most distinctive characteristics of Maroon and Creole culture and is mainly based on the above-mentioned beliefs and magical rituals, the enslaved Africans had brought along [29, 33, 34] but has also been influenced by Indigenous traditions [25, 35]. The invisible powers are several gods called wintis, as well as the spirits of ancestors [29, 33, 34].

Specialized practitioners called Winti priests—either males or females—serve as intermediaries between man, specific wintis, and the spirits of ancestors, and can evoke the spirits by special rituals to solve physical, psychological, or social problems [29, 33, 34]. The condition may be diagnosed during a special Winti ritual and is treated by medicinal and spiritual therapies consisting of specific herbs, special rituals, or both [29, 33, 34]. The Winti priests are referred to as lukuman (“the one who looks”, i.e., performs the diagnosis), dresiman (“the one who cures”, i.e., prepares and administers the medication), or duman (“the one who accomplishes”, i.e., treats and cures), to distinguish them from obiaman, bonuman, and wisiman who are in general associated with black magic practices [29, 33, 34].

Winti priests have a profound knowledge of the medicinal plants and the diseases and conditions they treat [29, 33, 34]. Some plants—such as the African rice *Oryza glaberrima* Steud. (Poaceae) and the Bambara groundnut *Vigna subterranea* (L.) Verdc. (Fabaceae), but also crops that originated from Asia such as the taro *Colocasia esculenta* (L.) Schott (Araceae) and the banana *Musa* sp. L. (Musaceae)—were grown in Suriname from leftovers of the food provided to the slaves or from seeds they had smuggled during their trans-Atlantic journey [35]. Others such as the cassava *Manihot esculenta* Crantz (Euphorbiaceae) and several yam species (*Dioscorea* spp.) have been adopted from the Indigenous [25, 26, 36]. And still others—particularly members of the plant families Fabaceae, Euphorbiaceae, and Asteraceae—were deemed useful because of their resemblance with species known from Africa or by trial and error [35].

3.3. Medicinal and ritual plants used by Maroons and Creoles

One of the first traditional medicinal healers of Suriname was the freedman Quassie van Timotibo, also known as Kwasi, who popularized one of the earliest and most popular Surinamese traditional medicines, kwasibita (“Kwasi’s bitter”) [37]. Suspected to be a member of the Redi Musus and held responsible for the fall of Fort Buku headed by Boni—one of the most revered Maroon rebel generals [16, 24, 27]—Kwasi was considered a traitor among a large part of the slave population [37]. However, he was respected by many Whites as the most proficient dresi- and lukuman of eighteenth-century Suriname [37]. Kwasi had obtained much of his medicinal knowledge from the Indigenous peoples and discovered around 1730 the remarkable qualities of the bitterwood or kwasibita *Quassia amara* L. (Simaroubaceae) for treating malaria fevers and stomach troubles [37, 38]. This owed him the reputation of “the most honorable and most learned gentleman, master Phillipus of Quassy, professor of Herbology in Surinam” [37]. Today, kwasibita preparations are among the most consumed oso dresis for promoting general health [38].

Maroons and Creoles use many other plants for treating a variety of disease conditions including, among others, parasitic infections, hypertension, diabetes mellitus, bone fractures, and psychological conditions [33, 34, 38–44]. Spiritual herbal baths and ritual washing are often part of the treatment, as they would have a medicinal and magical effect on the body, calming the nervous system [33, 34, 38, 39]. The washings would also provide spiritual purification, protect against injury, repair broken relationships, and exorcise evil forces [33, 34, 38–44]. A few popular plant-based medicinal applications are the so-called kowru dresis, genital steam baths for females, and remedies for children’s ailments [35, 38].

