

Spices in Sri Lanka, India and Bangladesh with Special Reference to the Usages and Consumptions

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Summary

The objective of this study is to investigate the different uses and consumptions of spices in Sri Lanka, India and Bangladesh. Some efforts have been made to extend the scope of this article to other countries like Indonesia and Bhutan. To achieve this objective, secondary data available in the literature were also examined and analyzed. In addition, two primary surveys were conducted in this respect by using small samples in three locations Andiambalama and Wategama in Sri Lanka, Ankapur village in India, and Jessore in Bangladesh in 2005 by questionnaires and interviews. Where it is relevant, the data collected through these surveys are also used.

Keywords: Sri Lanka, India, Bangladesh, spices, usages and consumptions

I. Introduction

Spices constitute an important group of agricultural commodities, which are virtually indispensable in the culinary art. They can be primarily defined as farm products used in various forms, namely fresh, ripe, dried, broken, powdered, etc. which contribute aroma, taste, flavor, color and pungency to food. Spices may be either bark, buds, flowers, fruits, leaves, rhizomes, roots, seeds, stigmas and styles or the entire plant tops.

Exotic imports obtained from Asia were particularly appealing to Greeks and Romans, who spent vast fortunes on trade with Arabia, which was the center of the spice trade in the past. The need to supply European markets spurred explorations, culminating in the extraordinary voyages that resulted in the discovery of the New World (America) and round-the-world route, and demonstrated that the globe could be circumnavigated by sea.

The desire to control spice sources took the Portuguese, Dutch, Spanish and British to countries like India, Sri Lanka and Indonesia. Each country feuded with others to establish a monopolistic control over the spice-growing regions and the major trade routes.

II. The objective and study method

In the survey, conducted in March 2005 in Jessore district of Bangladesh, we measured the quantity of spices used in one week was measured and the different usages of the spices except dishes.

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For further information on the study sites concerned and other information, please refer to Amaratunge, *et al.* (2001), and De Silva and Takeda (2002 a, 2002 b, 2003, 2004, 2005 a, 2005 b, 2006), Muthuraman and Takeda (2006 a, 2006 b), and Rahman and Takeda (2005, 2006 a, 2006 b, 2006 c, 2007).

III. Spices in Sri Lanka and India

Sri Lanka known then as Ceylon, was referred to as the “Pearl of the Orient” and the “Isle of Spices” by many explorers from Sindbad to Marco Polo, and was very much acquainted with the “Spice Route” from East to West for many centuries. From ancient times, other cultures have

Table 1 Spices commonly used in Sri Lanka

Common Name	Local Name	Botanical name	Family name	Part Used
Cardamom	<i>Enasal</i>	<i>Elettaria cardamomum</i>	Zingiberaceae	Seed
Chili	<i>Miris</i>	<i>Capsicum annum</i> & <i>C. frutescens</i>	Solanaceae	Pod
Cinnamon	<i>Kurundu</i>	<i>Cinnamomum zeylanicum</i>	Lauraceae	Bark
Clove	<i>Karambunati</i>	<i>Eugenia caryophyllis</i> or <i>Syzygium aromaticum</i>	Myrtaceae	Flower bud
Coriander	<i>Kottamalli</i>	<i>Coriandrum sativum</i>	Umbelliferae	Fruit
Cumin	<i>Suduru</i>	<i>Cuminum cyminum</i>	Umbelliferae	Fruit
Curry Leaf	<i>Karapincha</i>	<i>Murraya koenigii</i> Spreng.	Rutaceae	Leaf
Fennel	<i>Maduru</i>	<i>Anethum foeniculum</i>	Umbelliferae	Fruit
Fenugreek	<i>Uluhal</i>	<i>Trigonella foenum-graecum</i>	Fabaceae	Seed
Gamboge	<i>Goraka</i>	<i>Garcinia cambogia</i> Desr.	Guttiferae	Fruit
Garlic	<i>Sudulunu</i>	<i>Allium sativum</i>	Alliaceae	Bulb
Ginger	<i>Inguru</i>	<i>Zingiber officinale</i>	Zingiberaceae	Rhizome
Lemon Grass	<i>Sera</i>	<i>Cymbopogon citratus</i>	Gramineae	Leaf
Musterd	<i>Aba</i>	<i>Brassica alba</i> or <i>Sinapis nigra</i>	Brassicaceae	Seed
Nutmeg / Mace	<i>Sadhikka / Wasa wasi</i>	<i>Myristica fragrans</i>	Myristicaceae	Seed
Pandanus	<i>Rampe</i>	<i>Pandanus tectorius</i>	Pandanaceae	Leaf
Pepper	<i>Gam Miris</i>	<i>Piper nigrum</i>	Piperraceae	Fruit seed
Tamarind	<i>Siyambala</i>	<i>Tamarindus indica</i>	Leguminosae	Mesocarp
Turmeric	<i>Kaha</i>	<i>Curcuma longa</i>	Zingiberaceae	Rhizome

Source: Field survey, 2005.

been in contact with Sri Lanka to obtain the spices that grow there. European countries more than over the last five hundred years have found the allure of spices to be irresistible. The Portuguese, Dutch, and finally the British were attracted to India and then Sri Lanka by a persisting appetite for spices. Table 1 presents commonly found spices in Sri Lanka. It is well known that the best cinnamon, cloves, and other spices are indigenous to Sri Lanka.

Spices now play an important role in Sri Lankan agricultural economy in respect of export-

Table 2 Survey findings of use of spices in Sri Lanka (n=15)

English name	Local name	Consumption		Uses other than food preparation
		(g/month)	(g/month/head)	
Cardamom	<i>Enasal</i>	31	7	eat with betel leaves, prepare wine
Chili (Fresh)	<i>Amu miris</i>	n.a	n.a	
Chilies (Dried)	<i>Welapu miris</i>	577	125	treat stomachache; treat animal wounds; rituals to chase away demons (<i>aswaha katawaha</i>)
Cinnamon	<i>Kurundu</i>	52	13	treat toothache & earache; eat with betel leaves
Clove	<i>Karambunati</i>	26	6	treat stomachache, toothache, swelling; worm treatment; prepare wine
Coriander	<i>Kottamalli</i>	355	71	treat cold, fever, urine infection & pains; beverage
Cumin	<i>Suduru</i>	108	23	treat stomachache & diarrhea
Curry Leaf	<i>Karapincha</i>	450	111	as porridge for snake venom; treat stomach ache, high blood pressure & lack of appetite; control cholesterol
Fennel	<i>Maduru</i>	65	12	treat stomachache, gripe caused by water
Fenugreek	<i>Uluhal</i>	82	16	eat/drink with garlic for pregnant mothers and with lime to control dandruff; treat stomachache and rheumatic pains; apply as hair oil
Gamboge	<i>Goraka</i>	157	36	disinfectant; treat stomachache, foot worm/fungal problems, swelling & weight loss; prepare <i>jadi</i> (preserve fish)
Garlic	<i>Sudu lunu</i>	n.a.	n.a.	treat rheumatic discomforts, stomachache, heart problem and most other ailments for pregnant mothers
Ginger	<i>Inguru</i>	147	35	drink with tea; eat with betel leaves; treat cold, fever, stomachache, swellings, cough and sore throat
Lemon Grass	<i>Sera</i>	0	0	treat allergy; stalk as an earring
Mustard	<i>Aba</i>	127	26	treat edema, swelling; rituals to chase away demons (<i>aswaha katawaha</i>)
Nutmeg / Mace	<i>Sadhikka / Wasa wasi</i>	3/3	1/0	treat stomachache, vomiting; prepare wine and cakes; eat with betel leaves
Pepper	<i>Gam miris</i>	150	34	treat stomachache and indigestion
Rampe	<i>Rampe</i>	65	16	see the text
Tamarind	<i>Siyambala</i>	n.a	n.a	see the text
Turmeric	<i>Kaha</i>	107	21	Disinfectant; cosmetic for facial beauty cream; treat leach bites, fractures, pimples, wounds, measles, chicken pox, and fractures; dye

Source: Field survey, 2005.

