

# Research Article

## Traditional Medicinal Knowledge in India and Malaysia

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### ABSTRACT

Chronic diseases like diabetes, arthritis, rheumatism, asthma can be treated using ointments, infusions and concoctions. In Asia many endemic, native and exotic plant species have been consumed or applied for centuries, constituting a repository of knowledge reported in old manuscripts or transmitted by traditional healers, wild species collectors and urban gardeners. This paper presents information about 338 different vegetable species gathered in two Indian settlements – Goa and Kochi – in Malacca, Malaysia, and on the subject of their consumption both as food and as medicine. The aim of the Portuguese Tropical Institute is to provide a catalogue of medicinal flora existent in urban gardens that might improve the health of the less wealthy as well as those who have faith in natural treatments and alternative medicines.

**Key words:** Biodiversity, Ethnobotany, Health, Nutraceuticals, Urban.

### INTRODUCTION

The Portuguese Tropical Institute is mandated to study former overseas territories where the Portuguese presence gave uniqueness to food and health habits, meaning those related to alternative therapies, through the consumption of medicinal herbs and herbal mixtures.<sup>1</sup> Most of these preparations are used against chronic health problems and mild diseases by the poor residents in the urban realm who do not possess financial resources to buy conventional drugs in the pharmacies. My previous research has focussed on Brazil, which was also a former Portuguese territory and other Latin American countries (Argentina, Chile, Cuba, Peru, Costa Rica, Uruguay, and Mexico), where the Spanish colonisation left its imprint, under the framework of the theory of the three globalisations, that claims the Renaissance expansion of both Iberian peoples to have been the first globalisation process led in History.<sup>2,3</sup>

### MATERIALS AND METHODS

Asian fieldwork was initiated in the Kerala port of Kochi, in India, which was Portuguese during the early colonisation period, 1500-1662; then continued with the Malaysian city of Malacca, where the Portuguese have remained for 130 years; and finalised with Goa, the smallest Indian state, that was part of Portugal from 1510 to 1961. Examination of the plant species consumed in the 16<sup>th</sup> and 17<sup>th</sup> centuries was the first step of the research process, involving archival assessment of manuscripts focusing on food and therapeutic flora consumption. Some of these manuscripts were printed/reprinted in modern times because of their cultural, historic and scientific value.<sup>4-7</sup> The second step of the research consisted of surveys about current traditional medicinal knowledge (TMK), using data collection in situ, so as to provide a catalogue of medicinal flora existent in urban gardens and other sources, such as herb markets and Ayurvedic medicine practitioners, that might improve the health of the less wealthy as well as those who have faith in natural treatments and alternative medicines.

Data collection procedures utilized the personal narratives of 120 informants from three focus groups:

1. Urban gardeners and peri-urban farmers, totalling seventy (70);
2. Formal and informal herb traders, which

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amounted forty-six (46); 3. Ayurvedic medicine doctors, traditional medicinal knowledge practitioners and massage therapists, four in total (4), all from India. No data was gathered in this third focus group in Malacca. The sample questionnaire used for each one of the focus groups was similar to the data-gathering technique described in previous work.<sup>8-12</sup> The field-research was conducted in two cities (Kochi and Malacca) and one state (Goa) of 2 Asian countries (Malaysia and India) in 2013 and 2014, as stated.

TMK information obtained in face-to-face interviewing is presented in Table 1. The names of one-hundred-seventy-one (171) plant species were listed by botanical identification (family, gender and species), in alphabetical order. Local vernacular names for the plant species were also included, in Hindi, Malayalam (Kochi), in Konkani (Goa), and Malay languages (Malacca), besides the common English designation. The plants collected were identified using the Missouri Botanical Gardens norm,<sup>13</sup> the plant part and the method of preparation, per location researched, were added. The fruits, the staples, tubers and herbs solely consumed as food are not displayed in the table.

However, several nutraceuticals, most of them fruits, will be discussed in detail because of their recognised value in disease prevention. Additionally, some native species are part of herbal mixtures traded in dried portions or even in capsules, in herb pharmacies and supermarkets. They are also detailed in this paper because of their high availability, low price and extensive usage in the surveyed countries. They are regularly recommended in Ayurvedic treatments, also in Malacca, that possesses a community of Tamil immigrants. The same is valid for the Chinese settlers and their herbal mixtures and traditional Chinese medicines, traded in local establishments by their own pharmacists.<sup>14</sup> In fact, both the Indians (originally from actual state of Gujarat) and the Chinese travelled to Malacca long before the Portuguese. Nevertheless, current contribution focuses mainly the simples (single species medicines), making further chemical and pharmacological assessment of the plant species listed more viable.