Kowru dresis (“medicines against a cold”) are prepared from several plants including the leaves from *Senna* spp. (Fabaceae), the seeds from the aniseed *Pimpinella anisum* L. (Apiaceae), the aerial parts from the stonebreaker *Phyllanthus niruri* L. (Phyllanthaceae), the leaves from the birthwort *Aristolochia* spp. L. (Aristolochiaceae), the roots from the liquorice *Glycyrrhiza glabra* L. (Fabaceae), and/or the roots from the Chinese rhubarb *Rheum palmatum* L. (Polygonaceae) [28, 33, 34, 38]. These preparations are used to remove obstructions in bowels, airways, blood circulation, and genitourinary system, but also for mental well-being [28, 33, 34, 38]. The latter use is presumably based on the ancient African belief that even psychological conditions result from an imbalance between “hot” and “cold” and can be reversed by removing the “cold” [30]. Notably, in various communities *Senna* spp. and *R. palmatum* are traditionally used as a laxative and a purgative, respectively [45, 46]; *P. anisum* as a carminative and for colics [47]; *P. niruri* for stomach, genitourinary, liver, and spleen problems [48]; *Aristolochia* spp. for their antihelminthic activity [49]; and *G. glabra* for rejuvenation [50].

Genital steam baths are abundantly used by females for their personal hygiene [28, 33–35, 38] but also—as indicated by their suggestive vernacular names—to improve the appearance of the vagina in order to enhance sensation during intercourse, securing the relationship with and economic support by the male partner [28, 33–35, 38]. A few of the dozens of plants used in genital steam baths are the broko pipi (“broken penis”) *Bellucia grossularioides* (L.) Triana 1871 (Melastomataceae); the Paranamklem (“Paranam grip”) *Ludwigia nervosa* (Poir.) H. Hare (Onagraceae); the musude baasa (“early-morning hug”) *Miconia tomentosa* (Rich.)

D. Don ex DC. (Melastomataceae); and the kunami (“come to me”) *Clibadium surinamense* L. (Asteraceae). Leaves from the shy plant *Mimosa pudica* L. (Fabaceae) that fold inward and droop when touched, and aromatic plants such as the pêpë uwîi *Guatteria schomburgkiana* Mart. (Annonaceae) may be added to the bath [28, 33–35, 38].

Important childhood conditions requiring traditional treatment include atita and evil eye. Atita, commonly known in Suriname as zuurte or suri (“sourness”), is an ill-described condition in newborns that is characterized by stomach ache, cramps, diaper rash, yellow, sour-smelling feces, and diarrhea with small grains resembling okra seeds [28, 33–35, 38]. Atita may be caused by the baby’s intestinal flora which must adapt to the uptake of proteins from breast milk [35]. This condition is treated by bathing the baby with a decoction of the leaves and/or flowers from the ingiwiri (“Indian herb”) *Nepsera aquatica* (Aubl.) Naudin. (Melastomataceae), the yorkapesi (“demon pea”) *S. occidentalis* (L.) Link. (Fabaceae), or the busipesi (“bush pea”) *S. chrysocarpa* (Desv.) H.S. Irwin & Barneby and having the baby drink some of the decoction [28, 33–35, 38].

A baby is at risk to get evil eye or ogri ai (“bad eye”) by an envious or a malevolent glare that can inflict harm, suffering, or even death [28, 33–35, 38]. This condition is commonly treated by bathing the infant with Reckitt’s Blue, which presumably has its origin in its whitening (i.e., cleansing) effect on laundry [28, 33–35, 38]. Ogri ai can presumably be prevented by rubbing asafetida or didibri kaka (“devil’s feces”)—the foul smelling dried latex from the rhizomes of the stinking gum *Ferula assafoetida* L. (Apiaceae)—in the baby’s hair, and placing a gold bracelet with three black beads on its clothes [28, 33–35, 38].