Table 3 Survey findings of use of spices in India (n=4)

English name	Local name	Consumption (gr/month)	Consumption (gr/month/head)	Uses other than food preparation
Cardamom	<i>Elich</i>	50	13	
Chili (Fresh)	<i>Mirch</i>	4000	1000	
Chili (Dried)	<i>Mirch</i>	n.a	n.a	
Cinnamon	<i>Patta</i>	0	0	fever, cold and headache
Clove	<i>Karambu/ Lavanga</i>	35	9	toothache
Coriander	<i>Dhania</i>	750	181	
Cumin	<i>Jilakara</i>	217	53	
Curry Leaves	<i>Currive pako</i>	833	194	
Fennel	<i>Sombo</i>	33	11	mouth freshener
Fenugreek	<i>Mendula</i>	150	36	stomachache, constipation and diabetes
Gamboge	<i>Velait imli</i>	0	0	
Garlic	<i>Elligatta</i>	1167	319	
Ginger	<i>Allam / Inji</i>	433	114	with tea
Mustard	<i>Rai</i>	267	64	
Pepper	<i>Kali mirch</i>	167	46	increase digestion
Rampe	<i>Pudhinam</i>	58	17	
Tamarind	<i>Chinda pandu</i>	2167	500	
Turmeric	<i>Pospu / Manjal</i>	583	139	wounds and cosmetic

Source: Field survey, 2005.

oriented trade. In Sri Lanka, spices are cultivated in the wet and intermediate zones. The growing and processing of spices provides cash income to a wide range of rural Sri Lankans, particularly smallholders. In 2001, the value of Sri Lankan spice exports was Rs. 6,098 million, equivalent to 1.4 percent of total exports, 7.3 percent of agricultural exports, and more than half of the value of agricultural exports other than tea, coconuts, and rubber. Sri Lanka's major markets are Mexico, U.S.A., U.K., Colombia, Germany, and India.

All spices exported from Sri Lanka are tropical aromatics, the most prevalent being pepper, cinnamon, cloves, nutmeg, mace, and cardamom (Table 2 and 3). In the world of spice markets, Sri Lanka is the leading exporter of true cinnamon, which faces competition from the similar, but lower-priced cassia (Chinese cinnamon: *Cinnamomum cassia*, Lauraceae). Sri Lanka also exports pepper and cardamom, sales of which are rising. Some members of Sri Lanka's spice industry, especially new entrants, have invested in superior distillation equipment, creating a general interest in the export of derivatives (see also Note 1).

The word spice suggests a tropical herbal plant or some part of it that is valued for providing color and aromatic flavoring along with stimulating odor for use in cooking and in condiments, as well as in candies, cosmetics, fragrances and medications. Spices can improve the palatability and the appeal of dull diets. Piquant flavors stimulate salivation and promote digestion. Pungent spices can also cause sweating, which may even cause a cooling sensation in tropical climates.

The word curry is derived from Tamil *kari*, which simply means sauce-the sauce that accompanies the dishes of meat, vegetable or fish. However, this is no ordinary or simple sauce. It is made from a precise blending of a bewildering number of spices. Sri Lankan cooking is very hot and pungent due to almost excessive use of chilies, but also very aromatic. Compared to Indians, Sri Lankans eat more meats and fish but less dairy products. Meats and vegetables are often

cooked in gravies based on water or coconut milk instead of yoghurt in India.

The typical Sri Lankan flavor is due to heavy toasting of some spices (cumin, coriander, black mustard, and fenugreek) until they reach a rather dark color. It is often said that Sri Lankan curries have a “darker” or “brownier” flavor than Indian curries. Sri Lankan cooks often use aromatic spices native to the island (cinnamon and cardamom) and fresh leaves (curry leaves, screw-pine leaves (*rampe*: *Pandanus tectorius*, Pandanaceae) and lemon grass (see Note 2); the latter two are not in common use in India.

Sri Lankan curry is usually cooked in coconut milk, which gives it a rich and flavorful basic sauce. Every curry is further flavored by the addition of fresh herbs and garnishes. Chicken, beef, and mutton are cooked in the classic way in a thick sauce of coconut milk along with all the curry spices. The preparation of fish varies widely according to the region. The best-known fish dish is the southern *ambul thiyal* or ‘sour fish curry.’ The fish, usually tuna (two types of *kelawalla* and *balaya*), seer fish (*thora*; Note 3), or mackerel (*para*), is marinated in a sour paste, made from black pepper, gamboge (*Garcinia cambogia*, Guttiferae; goraka) and salt.

Spices are also fitted into philosophical concepts of improving health, since it was understood that they could affect the four humors (blood, phlegm, yellow bile and black bile) and influence the corresponding moods (sanguine, phlegmatic, choleric and melancholic). Thus, ginger would be used to heat the stomach and improve digestion; clove was believed to comfort the sinews; mace would prevent colic and bloody fluxes or diarrhea; nutmeg would benefit the spleen and relieve any bad cold. Cinnamon, one of the most popular flavors in cooking, was considered to be particularly good for digestion and for sore throats. Hot pungent spices were used to treat cold. It is noteworthy that the therapy for rheumatism has been pepper and capsaicin, a chili pepper extract. The ingredient found in cinnamon and clove, eugenol, is a local anesthetic agent, which is utilized in dentistry.

Spices, along with salt, would have been incorporated in mixtures to pickle and preserve vegetables; the pungent spices were useful for relieving the salty taste of such foods. Aromatic spices, such as cloves and cardamom, would be useful to disguise the foul breath of onion and garlic eaters. Burnt spices or incenses could be used to help counteract the malodors that were prevalent in rich homes. Some spices, such as turmeric, pepper and cinnamon, do have antimicrobial properties.

The heady aromas of expensive, exotic spices ensured that they would offer a voluptuously stimulating environment for invigoration of romantic encounters. Their potent, life-restoring virtues earned them a reputation of being essential every-night aphrodisiacs. The Hindus had their “Kama Sutra”, of which extolled favored spices such as nutmeg, cloves, cardamom and ginger. Modern romances are catalyzed by spices and herbs which are called on to provide symbolic and sensory support in luxurious perfumes, heady scents, and sensual aromatic cream or oil massages.

Cloves and some other spices and herbs contain eugenol; its smell is fragrant and aromatic, and has long been considered as enhancing sexual feelings. Pepper contains piperine: this pungent agent can stimulate sexual function, according to ancient beliefs.

Undoubtedly, folk remedies and family traditions lead to many people favoring specific spicy beverages for a spectrum of health purposes varying from aphrodisiacs and digestives to cold preventatives and bronchitis therapies. Sri Lanka still produces tonics using various spices

and herbs, and they are marketed as digestives, cough medicines and so on.

Spices used in Sri Lanka and India are presented in alphabetical order, regardless of the importance, featuring the characteristics, usages, consumptions and other remarks (Tables 1, 2 and 3).

1. Cardamom

Its origin is southern India and Sri Lanka. The aromatic extract contains many essential oil chemicals. Thus, its main use is as an adjunctive spice in curries. Cardamom is often named as the “third most expensive” spice in the world (after saffron and vanilla), and the high price reflects the high reputation of this most pleasantly scented spice. It is known in India as Queen of Spices. The effects of cardamoms are those of a very agreeable aromatic; they are used partly on account of their flavor, and partly for their carminative and stimulant properties. It has numerous applications in the cooking styles of Sri Lanka and India.

In Sri Lanka, cardamom is an excellent in moderation to flavor curries, for sauces, and to give aroma to confectionery. The pods are added to fiery beef or chicken curries, together with cinnamon. Ground cardamom is used for wines, cakes, cookies, pies, and puddings, especially *wattalapam*, a typical Malay egg pudding. Cardamom-flavored sweets are found all over India and Sri Lanka.

In the Mogul cuisine (Northern India), cardamom is abundantly used in the delicious rice dishes called *biriyanis*, and in several mild meat dishes from the same region. Indian *biriyani* is made by placing layers of cooked rice and aromatic meat or vegetable stews in a large pot; after addition of dried fruits (e.g., raisins, fresh or dried pomegranate seeds), nuts (e.g., almonds) or even saffron water, the pot is sealed and heated in the oven so that the different flavors mingle.

Sometimes, curry powders contain small amounts of cardamom; cardamom is also frequently added to the Northern Indian *garam masala*. In Kashmir, where the Moghul influence is particularly strong, people like sweet tea flavored with cardamom pods. Spiced tea (*chai masala*) is, in India, a luxury one cannot afford every day; the most common flavorings are cardamom, cinnamon, cloves and even black pepper. To prepare, water, milk, sugar, tea leaves and spices are boiled together for a few minutes; after straining, the tea is ready to drink.

Medically, it is used mainly as an aid to digestion. It is used more prosaically to treat colds, bronchitis, fevers, inflammatory conditions of the oropharynx, and liver complaints. Cardamom flower buds are used to improve digestion, stimulate the mind and freshen breath.

Cardamom has long been famous as an aphrodisiac. According to Indian herbal medicine, crushed cardamom seeds boiled with milk and honey are an excellent remedy for impotence and depression. Together with betel leaves and areca nuts (Takeda, 2000, 2004), cardamom forms part of the betel quid that Indians and Sri Lankans like to chew as a mouth freshener and digestive aid.

2. Chili (chilies, chili peppers or capsicums)

Chili peppers or capsicums, come in so many cultivated varieties (cultivars) that the shape, color, taste and pungency of any one cultivar can vary considerably. Their pungency is mainly caused by capsaicin, which belongs to the vanilloid family of chemicals.

Chilies may be used fresh or dried, ripe or unripe, and cooked or raw. Some claim that chilies' pungency hides more subtle flavors and that the fiery hotness suppresses all other tastes. After

some experience with fiery but tasteful food, most people develop the ability to discern subtle flavors behind the chilies' heat. They are commonly employed for their pungency, and subtleties in flavor are controlled by a host of additional spices.

Sri Lankan and South Indian cuisine uses fresh green chilies, which are taken in mind-boggling amounts for stir-fries and deep-fried lentil snacks. For curries, dried red chilies are usually preferred; 2-3 large tablespoons for one liter of curry is not unreasonable in Sri Lankan hot curry.

Chili peppers are best known in medicine as sources of capsaicin, which is used as a pain relieving medication for topical use in arthritis and neuropathies. Chilies, which have pungency increase mucous secretion in the lungs and nose. They are still used in Ayurvedic therapy to treat peptic ulcers. The addition of chili pepper to chicken soup (with accompanying garlic and other herbs) is recommended as a useful therapy for colds, sinusitis and bronchitis. When taken internally, capsicum is a powerful stimulant producing when swallowed in small doses, a sensation of warmth in the stomach, and a general glow over the whole body; hence in moderation it is very useful as a condiment, for which it is very extensively employed. Especially in tropical countries where vegetable food is chiefly consumed, it promotes digestion, and prevents flatulence.

3. Cinnamon

The most fragrant and delicate cinnamon is obtained from the *Cinnamomum zeylanicum*, a tree native to Sri Lanka. Among the Europeans, the true cinnamon of Sri Lanka was discovered by the Portuguese in the early 16th century, who thenceforth controlled the trade with great cruelty. An increasing demand for cinnamon led to the Dutch fighting the Portuguese, and in the mid-17th century Ceylon's (Note 4) cinnamon trade was taken over and controlled by Holland. In the 18th century, many Dutch were massacred in Sri Lanka in an effort to break the cruel rule of the new colonialists, but this led to reprisals and a subsequent growth in Portuguese control of the island's cinnamon plantations. The Dutch forcefully monopolized cinnamon; to keep up prices in 1760, they burnt huge amounts in Amsterdam to create a shortage. Perhaps this hostile act convinced cinnamon fanciers in other countries that the spice was being over-utilized in gourmet cooking and in wine making. In 1796, the English seized control of Ceylon hoping to revive interest in cinnamon. World trade in cinnamon is between 7,500 to 10,000 tons annually. Sri Lanka contributes 80 to 90 percent, most of the remaining balance coming from Seychelles and Madagascar (Smith, 1986).

Cinnamons major uses are in bakery, meat seasoning, fish, preserved fruit and vegetables, curry powders, beverages, tea, desserts, and some pharmaceuticals. Since true cinnamon is native in South Asia, it is not surprising that the cuisines of Sri Lanka and India make heavy use of it. It is equally suited for the fiery beef curries of Sri Lanka and the subtle, fragrant rice dishes (*biriyanis*) of the Imperial North Indian cuisine. It is also widely in use for flavoring tea. In Sri Lanka and India, cinnamon is applied as a whole; the bark pieces. The cinnamon chunks may be removed before serving, but are more frequently kept as a fragrant decoration.

Cinnamon extracts have been used medically to treat gastrointestinal problems and as a specific for diarrhea. Cinnamon is also an ingredient of medicines for cough, hoarseness and sore throats. It is also believed to be an aphrodisiac. Cinnamon is prescribed in homeopathic medicine for diarrhea, hemorrhage, and cancerous tumors.

4. Cloves

The word clove comes from the Latin word *clavus*, meaning nail, since the shaft and head of the clove bud resembles a nail. It is one of the best known of all spices, but also one of the most difficult to use because of their pungency. It is strong in aroma and hot and pungent in taste. Cloves are used in many types of curry. It is used to flavor meats, curries, rice dishes, pickles, and sauces.

Clove has an obvious medicinal value. Clove, which is an aphrodisiac (with properties similar to those of rhinoceros horn i.e. an imaginary symbol of potency), was a highly valued flavor, a possible food preservative, and a pharmaceutical panacea in past centuries. It contains eugenol, which is an effective local anesthetic, and this has long been used in dentistry. The oil of cloves sometimes affords relief when introduced into the cavity of a carious tooth. Toothpastes which include clove oil has very good demand in Sri Lanka. Other constituents include salicylic acid. Cloves in substance or infusion are sometimes given to relieve nausea and vomiting, more especially the vomiting of pregnancy, to relieve flatulence, and to except weak digestion.

5. Coriander

Coriander is a basic ingredient used daily in Sri Lanka to add flavor to curries. Coriander is used in condiments, desserts, liqueurs, perfumes and in candies (e.g., sugar-covered coriander seeds). Coriander is one of the main ingredients of curry powder in Sri Lanka and India. They are also used in Indian *masalas* as well in Northern India (*garam masala*) as in the South (*sambaar podi*). Roasting or frying, much practiced in Sri Lanka and India, enhances the flavor. In Sri Lanka, normally only the fruits are used, which are usually roasted before being ground.

Coriander has been advocated for health purposes in folk therapies, and the list of such uses is similar to those for other spices. Coriander fruits possess stimulant and carminative properties like those of the other aromatic umbelliferous fruits. Coriander first roasted and then boiled, and the extract is commonly drunk for fight against common cold.

6. Cumin or cummin

Cumin is one of the most typical spices for Sri Lanka and India. Cumin, which has a remarkable pungent and aromatic flavor, is one of the ingredients of curry powder together with sweet cumin and coriander. The fruits are used as a whole, and are fried or dry-roasted before usage. Cumin is essential for the preparation of Northern Indian *tandoori* dishes. The fragrance of roasted cumin, typically in combination with coriander, is the most characteristic impression from South Indian or Sri Lankan cuisine. In South India, an extremely popular spice mixture called *sambaar podi* (sambaar powder) is prepared to flavor the thin lentil curries (*saambaar*) traditionally served with pancake-like bread made from rice flour (*dosai*), or with *iddli*, steamed dumplings of fermented rice and bean dough. Base components of *sambaar podi* are lentils (*urad dal*), which are dry-roasted or toasted until they lose their raw flavor.

It is also used in wines, when alcohol is flavored. Cumin resembles other similar old spices, having been advocated for many medical indications. It is being evaluated for possible anticancer and antioxidant effects.

7. Curry leaf (leaves)

The curry-leaf tree is native to India; today, it is found wild or become wild again (namely, escape type), almost everywhere in the Indian subcontinent excluding the higher altitudes. Fresh

leaves are rich in essential oil, but the exact amount depends also on the extraction technique besides freshness and genetic strain.

Curry leaves are extensively used in Sri Lanka (and are absolutely necessary for the authentic flavor) and Southern India, but are also of some importance in Northern India. The term *curry*, in its true home, South India, means a thin, spicy vegetable stew. Curry powder is a British invention to imitate the flavor of Indian cooking with minimal effort. Some curry powders, indeed contain curry leaves, but probably only for historic or linguistic reasons, since dried curry leaves lose their fragrance within days. A typical Indian curry powder should derive its taste mainly from roasted cumin, roasted coriander, black pepper, chilies and roasted fenugreek. Other typical Indian spices often contained in curry powders are dried ginger, ajwain (*Trachyspermum ammi* syn. *Carum copticum*, Umbelliferae ; see also Note 5) and celery (as a substitute for Indian *radhuni*), furthermore salt, flour from lightly toasted lentils and aromatic Moghul spices in variable amounts (cinnamon, cloves, green cardamom, Indian bay leaves). Since curry powder is not a traditional recipe, there is little consensus about what should go into it, and anyone is free to sell his own creation.