4. Ethnopharmacological practices of Hindustani

4.1. The Hindustani community in Suriname

The first indentured laborers from (then British) India arrived on June 5, 1873, in Paramaribo with the sailing ship Lalla Rookh that had departed more than 3 months earlier from central depots in Calcutta [18, 19]. The 452 passengers—called “Hindustanis” by the Dutch—were mostly recruited from the modern-day states of Uttar Pradesh and Bihar in northern and eastern India, respectively [18, 19]. Important reasons to leave their homeland were the high unemployment and the substantial loss of traditional jobs due to the rapid industrialization of India [18, 19]. However, at least some of them might have been misled into believing that they were taken to a place of pilgrimage called Sri Ram which turned out to be Suriname [18, 19]. Sixty-three more shiploads with laborers arrived in Suriname, taking as many as 34,304 Hindustani to the Dutch colony until 1916, when this practice was discouraged by Mahatma Gandhi’s movement for an independent India [18, 19].

Although formally considered laborers on a 5-year contract rather than slaves [18, 19], working conditions on the sugar and coffee plantations were more or less equal to slavery [18, 19]. Working hours were long, payment was low, housing was in former slave accommodations, and not completing assigned tasks was severely punished [18, 19]. This regularly led to bloody uprisings, the largest one of which occurred in 1902 at the Marienburg sugar factory

in Commewijne, then the center of sugarcane processing in Suriname [18, 19]. Angry workers killed the Scottish supervisor James Mavor, and in retaliation the Dutch colonial forces killed 24 workers and wounded over 39 [18, 19]. The Hindustani fatalities were buried in a mass grave that has remained unidentified until today [18, 19].

Nevertheless, only one-third of the workers returned to India after the completion of their contract [18, 19]. The remaining two-thirds accepted the offer of free settlement rights on plantations plus a bonus of a 100 Dutch guilders for abandoning their right to a return passage [18, 19]. Several of them used their bonus money and their savings to grow rice on their small plots of land, particularly in the western district of Nickerie yielding them appreciable incomes [18, 19]. Even today, a number of Hindustanis own sizable rice farms in Suriname [51].

4.2. Ayurveda

All and all, the Hindustani community has economically and politically been very successful in the Surinamese society but has managed to keep their culture and traditions alive, strengthening the group identity [51]. This holds true for their religion, marriage rituals, customs in raising children, family and communal life, burial rites, as well as celebrations as Holi Phagwah, the festival of colors that celebrates the victory of good over evil and the arrival of spring, and Diwali, the festival of lights that rejoices the triumph of light over darkness [51]. Notably, Surinamese Hindi or Sarnami—a dialect based on Bhojpuri, the main language spoken in the parts of India, the Hindustani originated from—is the third-most spoken language in Suriname after Surinamese and Dutch [51].

The Hindustanis have also largely preserved their cultural and traditional medicinal practices which are strongly linked to Ayurvedic medicine or Ayurveda (Sanskrit for “knowledge of life”) [52–54]. Ayurveda is probably one of the oldest forms of medicine [52–54]. It originates from India and dates back more than 3000 years ago, and is still one of the country’s most important traditional health-care systems [52–54]. Up to 80% of Indians use Ayurvedic medications for a variety of conditions including complex ailments such as angina pectoris and diabetes mellitus [52–54]. Ayurvedic practitioners are educated in 180 training centers [52–54], and the huge intellectual property and economic interest are managed by the prominent Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy [52–54]. India’s government also supports laboratory and clinical research on Ayurvedic preparations [52–54].

Ayurvedic medicinal concepts are based on the belief that health and wellness depend on a delicate balance between mind, body, and spirit, and that imbalance results in disease [52–54]. This holistic approach is a fundamental aspect of Ayurveda [52–54]. Today, Ayurveda is widely practiced throughout the world and in many countries recognized as a form of complementary and alternative medicine [52–54]. The principal ingredients of Ayurvedic medications are preparations derived from leaves, fruits, seeds, bark, or roots from certain plants [52–54]. Hundreds of plant species are used for such preparations [52–54]. In addition, Ayurvedic medications may be prepared from animal products such as milk, bones, or fats, and/or minerals such as sulfur, lead, arsenic, copper sulfate, and gold [52–54].