One cannot represent the large spectrum of Sri Lankan and Indian cooking styles in a single spice mixture; Sri Lankans and Indians prepare their mixtures separately for each dish and usually do not store them, thus guaranteeing the unique flavor of each recipe. Curry powder, therefore, belongs more to British or international cuisine than to Sri Lanka or India; anyone trying to cook authentic Sri Lankan or Indian recipes should stick to traditional Sri Lankan and Indian spice mixtures or, even better, single spices.

In Sri Lankan and Indian cuisines, curry leaves are used fresh; for some recipes, the leaves should be oven-dried or toasted immediately before usage. Another common technique is short frying in oil. Since South Indian cuisine is dominantly vegetarian, curry leaves seldom appear in non-vegetarian food; the main applications are thin lentil or vegetable curries and stuffings for the crispy *samosa*. Because of their soft texture, they are never removed before serving, and can be eaten without any hazard. In Sri Lanka, almost all curries are flavored with curry leaves.

In the recent past curry leaves became even more popular, as medical experiments have proven its ability to control cholesterol levels. In Sri Lanka, today they are extensively used in various forms (e.g., porridge, salads, etc.) in addition to use them as a spice in curries.

8. Fennel

Fennel is a common cooking spice worldwide, popular with fish and curries. Fennel fruits are aromatic, stimulant, and carminative. Fennel is quite important in several regional cuisines of the Sri Lanka and India. In Sri Lanka fennel seeds are used in the preparation of curry powder together with coriander and cumin, and also as flavoring for sweet dishes and alcoholic liqueurs. It is part of the typical three-spice-mix *thuna paha* in Sri Lanka and five-spice-mix *panch phoron* in India-Bengal. In Sri Lanka, toasted fennel fruits are one of the typical ingredients responsible for the subtle and complex aroma of fiery and chili-laden curries. The toasting procedure not only increases the flavor, but also changes the character of fennel to a spicier and less sweet impression. After meals, fennel is used in India to prevent gas and upset stomach.

The main active constituents, which include the terpenoid anethole, are found in the volatile oil. Anethole and other terpenoids may have mild estrogen-like activity, and inhibit spasms in

smooth muscles, such as those in the intestinal tract. Legends suggested it was beneficial for eyesight, and it was subsequently used for gastrointestinal disorders and for coughs. Recent studies have found fennel to possess diuretic, choleric (increase in production of bile), pain-reducing, fever-reducing, and antimicrobial actions. Fennel was used for indigestion and possibly for stimulating milk flow in women. Whole seeds may be chewed or used in tea. Fennel water mixed with sodium bicarbonate and syrup, forms 'Gripe Water,' used to correct the flatulence of infants. Syrup prepared from fennel juice was given for chronic coughs.

9. Fenugreek

Fenugreek seeds are a popular spice and have long been used as a nourishing dietary herb in India and Sri Lanka. In India and Sri Lanka the seeds are largely employed, both as food and medicine, while the fresh plant is consumed as a vegetable in India. Fenugreek, which has a rather unpleasant scent and a bitter taste, is used to flavor and give the necessary binding or thickening effect to curries. It is more familiar as a component of Indian curry powder, to which it contributes a curry-like taste. Small amounts of fenugreek should be found in any good curry powders. It is also used raw or roasted to give flavor to chutney.

Dry roasting can enhance the flavor and reduce the bitterness, provided care is taken not to overheat the seeds. Fenugreek is also popular in the South of India and appears in the ubiquitous Tamil spice mixture *sambaar podi*. In Sri Lanka it is commonly used for white curries made out of using coconut milk.

The seed is a source of the steroidal saponin diosgenin, which can be used to manufacture many pharmaceuticals, such as progesterone. The chemical trigonelline is converted into niacin when the seed is roasted. The seeds also provide a mucilaginous fiber content that may benefit the bowel. Of more current interest is the evidence that fenugreek has a minor hypoglycemic effect, thus suggesting it may, in fact, help with diabetes.

It is used as an appetizer, a tonic and an aphrodisiac, and it is included in many foods and beverages. Fenugreek has a long history of dubious indications, including fevers, colic, flatulence, dyspepsia, dysentery, cough, tuberculosis, edema, rickets, leg ulcers, gout, diabetes and baldness. The seeds are boiled with lime and then apply onto head to control dandruff.

10. Gamboge

It is a tropical fruit commonly known as Malabar tamarind and belongs to the family Clusiaceae earlier known as Guttiferae. Malabar is a region in the western coast of South India. Cambodge or goraka fruit has excellent therapeutic value and the dried rind is a popular fruit spice used in cookery as an important ingredient in many dishes for flavoring curries in place of tamarind or lime. Gamboge, usually ground with a little hot water, is used as a souring and thickening agent in curries, fish and meat preparations, and certain vegetable curries. It is widely used particularly in Sri Lankan fish curries (*ambul thial*).

This fruit is a rich source of hydroxycitric acid (HCA). Test tube and animal research suggests that HCA may be helpful in weight loss because of its effects on metabolism.

11. Garlic

It is generally thought of as a spice because of its remarkable pungent aroma, and its value for culinary and medical uses. The smell of garlic is caused by allicin (diallyldisulfide-S-oxide), which is derived from precursors such as alliin (S-allyl-L-cysteine sulfoxide) by the enzyme alli-

inase which is liberated when the clove is broken up. The active compound resembles the well-known drug N-acetyl-L-cysteine (Mucomyst), which has mucolytic and antioxidant properties. Many Indian and Sri Lankan recipes add garlic in an early phase. In Sri Lankan cooking, sometimes it is fried before adding other ingredients.

Garlic has had a long-held reputation as a medicine. The chemicals in garlic can help reduce serum cholesterol, hypertension, blood clotting, blood sugar, bowel parasites, respiratory and other infections, and the aging process itself. Garlic contains several potent antioxidants, and there is evidence that its addition to the diet may help reduce the incidence of gastric and colorectal cancers.

12. Ginger

The unique spice is used, usually dried and ground, to flavor sauces, curry dishes, confections, pickles, and ginger ale. The peeled root may be preserved by boiling in syrup. Sri Lankans frequently use ginger paste or fired ginger on meat dishes. Ginger tea, prepared by cooking slices of fresh ginger for a few minutes, is a spicy and healthy drink enjoyed in Sri Lanka. It is used in chutney, pickles, preserves and dried fruit. It is used ground in cakes and cookies.

Ginger's warming effects bring relief during cold and flu season. It is believed to have anti-inflammatory and anti-allergy properties. Ginger tea is a hot infusion which is very useful for stoppage of the menses due to cold, and externally it is a rubefacient. Ginger is used medically to help expel gas from the intestines and treat nausea from morning sickness, upset stomach, seasickness, and motion sickness. It is also used to help reduce fevers and lessen the symptoms of colds. Its ability to prevent vomiting has been verified by clinical trial, and it has been shown to stimulate the intestines and promote production of saliva, digestive juices, and bile. It also tends to boost the pumping action of the heart. It is a general stimulant, being one of many spices that are regarded as being aphrodisiacs. Ginger has been recommended as an expectorant and it is traditionally used in teas or soups to treat colds or bronchitis.

13. Mustard

The most pungent mustard taste is obtained from freshly ground seeds. In both Sri Lanka and India mustard is very widespread. Mustard seeds mostly as a paste, are much used as a spice directly. Their pungency is completely destroyed by cooking, and therefore the ground seeds should be added as late as possible if some pungency is desired. In Sri Lanka and India, mustard seeds are commonly toasted, or fried in a little oil, until they acquire a grayish hue. This frying procedure changes the character of black mustard seeds completely: They are no longer pungent, but display an interesting nutty taste hardly comparable to anything else on the spice shelf. This flavor is particularly loved in Sri Lanka and South India.

When swallowed whole they operate as a laxative, and have been used as a remedy in dyspepsia, and in other complaints attended with torpidity of the bowels.

14. Nutmeg and mace

Nutmeg is a seed of *Myristica fragrans* and mace is the aril that surrounds the seed. The brown, wrinkled, oval fruit contains a kernel, which is covered by a bright red membrane. The membrane provides the spice mace, and the kernel provides the spice nutmeg. Today, nutmeg and mace's popularity has shrunken in Sri Lanka and the spice is less used. It appears in delicately flavored meat dishes. The Northern Indian spice mixture *garam masala* also contains nut-

meg or mace. The ground nutmeg is sometimes used to flavor puddings and cakes.