4.3. Medicinal and ritual plants used by Hindustanis

The Hindustanis in Suriname also use a large variety of plants for their Ayurveda-based cultural and medicinal customs [55–57]. Several of these plants have been brought over from India but others have been discovered in Suriname or adopted from other cultures [55–57]. Examples of long known and very popular Ayurvedic medicinal plants are the neem *Azadirachta indica* A. Juss., 1830 (Meliaceae), the ashoka tree *Saraca asoca* (Roxb.) Willd. (Fabaceae), the Indian bael tree *Aegle marmelos* (L.) Corrêa (Rutaceae), the bitter melon *Momordica charantia* Linn (Cucurbitaceae), the jambolan *Syzygium cumini* (L.) Skeels (Myrtaceae), the turmeric *Curcuma longa* L. (1753) (Zingiberaceae), and the holy basil or tulsi *Ocimum tenuiflorum* L. (Lamiaceae) [55–57].

The bitter-tasting constituents of parts of *A. indica* are believed to boost the immune system and to treat many diseases, among others, colds, fevers, respiratory conditions, stomach ailments, high blood pressure, and/or diabetes mellitus [58]. Volatile substances emanating from *A. indica* leaves placed under the bed sheets would also treat chicken pox [59], and a tea from these parts of the plant is typically used as an internal cleanse [58]. These beneficial effects may be related to the anthelmintic, antifungal, antibacterial, and antiviral activities of nimbinin, one of the main bioactive compounds of *A. indica* [60].

The stem bark, flowers, and seeds from *S. asoca* are used against postmenopausal syndrome and gynecological disorders [61]. And preparations from various parts of *A. marmelos*, *M. charantia*, and *S. cumini* are extensively used for treating diabetes mellitus but so far without convincing scientific evidence [62–64]. However, a few studies suggest that the presumed blood glucose-lowering activity of *M. charantia* may depend on the way the medication is prepared: preparations from fresh leaves seem to elicit a better effect when compared to the widely available tablets or capsules [65].

C. longa and *O. tenuiflorum* are among the most popular Ayurvedic herbs. The powdered rhizomes from *C. longa* are an essential part of curry which is used as a spice in many Hindustani dishes [51]. *C. longa* preparations are furthermore used, among others, as a diuretic; to stimulate blood flow in the pelvic area; to treat fevers with jaundice, hepatitis, and malaria; to prevent excessive menstrual pain; to enhance mental functioning and well-being; and externally for herpes, bruises, wounds, and rheumatism [66]. The leaves from the aromatic plant *O. tenuiflorum*—either fresh, dried, powdered, or as a tea—would treat a similar variety of diseases including stress and a disturbed homeostasis [67].

Many of these plants are also considered sacred and are used in various Hindu rituals [51]. For instance, preparations from *A. indica* leaves, bark, and fruits are consumed during certain ceremonies, festivals, and commemorations; the fruits from *A. marmelos* are offered to Shiva, the god of yoga, meditation, and arts during religious rituals; a paste of turmeric in coconut oil is applied on the skin of the bride and the groom during pre-marriage rituals to make their skin bright and glowing; the flowers from *O. tenuiflorum* are used as a holy cleanser for food offerings during prayers; and *S. asoca* is worshipped during Chaitra, the first month of the Hindu calendar, marking the arrival of Spring.

5. Ethnopharmacological practices of Javanese

5.1. The Javanese community in Suriname

The first group of Javanese indentured laborers arrived in Paramaribo on August 9, 1890 [19, 20]. It consisted of 94 small farmers from villages in Central and East Java in the former Dutch East Indies [19, 20]. They had been recruited by the very influential Netherlands Trading Society established by the Dutch King Willem I, either by force, bribery, or manipulation [19, 20]. The approximately 40-day journey was hard, and many Javanese died on the ship, in-transit in The Netherlands, or upon arrival in Paramaribo [19, 20]. Those who survived were mainly set to work on sugarcane plantations in the district of Commewijne [19, 20].

This was deemed so successful that many more followed from 1894 on. In 1904, Javanese laborers were even specifically recruited to construct the Colonial Railways for the transport of sugarcane from surrounding plantations to the sugarcane factory in Marienburg [19, 20]. Contracts were signed for 5 years, but life in Suriname's countryside was brutal and wages were minimal [19, 20]. For this reason, thousands of Javanese returned to Indonesia or to The Netherlands, particularly after Indonesia's independence in 1954 [19, 20].

The influx of indentured workers from Java ceased in 1939 with the advent of the Second World War, and had brought a total of 32,956 Javanese in Suriname [19, 20]. Those who settled in Suriname received a plot of land and a reimbursement of 100 guilders repatriation money [19, 20]. They were initially kept isolated in the countryside, particularly after Governor Johannes C. Kielstra's (1933–1943) consent of Javanese farm villages with their own village head (the lurah) and chief committee [19, 20]. On the other hand, this secluded lifestyle strengthened the group identity, as they maintained the rich culture they had brought with them from Java [19, 20].

Nowadays, the Javanese community has been well integrated in the Surinamese society, but many of their traditions and rituals have been preserved [68–70]. This holds true not only for their language but also for their types of entertainment such as the wayang shadow puppet show accompanied by distinctive orchestral gamelan music, and Javanese ludruk theater that includes the centuries old tradition of storytelling through slow, graceful, and expressive dances [70]. An important ritual that has been preserved is the preparation of the sacrificial slamatan meal at seven specific time periods to commemorate the departed, including the day of passing and 1000 after his/her death [70].

5.2. Jamu

The Javanese have also maintained their traditional medicinal practices which are mainly based on medicinal plants and are referred to as Jamu [70]. Jamu is the widely practiced form of traditional medicine in Indonesia that probably has its origin in the Mataram Kingdom era in ancient Java, some 1300 years ago [71, 72]. Jamu is mostly based on plants, but materials from animals such as honey, royal jelly, bee larvae, milk, and chicken eggs are also used [71, 72].

Jamu products called jamus are in Indonesia traditionally available from (particularly female) peddlers and street-side vendors, but are nowadays also produced and retailed by large companies in dried form in sachet packaging or as tablets, capsules, and liquid drinks [71, 72]. The manufacturers of jamus are united in Gabungan Pengusaha Jamu, an Indonesian Herbal and Traditional Medicine Association [71, 72]. Together, they employ roughly 15 million workers, produce over 1200 different jamu products, and bring in annual revenues of more than US\$ 73 million [71, 72].

Jamu is practiced in both Indonesia and Suriname by highly respected medicinal practitioners known as dukuns or tabibs [70, 71, 73]. The dukun is very influential and holds extensive knowledge about the preparation of the large variety of sometimes rather complicated jamus [70, 71]. An example is the very popular jamu galian consisting of different parts of eight plants that is widely used in Suriname as a general health-promoting tonic [70, 71, 73]. The dukun also plays an important role during, for instance, nyuwuk, a ritual to bring a person at ease by praying over and blowing three times over a glass of water that then must be drunk by the client [70, 71, 73]. Nyuwuk is often performed prior to examinations, circumcisions, or giving birth [70, 71].

5.3. Medicinal and ritual plants used by Javanese

Many plants incorporated in jamus belong to the family Zingiberaceae which have been brought from Java and are now cultivated in Suriname [74]. A few examples are the laos *Alpinia galanga* (L.) Willd., the pink and blue ginger *C. aeruginosa* Roxb., (1810), the temu gir-ing *C. heyneana* Valetton & Zijp, the earlier mentioned *C. longa* that has its origin in Indian Ayurveda, the yellow ginger *C. xanthorrhiza* Roxb., the aromatic ginger *Kaempferia galanga* L., the benge *Zingiber cassumunar* Roxb., and the bitter ginger *Z. zerumbet* (L.) Roscoe ex. Sm. [74]. For medicinal purposes, the macerated and/or decocted rhizomes are used, either from a certain species or from combinations of several species [74].