In small quantities, nutmeg acts on the stomach to improve appetite and digestion. It has been used with advantage in mild cases of diarrhea, flatulent colic, and certain forms of dyspepsia. Nutmeg oil is sometimes used to dispel flatulence. It helps prevent gas and fermentation in the intestinal tract. Both nutmeg and mace are used for flatulence and to correct the nausea arising from other drugs, also to allay nausea and vomiting. Nutmeg is an agreeable addition to drinks for convalescents.

15. Pepper

Black pepper is native to Malabar, a region in the western coast of South India; today, this region belongs to the union state Kerala. This pungent berry, the earliest spice known to human-kind, is used as a substitute for red-hot chilies. The main flavor comes from piperine. It also contains other essential oils, including terpenes, contribute to the aroma. Its alkaloids include the pungent tasting chavicine and piperidine.

In the last decades of the 20th century, pepper production increased dramatically as new plantations were founded in Thailand, Vietnam, China and Sri Lanka. Since pepper cultivation has much increased lately and new plantations spread to different locations, black pepper is constantly introduced into cooking styles that did not use much pepper before. Black pepper can be used for nearly every kind of dish - some even like it for sweets. The combination of ripe jack-fruit and pepper is almost a classic in Sri Lankan food. Pepper pungency goes well with sour flavors, thus a pinch of pepper is well used for other fruits like pineapple and mangoes.

Pepper appears in several well-known or not-so-well-known spice mixtures. In its native home, India, pepper is used abundantly: The Anglo-Indian curry powder contains black pepper as well as Northern Indian *garam masala* and South Indian *sambaar podi*.

Pepper is believed to purify the blood and warm the body. Black pepper is used in Ayurvedic medicine to treat fevers and digestive disorders. Pepper has long been recognized as an ingredient for stimulating the appetite as well as an aid in the relief of nausea. In India, it had been used as a medicine for variety of ailments from paralysis to toothache. Black pepper is used in liniments and gargles. Pepper has been found to stimulate the activity of the heart and kidneys. It is also an effective insecticide against houseflies. Traditionally, it is also used for rituals in Sri Lanka, to chase away demons.

16. Tamarind

In Sri Lanka and India tamarind is a popular cooking and condiment flavor. The sticky pulp of surrounding the seed use as a souring agent in many curries. Various preparations are available, including juices, jams and pastes. The sour fruit pulp contains tartaric acid; its taste goes well with meat and vegetable dishes, and it is used in marinades, curries, and chutneys. The sour and fruity taste of tamarind merges well with the heat of chilies and gives many Sri Lankan and Indian dishes their hot and sour character, and their dark color. In both countries, tamarind is mostly combined with meat or legumes (lentils, chick peas or beans). It is also used in drinks and in refreshing confectionary preparations.

In Sri Lankan and Indian traditional medicine, tamarind had many indications, including its use as a digestive, laxative, tonic, antihelminthic, antipyretic, and astringent. It is favored for wound treatment, sore throat, urinary problems, gonorrhoea, ulcers, liver disease and so on. Tama-

rinds have slightly laxative properties, and are also refrigerant from the acids they contain. An infusion of tamarind pulp forms a very grateful and useful drink in febrile affections.

17. Turmeric

Turmeric is used as a condiment in curries. It is a very important spice in Sri Lanka and India. Today, turmeric is added to nearly every dish, be it meat or vegetables. It is found the largest quantities in boiled lentils or potatoes. Furthermore, it appears in turmeric-dyed yellow rice, which is very common in Sri Lanka. In India, turmeric is part of all curry powders (Muthuraman and Takeda, 2006 a, 2006 b). It is widely used as an appetite stimulant and digestive in various sauces, and as a rice colorant and a standard curry constituent, or as an inexpensive substitute for saffron.

The spice has become more popular recently as a source of the yellow turmerone, curcumin: this is believed to have antioxidant, anti-inflammatory and anticholesterolemic properties. Herbalists advise that it may be used to prevent heart disease, cancer, and arthritis. Curcumin is often added to food products as a colorant and to prevent their spoilage by oxidation. A little turmeric and salt are all that is necessary to preserve fish and meat. Turmeric is famous for its antiseptic properties. Water containing turmeric power is spreader inside and outside the building to kill germs.

IV. Spices in Bangladesh

The deltaic plains of Bangladesh have been famous for rice production, which has been the chief occupation of its people. Rice, therefore, figures prominently in the food habits of the people. Rice is usually boiled and eaten with curry. The people of Bangladesh eat rice, not just a small quantity to go with vegetable and meat, but a lot. They eat rice every day and almost at every meal. At daybreak, the farmers, the laborers or the lower income-group people start their long day with a breakfast of *panta*, plain boiled rice which is soaked overnight in water and slightly swollen. This watery rice mixed with salt and chilly, either green or fried dry ones, makes a rather filling breakfast for the poor to start their heavy toil. But this is not just the only sort of breakfast. *Muri* (fried rice) or *chira* (flattened rice), or *khoi* (popped rice) are other items of a traditional breakfast in most Bengali homes in the rural areas. The food habit of urban people is a little bit different. At breakfast, urban people take bread, fried bread or loaf. They usually take rice twice in a day at noon and at night.

The food habit of the people quite depends on the economic status of each household. When the poor families either in rural and urban areas have not sufficient food for their daily life, the rich people either in rural and urban area have different types of dishes in their daily meals. In Bangladesh, the household who has little bit economic solvency takes food five times in a day for example: early breakfast soon after waking up at around 8 a.m., breakfast at around 10 a.m., lunch at around 2 p.m., *nasta* (light food) at around 6 p.m. and dinner at around 10 p.m.

In Bangladesh, some tradition is found, for example; improved dishes are prepared on the basis of the presence at the house of the household head. Usually, noon is the best time for improved diet as compared to morning or night. Bangladeshi people take much more food at noon as compared to lunch or dinner. To take the oily and spicy food is the common phenomenon for

the people of Bangladesh.

The frequency of making the dishes in a day also depends on the economic status of a household. Economically solvent household prepares dishes more than three times in a day when poor families have no ability to prepare dishes every day and they eat stale food.

Bangladesh is famous for its delicious food. Hundreds of different types of dishes are found here. For example, more than 40 items of dishes can be prepared by one type of meat. The commonly eaten dishes are: meat curry, fish curry, vegetables, *dal*, *bhorta*, etc. *Jhol* is typical and an exclusive dish of Bangladesh. It is a vegetable and fish curry with a lot of thin gravy in it, usually very hot with chilies. *Dal* or soup made from lentil, gram (chickenpea) or bean is taken with rice and nearly always at the fag end of the meal. The traditional and festival food of Bangladesh are *polau*, *biriani*, *kofta*, *kabab*, *zorda*, *finni*, *borhani*, etc.

Poor, lower middle, middle class and rich people are co-existing in the Jessore district, in the southwestern part of Bangladesh (Rahman and Takeda, 2005; 2006; 2007). In the study, 14 families were purposively selected as respondents. The question may be raised why the sample selection was purposively, but it may be said that most of the families especially housewives were not in a position to measure the quantity of spices used in the dishes in every week and or reluctant to face interview. Accordingly, the study selected those samples where the reliable data set could be obtained.

Before collecting the data, the households were requested to become aware or measure the quantity of spices in one week. In order to compare the data collected in Sri Lanka and India, the data are listed in Tables 4, 5 and 6 after changing into one month from one week. To have the representative data, different households in different professions and different incomes have been included: 3 businessmen with income range varying from 7,000 Tk. to 10,000 Tk., 3 farmers with income range from 2,000 Tk. to 22,000 Tk., 7 service holders with income range from 4,000 Tk. to 40,000 Tk. and 1 brick-layer with income 28,000 Tk. The survey recipients were all women (housewives), because in Bangladesh, all types of dishes are prepared and alternative use of the spices are also done by women.

Spices in Bangladesh are also presented in alphabetical order, regardless of the importance, featuring the characteristics, usages, consumptions and other remarks (Tables 4, 5 and 6).

1. Bay leaf

Bay leaf is the dried ripe leaf with several branches and leaves with jagged edges. Bay leaves are widely used throughout the world (see also Note 6). It may be best known in bouquets garnis or used similarly in soups, sauces, stews, daubes and courts-bouillon's, an appropriate seasoning for fish, meat and poultry. Bay leaf is often included as a pickling spice.

Fourteen families used 84 bay leaves for making dishes in a week while all of them used 10 leaves for folk medicine.

2. Cardamom

Cardamom, the queen of all spices, has a history as old as humankind. It is one of the high priced spices in the world. It is the dried fruit of an herbaceous perennial plant. It has well-established culinary values, and it is used in a wide range of meats, sweets and confectionery. Cardamom acts as a mouth-freshener after meals. Tea and coffee made with cardamom are pleasantly aromatic and refreshing. Cardamom oil is an essential factor in food items and in prepara-

Table 4 Spices commonly used in Bangladesh (n=14)

English name	Local name	Form of use	Purpose	Dishes
Bay Leaf	<i>Tespata</i>	As it was	Aroma	Curry, meat, sweet, <i>dal</i> , etc.
Cardamom	<i>Alus</i>	As it was	Taste and aroma	Curry, meat, sweet, desert, etc.
Chili (Green)	<i>Kacha morich</i>	Slice and/or paste	Taste	Curry, meat, fish, etc.
Chili (Red)	<i>Paka morich</i>	As it was and/or paste	Taste and color	Curry, meat, fish, etc.
Cinnamon	Daruchini	As it was and/or paste	Taste and aroma	Curry, meat, fish, sweet, desert, etc.
Clove	<i>Lobongo</i>	As it was	Taste and aroma	Curry, meat, fish, etc.
Coconut	<i>Narikel</i>	Coconut milk	Taste	Curry, desert, sweet, etc.
Coriander	<i>Donia</i>	Powder and/or paste	Taste and aroma	Curry, meat, fish, etc.
Coriander (Leaf)	<i>Donia pata</i>	Leaf	Taste and aroma	Curry, fish, etc.
Cumin (Seeds)	<i>Zira</i>	As it was and/or paste and/or powder	Taste and aroma	Curry, meat, fish, etc.
Fennel (Seeds)	<i>Gomouri</i>	As it was	Taste and aroma	Curry, meat, fish, etc.
Fenugreek	<i>Meti</i>	As it was and/or paste	Taste	Curry
Garlic	<i>Roshun</i>	Slice and/or paste	Taste	Curry, meat, fish, etc.
Ginger	<i>Ada</i>	Paste and/or slice	Taste	Curry, meat, fish, etc.
Mace	Upper part of <i>zaijol</i>	Powder	Taste and Aroma	Curry, meat, etc.
Mustard (Seeds)	<i>Sorisha</i>	Paste	Taste	Curry, meat, fish, etc.
Nutmeg	<i>Zaijol</i>	Powder	Aroma	Curry, meat, fish, etc.
Onion	<i>Pias</i>	Slice and/or paste	Taste	Curry, meat, fish, <i>dal</i> , <i>bhorta</i> , etc.
Pepper (Black)	<i>Gol morich</i>	As it was and/or paste	Taste	Curry, meat, fish, etc.
Tamarind	<i>Tetul</i>	As it was	Taste	Curry, <i>dal</i> , etc.
Turmeric	<i>Holud</i>	Powder and/or paste	Color	Curry, meat, fish, etc.

Source: Field survey, 2005.

Table 5 Quantity of spices used per one month (n=14)

Name of spice	N	Weight (gm)	Number	Tea spoon	Table spoon
Bay Leaf	14		84		
Cardamom	14		16		
Chili (Green)	10	1784			
Chili (Green)	4		86		
Chili (Red)	13	40			
Cinnamon	6	20			
Cinnamon	8			88	
Clove	14		22		
Coconut	2	1000			
Coconut	4				480
Coriander	11				80
Coriander (Leaf)	5	400			
Cumin (Seeds)	14			228	
Fennel (Seeds)	2	40			
Fenugreek	2			24	
Garlic	10	600			
Garlic	4			196	
Ginger	14	600			

Mace	1		8
Mustard (Seeds)	9	500	
Nutmeg	3		24
Onion	13	2200	
Onion	1		68
Pepper (Black)	14	40	
Tamarind	5	160	
Turmeric	14		296

Source: Field survey, 2005.

N=Number of family, Total family 14.

Table 6 Other uses of spices (n=14)

Name of spice	N		
	Preservative	Folk medicine	Skin care
Bay Leaf	14	10	
Cardamom	10		
Chili (Green)	14		
Chili (Red)	9		
Cinnamon	7		
Clove	11	14	
Coconut	6		14
Cumin (Seeds)	12		
Fennel (Seeds)	4		
Fenugreek		5	
Garlic	14	6	
Ginger	7	14	
Mustard (Seeds)	12		
Onion	14		
Pepper (Black)	12	8	
Tamarind	9		
Turmeric		1	8

Source: Field survey, 2005.

N=Number of family, Total family=14.

tion of certain medicines.

Table 5 shows that all 14 families used cardamom; they used 16 times in a week. Ten families used cardamom as preservative.

3. Chili

Chili is grown throughout the country and is used in almost all dishes. Chilies are of numerous varieties and their degree of pungency varies. Dry and fresh chilies are used in various dishes such as curry, meat, fish, etc. Dry chili gives a red color and makes the dish attractive. Chilies are used with or without stalks. It is used as it is or a paste form.

Ten and 4 families used 446 grams and 86 green chilies respectively when 13 families used 10 grams of red chili for making dishes (Table 5). Table 5 shows that 9 and 10 families used green and red chili, respectively as a preservative.

4. Cinnamon

Cinnamon is the dried bark of an evergreen tree in the tropics. There is a particular season for peeling of the bark. It is considered superior compared to cassia though they belong to the

same genus. Cinnamon is used in a wide variety of foods, beverages, pharmaceuticals, liquors, cosmetics, perfumery and toiletries.

As Table 4 describes the form, purpose and using dishes of spices in the surveyed area, cinnamon is used for making curry, meat, fish, sweet, desert, etc. Table 5 shows that 6 families used 20 grams of cinnamon while 8 families used 88 teaspoonfuls of that in one week. Cinnamon is used as it is or after pasting. According to Table 6, 7 families used cinnamon as preservatives.

5. Clove

Clove, one of the oldest spices in the world, is the dried, unopened flower bud of a small evergreen tree. Clove goes mainly as an ingredient of a variety of food specialties, beverages, medicines, cosmetics, perfumery and toiletries. Either whole or as a powder, clove finds extensive application in Bangladeshi foods. Clove is also highly recommended for making pickles, ketchups, and several kinds of sweets. It is very often used with pan for chewing after meals, and in tooth-pastes as a fragrant mouth-freshener.

The number of clove used for making dishes by 14 families was 22 times. Eleven and 14 families used clove for the preservation of food and folk medicine, respectively.

6. Coconut

Coconut palm, botanically known as *Cocos nucifera*, with *nucifera* meaning “nut-bearing.” The coconut fruit has many food uses for its milk, meat, sugar, and oil. It also functions as its own dish and cup. The husk was burnt for fuel by natives, but today a seed fiber called coir is taken out from the husk and used to make brushes, mats, fishnets, and rope. A very potent fermented toddy or drink is also made from the coconut palm’s sap. Coconut oil, a saturated fat made from dried coconut meat, is used for commercial frying and in candies and margarines, as well as in non-edible products such as soaps and cosmetics. See also Takeda (2000, 2004) and Takeda, *et al.* (2002) as to detailed other usages.

According to Table 5, 2 and 4 families used 300 grams and 120 tablespoonfuls of coconut milk for preparing dishes, respectively. Table 6 shows that 6 and 14 families used coconut oil as preservative and skin care, respectively.

7. Coriander

Coriander is the dried ripe fruit with several branches and leaves with jagged edges. Coriander forms the base of most Bangladeshi dishes. Both its seeds and leaves are used in dishes. Coriander seeds are mostly used in powder form, slightly roasted to improve the flavor. Its leaves are used for making *chutneys*, *vorta* and garnishing. This fragrant spice also has its own medicinal properties. Oil of coriander seeds is a valuable ingredient in perfumes. Crushed coriander mixed with milk or rose water is used as eye drops.

Eleven families used 80 tablespoonfuls of coriander while 5 families used 400 grams of leaf in one month.

8. Cumin

Cumin is the dried fruit of a small herbaceous plant. Cumin adds flavor to foods, liquors and beverages. The spice is of particular value in the blending of Bangladeshi curry powder. Cumin has digestive properties and when boiled in water acts as an excellent refresher. It is also used in medicines, toiletries and perfumery.

Fourteen families used 57 teaspoonfuls of cumin seeds while 12 families used it as preserva-

tive.

9. Fennel

Fennel is the dried ripe fruit of a perennial aromatic herbaceous plant, which grows in mild climate. It is used in a wide range of dishes. Fresh fennel leaves are also used in fish and meat dishes, salad dressings and stuffing. Fennel seeds are used in pickles and variety of meat preparations. Powdered fennel is a flavoring agent in biscuits, cakes and cooked apple dishes.