As the majority of Javanese is Muslim [2], jamus are usually prepared on Mondays and Thursdays which are assigned for fasting in Islam. They are used for treating a wide variety of conditions. For instance, the rhizomes from *A. galanga* would treat the fungal skin infection “lota” (pityriasis alba), stomach cramps, and dysentery [74]. And those from *C. xanthorrhiza* would help against liver ailments, eczema, constipation, and gallstones, and for cleansing the uterus after giving birth [74]. The mother is also advised to drink on a daily basis a decoction of *C. xanthorrhiza*, *C. aeruginosa*, and *Z. zerumbet* rhizomes together with leaves from *P. anisum* [73]. These apparent health benefits may be attributed, at least in part, to the anti-parasitic activity of *A. galanga* preparations and one of its bioactive constituents galangin [75, 76], and the anti-inflammatory and hepatoprotective effects of curcumin in *C. xanthorrhiza* products [77].

Jamus prepared from *C. longa* are used for treating, among others, inflamed gums, abscesses, menstrual pains, and skin rash, partially because of their antiseptic activity and refreshing effect [74]. The latter action may also help explain the application of a *C. longa*-based ointment called bobok for alleviating the discomfort of sprains, insect bites, and toothache [74]. Furthermore, the juice collected from *C. longa* rhizomes is, together with that from *Z. zerumbet* rhizomes,

used for treating stomach ache, and together with the macerated rhizomes of *C. aeruginosa*, and *Z. zerumbet*, a grated onion, sugar, and a packet of cooked *Glycine max* soybeans, for treating pinworm infections in children [74]. The potential health benefits of *C. longa* may be ascribed to the antimicrobial and anti-inflammatory properties of curcuminoids in the plant [66].

Medicinal plants belonging to families other than the Zingiberaceae that are incorporated in popular jamus are the cat's whiskers *Orthosiphon grandiflorus* Bold. (Lamiaceae), the betel *Piper betle* L. (Piperaceae), the ketyi beling *Strobilanthes crispus* Blume (Acanthaceae), and the gambir *Uncaria gambir* (W. Hunter) Roxb., 1824 (Rubiaceae) [74]. An infusion of the leaves from *O. grandiflorus* and *S. crispus*, either separately or in combination, can be used against kidney stones and renal colics [74]. And rolled-up or macerated leaves from *P. betle* are placed in the nostrils to stop nose bleeding. *P. betle* leaves are also chewed together with those from *U. gambir* to heal inflamed gums [74]. There is at least some preclinical evidence to support these applications [78–81].

6. Closing remarks

As a result of its fascinating and tumultuous history, Suriname has become a treasure chest of traditional medicinal approaches and rituals based on plants. Traditions and rituals from every continent on Earth have found their way in the country and have largely been preserved. This is illustrated by the various examples given in this overview about Maroons and Creoles as well as Hindustanis and Javanese. However, the same applies to the rich Indigenous South American cultures, traditional Chinese medicine, and the cultures brought over by many other ethnicities in the country. Gradually, many of these traditions are finding their way to other ethnicities. This is likely to result in a unique and even richer traditional medical culture in the country.

For instance, the use of kowru dresis as well as many remedies and rituals against evil eye has its origin in Africa but is not anymore restricted to Maroons and Creoles and has become common practice in all ethnic groups in Suriname. The neem plant *A. indica*, the turmeric *C. longa*, and the bitter melon *M. charantia* have presumably been introduced in Suriname by Hindustanis but are now widely used throughout the country against a variety of conditions. And the broad use of the cat's whiskers *O. aristatus* for treating kidney stones and renal colics is attributable to the Javanese. This ethnic group is also responsible for the presence of many medicinal Zingiberaceae species in Suriname and the general use of the laos *A. galanga* against the skin disease lota.

Contributing to this pool are the traditional medicinal customs of the Indigenous which already had a profound influence on Maroon culture, and traditional Chinese medicine that has become, similarly to Indian Ayurveda, a form of complementary and alternative medicine that is worldwide respected. It is foreseeable that these cultural fusions—meetings of the mind—will lead to the development of a distinct form of herbalism in Suriname that will generate a unique array of medicines.

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