According to Table 5, two families used 40 grams of fennel seeds for preparing dishes while 4 families used it as preservative (Table 6).

10. Fenugreek

Fenugreek is known as the earliest spices. Fenugreek is the ripe, dried fruit of an annual leguminous herb. Seeds and plant of this herb is used in Bangladeshi cuisine. The dried leaves of the fenugreek are used as a quality flavor for meat, fish and vegetable dishes. It acts as a medicine as well as an embalming agent. Fenugreek seeds are rich in vitamin E. Fenugreek has a strong, quite peculiar odor reminiscent of maple. The spice is exported in its whole and powdered form. The extracted oil of fenugreek is extensively used in perfume.

Two families used 6 teaspoonfuls of fenugreek for making dishes while 5 families used it as folk medicine (Table 5 and 6).

11. Garlic

Garlic is a hardy bulbous perennial of the lily family, with narrow flat leaves. It has an attractive flavor and acknowledged medicinal value. It is one of the 'trinity' of flavors along with ginger and onion in Bangladeshi cuisines. Garlic acts as a flavoring agent in variety of dishes. In pickles, it acts as a preservative flavoring. Garlic pickles and freshly ground garlic chutneys are popular side dishes for rice, snacks and chappathis. Garlic oil is used in ready-made spice-mixes, pharmaceuticals and disinfectants.

Table 5 shows that 10 and 4 families used 600 grams and 196 teaspoons of garlic for making dishes while according to the Table 6, 14 and 6 families used it as preservative and folk medicine.

12. Ginger

Ginger has been used since time immemorial. It is a horticultural crop cultivated in and marketed as fresh and dried spice. It is a small grassy plant grown in all seasons throughout the year. More than a spice ginger is considered as a tastemaker, a drug, an appetizer and a flavor-increasing element.

Table 5 shows that all families used ginger and the mean quantity was 600 grams in a month. Ginger is used as preservative and folk medicine in the surveyed area. Seven and 14 families used it as preservative and folk medicine, respectively.

13. Mustard (seed)

Mustard is an erect, multi-branched herbaceous plant. Three varieties of mustard are white mustard, black mustard and brown mustard. All over the world, mustard is used for its appetizing flavor and preservative value. It is also used in medicines. Today, its use has been extended widely. In Bangladesh, mustard is used largely for tempering food.

Nine families used 500 grams of mustard seeds for making dishes while 12 families used it as preservative.

14. Nutmeg and Mace

Nutmeg and mace are used for preparing dishes in Bangladesh but they are not frequently used, as they are not available at any place. For increasing the flavor of the dishes, they are used.

Three families used 24 teaspoons of nutmeg while only one family used 8 teaspoons for mace for preparing dishes.

15. Onion

Onion is a bulb crop produced in Bangladesh. It is used in plenty and very popular throughout the world. It is one of the oldest spices known to human race. Its leaves are grassy and long with a bulb grown underground. Belonging to lily family onions are of two types; small and big. Generally in Bangladeshi cuisines small onion is used along with mustard seeds for seasoning the curry. Big onion is used for salads and used in different ways according to the preparation of dishes. Good amount of sulphur compounds are present in onion and it acts as an antiseptic.

Table 5 shows that 13 and 1 family used 2,200 grams and 68 table spoons for making dishes, respectively while 14 families used it as preservative.

16. Pepper (black)

Pepper, the king of all spices is considered as the oldest and best known in the world. Peppercorns are very strong in odors and taste, used in canned foods as a flavoring agent. It is commonly used in all dishes as a very popular spice.

Table 2 shows 14 families used 48 grams of black pepper while 12 and 8 families used it as preservative and folk medicine, respectively in Table 6.

17. Tamarind

The food uses of the tamarind are many. The tender, immature, very sour pods are cooked as seasoning with rice, fish and meats in Bangladesh. Medicinal uses of the tamarind are uncountable. Tamarind preparations are universally recognized as refrigerants in fevers and as laxatives and carminatives. Alone, or in combination with limejuice, honey, milk, dates, spices or camphor, the pulp is considered effective as a digestive, even for elephants, and as a remedy for biliousness and bile disorders, and as an anti scorbutic. In native practice, the pulp is applied on inflammations, is used in a gargle for sore throat and, mixed with salt, as a liniment for rheumatism. It is, further, administered to alleviate sunstroke, food poisoning caused by *Datura metel*, Solanaceae), and alcoholic intoxication.

Table 5 shows 5 families used 160 grams of tamarind for making dishes while 9 families used it as preservative.

18. Turmeric

Turmeric is the dried rhizome of a herbaceous plant. It is mainly used for making the color of the dishes. It is the most popular spice as a beauty aid. The spice is sometimes called 'Indian saffron'. Its antiseptic and preservative properties make an ideal choice as a food flavor, an effective ingredient in medicines and cosmetics. It is an antidote against poison. As a beauty aid turmeric paste prevents and cures pigmentation, maintains pH factor and makes skin glowing. When taken internally, it purifies the blood.

All families used 296 teaspoons of turmeric. One and 8 families respectively used turmeric for folk medicine and skin care.

V. Results

The study found that the various usages of spices in Sri Lanka, India and Bangladesh while showing the difference each other, although these countries seem to belong to the same food culture, food habits and so on.

The characteristics of spice consumption and usages in Sri Lanka and India are summarized in Table 2 and 3. Chilies are most frequently consumed in both countries, although interviewees in India were very few, namely only 4 because of the shortage of interpreters (from English to Hindu) on the field spot at the local village, especially far from the big town.

It was, however, very lucky to study in Bangladesh, with the result that we got more detailed and further information. We found that 21 types of spices are commonly used for making dishes and 17 types of spices are used for other than making dishes, i.e. for the preservation of foods, folk medicine and skin care. The people of Bangladesh like hot spicy and oily food. All family think more species and more oil make the dished delicious. All of the families in the surveyed area had not adopted any standard quantity of species; it depended on the previous cooking experience of the housewife. Spices are used in various forms, i.e. as it was, paste and powder. The study also revealed that a great number of families used spices as preservative followed by the folk medicine and skin care.

VI. Discussions

People arrived to trade in spices and also left some of their culinary practices as well. Sri Lankan cooking has evolved by combining culinary practices of many of these cultures. The most noticeable impacts have been the Portuguese, Dutch, Moor, and Malay influences. Furthermore, spices are well known as appetizers, preservatives and many of them have rich medicinal properties and are used in pharmaceutical, perfumery, cosmetic products, religious rituals, etc. as used in Bangladesh.

Accordingly, the culture of spices has been accumulated on cultural influences introduced from foreign countries in addition to their deeply rooted and/or domestically established culture for a long time. Christopher Columbus sought after the sea route to India in search for peppers and so on, and he was the first voyager to America in 1492. In addition, Ferdinand Magellan, who was the discoverer of the round-the-world-route in 1519 to 1521, loaded the peppers such as cloves and nutmegs grown in Moluccas Islands (Note 7), brought them to Portugal, and got the big wealth in return. Thus, peppers, which have been brought about from India or other Asian countries since then, altered greatly the taste of Europeans by seasoning various kinds of dishes with peppers and other spices as ever. At the same time, peppers were also mostly valued for food storage in the long distance voyages in the past when there had been no refrigerators or something like that available in the voyage at all.

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Notes

Note 1: Spice Industry in Sri Lanka

Sri Lanka known then as Ceylon, was referred to as the “Pearl of the Orient” and the “Isle of Spices” by many explorers from Sinbad to Marco Polo, and was very much acquainted with the “Spice Route” from East to West for many centuries. From ancient times, other cultures have been in contact with Sri Lanka to obtain the spices that grow there. European countries more than over the last five hundred years have found the allure of spices to be irresistible. The Portuguese, Dutch, and finally the British, were attracted to India and then Sri Lanka by a persisting appetite for spices. Table 1 presents commonly found spices in Sri Lanka. It is well known that the best cinnamon, cloves, and other spices are indigenous to Sri Lanka.

Note 2: Lemon grass

Takeda had a chance to see the extracting process of lemon grass oil in the eastern part of Bhutan on Nov.13 and 14, 2007, which is mainly exported to India and Germany. Some oil is also available at big towns for cosmetic perfumes. However, the people of Bhutan do not have any habit to use the grass for cooking and other usages like the cuisines of Thailand.

Note 3: Seer fish

There are many varieties of seer fish and tuna, but almost all are commonly known as *thora* and *kelawalla*, respectively. Seer fish refers to a subfamily of the Scombridae or Mackerel family. Seerfishes include such species as: Indo-Pacific king mackerel, (*Scomberomorus guttatus*), streaked Spanish mackerel (*S. lineolatus*), spotted Spanish mackerel (*S. guttus*), and wahoo (*Acanthocybium solandri*; *sawara* in Japanese). They are all fast swimming predators and fight vigorously when caught. Seer fishes are also referred to as “king mackerels” in some areas. They have very sharp teeth, and are handled with care by fishers familiar with them. The wahoo is one of the more popular among this group for eating. It can be fried, grilled, and steamed. It is gaining popularity in the South Pacific and United States as a canned product.

Note 4: Ceylon

Sri Lanka, officially the Democratic Socialist Republic of Sri Lanka is known as Ceylon before 1972. It is an island nation in South Asia, located about 31 kilometers (19.3 miles) off the southern coast of India. Popularly referred to as the *Pearl of the Indian Ocean*, it is home to around twenty million people. Due to its location in the path of major sea routes, Sri Lanka is a strategic naval link between West Asia and South East Asia, and has been a center of Buddhist religion and culture from ancient times. Today, the country is a multi-religious and multi-ethnic nation, with nearly a third of the population following faiths other than Buddhism, notably Hindu-

ism, Christianity and Islam. The Sinhalese community forms the majority of the population, with Tamils, who are concentrated in the north and east of the island, forming the largest ethnic minority. Other communities include the Muslim Moors and Malays and the Burghers. The population consists of Sinhalese (74%), Tamil (18%), Moor (7%) and the Burghers (1%). The Burghers are, historically from Sri Lanka, consisting of descendants of European colonists, mostly Portugal, Dutch and British from the 16th to 20th centuries. According to Saliya De Silva (p.c.: Oct. 8, 2007), there are two Burgher types in Sri Lanka, originating from the Portuguese and the Dutch. They are concentrated about 25 km away from Kandy. Now they are mixed with local people and there are lots of Sinhalese with brown hair and blue eyes.

Famous for the production and export of tea, coffee, rubber and coconuts, Sri Lanka boasts a progressive and modern industrial economy and the highest per capita income in South Asia. The natural beauty of Sri Lanka's tropical forests, beaches and landscape, as well as its rich cultural heritage, make it a world famous tourist destination. After over two thousand years of rule by local kingdoms, parts of Sri Lanka were colonized by Portugal and the Netherlands beginning in the 16th century, before the control of the entire country was ceded to the British Empire in 1815. During World War II, Sri Lanka served as an important base for Allied forces in the fight against the Japanese Empire. A nationalist political movement arose in the country in the early 20th century with the aim of obtaining political independence, which was eventually granted by the British after peaceful negotiations in 1948.

Note 5: Ajwain

Ajwain originated in the Middle East, possibly in Egypt. It is now primarily grown and used in the Indian Subcontinent, but also in Iran, Egypt and Afghanistan. It is sometimes used as an ingredient in *berbere*, an Ethiopian spice mixture.

Raw ajwain smells almost exactly like thyme because it also contains thymol, but is more aromatic and less subtle in taste, as well as slightly bitter and pungent. It tastes like thyme or caraway, only stronger. Even a small amount of raw ajwain will completely dominate the flavor of a dish. It reduces flatulence caused by beans when it is cooked with beans. It may be used as a substitute for cumin as well. It is also traditionally known as a digestive aid and an antiemetic.

It is also known as carum (carom seeds) or bishop's weed, but it is an uncommon spice except in certain areas of Asia. It is the small seed-like fruit of the Bishop's weed plant (*Trachyspermum ammi* syn. *Carum copticum*, Umbelliferae), egg-shaped and grayish in color. The plant has a similarity to parsley. Because of their seed-like appearance, the fruit pods are sometimes called ajwain seeds or bishop's weed seeds. Ajwain is often confused with lovage seed; even some dictionaries mistakenly state that ajwain comes from the lovage plant. Ajwain is also called 'owa' in Marathi, 'vaamu' in Telugu and "omam" in Tamil. In Indian cuisine, ajwain is almost never used raw, but either dry-roasted or fried in ghee or oil. This develops a much more subtle and complex aroma, somewhat similar to caraway but "brighter". Among other things, it is used for making a type of paratha, called 'ajwain ka paratha'.

Note 6: Bay leaf

The tree of bay leaf (*Laurus nobilis*, Lauraceae) is indigenous to Asia Minor, from where it spread to the Mediterranean and then to other countries with similar climates. According to legend the Delphi oracle chewed bay leaves, or sniffed the smoke of burning leaves to promote her

visionary trances. Bay, or laurel, was famed in ancient Greece and Rome. Emperors, heroes and poets wore wreaths of laurel leaves. The Greek word for laurel is dhafni, named for the myth of the nymph Daphne, who was changed into a laurel tree by Gaea, who transformed her to help her escape Apollo's attempted rape. Apollo made the tree sacred and thus it became a symbol of honor. The association with honor and glory continue today; we have poet laureates (Apollo was the God of poets), and bacca-laureate means "laurel berries" which signifies the completion of a bachelor degree. Doctors were also crowned with laurel, which was considered a cure-all. Triumphant athletes of ancient Greece were awarded laurel garlands and was given to winners at Olympic games since BC 776. Today, grand prix winners are bedecked with laurel wreaths. It was also believed that the laurel provided safety from the deities responsible for thunder and lightning. The Emperor Tiberius always wore a laurel wreath during thunderstorms.

Note 7: Moluccas Islands

These, small and large, islands are geographically scattered between Sulawesi Island, north-eastern Indonesia and Papua New Guinea, and have been called spice islands since old times. Nutmegs and cloves, etc. are indigenously grown spices. Since the 16 century, Moluccas Islands had been a goal to the voyagers in search for spices,. The Portuguese became the first voyagers to these islands, then followed by the Spanish. The battles between them begun and continued to monopolize the trade of spices. The Dutch occupied the southern part since 1599, and attacked the English trading house in Amboyna Islands (Ambon Island) in 1623, then they killed all of them, which is called Amboyna massacre. The Dutch monopolized these islands since then, while the English lost the power around these islands and turned the trade mainly to India.

See also Franky et al. (in press) as to details spices used in Indonesia.

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スリランカ・インドおよびバングラデシュにおける 香辛料の利用と消費

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摘 要

人類が狩猟採集経済においても長いあいだ山野に自生する種々の香辛料を自らの調理に利用していたと想像するのは決して難しいものではない。その後、およそ一万年前に人類は農耕を開始し、作物の栽培、家畜や家禽を生活の場に取り込んだ食糧生産経済（新石器革命）に移行した。数百万年におよぶヒトの長い歴史の中で、それぞれの民族が自らの料理に相応しい香辛料を開発・選択・栽培する独自の食文化を構築していくことになった。すなわち、人類と調味料との結びつきにも長い歴史があったことになる。

ヨーロッパ諸国からインド、アジア大陸、アメリカ大陸などに海外進出する大航海時代は、15世紀半ばごろから始まり、17世紀半ばごろまで続いた。ポルトガル人のヴァスコ・ダ・ガマがアフリカ大陸の南端の喜望峰（Cape of Good Hope）を越えてインド西南部のカリカット（Culicut）に達したのは、1498年5月20日であった。アフリカ周りのインド航路が開拓されたことによってインド産に限らず、東南アジアの島々から熱帯産の多彩な香辛料が大量に本国に持ち込まれるようになり、ヨーロッパ人たちは以前に経験したことのない新しい味覚を味わい知ることになった。その後、ポルトガルはマレー半島やセイロン島（現在のスリランカ）にも進出し、その流れを汲んで1543年に種子島に鉄砲が伝来されることになり、1557年にマカオに要塞を築き、東アジア進出の足場をつくった。一方、オランダは1610年ジャカルタにオランダ東インド会社（略称 VOC）の商館をつくり、香料貿易の独占をねらった。さらには香料諸島とも呼ばれ、大航海時代の到達目標にもなっていたモルッカ諸島をはじめ、他の島々に産する香辛料の利権と貿易の主導権を巡り、オランダ、イギリス、スペインなどの列国間で熾烈な争いが起こった歴史がある。

このように列国が競い、あい争ってまで香辛料を求める歴史があった中で、香辛料を産し、また日常生活における利用頻度が高いインド、スリランカとバングラデシュで、伝統的に利用される香辛料の種類、その用途と頻度に関して行った現地調査結果を報告し、考察を加えた。