## RESULTS AND DISCUSSION

The number of medicinal species recorded during field-work totaled 338, although there is a good array of plants common to the three urban environments field researched (Table 1). The top ranking species are consumed against respiratory diseases (26.3%), ranging from colds, flu, to cough and catarrh. Anti-asthmatic plants are separated from this category and amount to seven (4.09%). They

are: Beleric myrobalan, liquorice, sacred holy basil (tulsi), basil, long pepper, Thai eggplant, and pushkarmool. All these species are Asian natives.

Usually, respiratory ailments use simples but there are herbal mixtures prepared, either to be consumed in infusion or in concoction, or in syrups and Ayurvedic capsules. Simples are plant species used alone.

- The simples include mostly native species, such as: Asiatic pennywort (Brahmi), night-flowering jasmine, vasa and neem leaves; the flower of chrysanthemum (Malacca); the fruits of chebolic myrobalan and bitter gourd (to be eaten, in Goa); and the root of liquorice (chewed in Kochi).
- Anti-fever species are consumed whenever necessary, like the fruits of beleric myrobalan, the seed of fenugreek, and the leaf of basil, an anti-malarial.
- Exotic flora is consumed in India as in Malaysia, namely cashew and mint. Cashew was introduced in India by the Portuguese, between 1563 and 1578, as it was not listed in the earlier herb<sup>7</sup> but it was mentioned<sup>15</sup> the alcoholic drink distilled from the fruit is good for blood circulation, cough and colds.
- Herbal mixtures involve such extreme-orient species as the rhizomes of dog-strangling vine, pinellia, ginseng, umbilicaria; the bulb of fritillaria, the roots of stemona, pushkarmool and the Chinese bell flower; the flower of scarlet cordia and the wooden sticks of sappan lignum. Less complex domestic prescriptions include Indian turmeric root, lime and honey to ease cough, recommended in Goa.

The second category of plants (20%) includes sedatives and anti-stress therapies

- They are simples, herbal mixtures, and capsules of Ayurvedic preparations available in herb pharmacies and markets. The herbs are ingested in infusions and concoctions and the preferences are: sacred and vana tulsi, as well as brahmi leaves; coriander, cumin and anise seeds; Indian snakeroot, ginger, ginseng and katuki; the flowers of clitoria and jasmine; arjuna bark and gulvel stems.
- Body oils are regularly applied both in Ayurvedic treatments and in extreme-oriental therapeutics (Thai, Malay and Chinese). The long lists of plant species, rarely simples, are combined in energizing, relaxing or body-shaping massages. Those oils are extracted from native ylang-ylang and neelkamal flowers and the leaf

**Table 1: Medicinal Plants of Malaysia (2013) and India (2013-2014)**

Plant species per FAMILY	Common name (Local name)	Plant part	Method of preparation per location (K, G, M)
<b>ACANTHACEAE</b>			
<i>Asteracantha longifolia</i> (L.) Nees	Kokilaksha	Seed	Used in male geriatrics against loss of libido together with others (G).
<i>Adhatoda vasica</i> Nees	Vasa	Leaf	Herbal remedy against cough, colds and bronchitis (G).
<i>Strobilanthes crispus</i> (L.) Bremek	(Pecah kaca)	Leaf	Anti-cancer, anti-oxidant, anti-diabetic and anti-ulcerogenic (M).
<b>AMARYLLIDACEAE</b>			
<i>Allium cepa</i> L.	Onion	Bulb	Fried it is applied as anti-inflammatory and analgesic (K).
<i>Allium sativum</i> L.	Garlic	Bulb	Spice. Also combined as part of a fungicide (K). Consumed against colds, skin problems and digestive disorders (G).
<b>ANACARDIACEAE</b>			
<i>Anacardium occidentale</i> L.	Cashew	Fruit	Squeezed into alcoholic drink, good for blood circulation, cough and colds (G).
<i>Mangifera indica</i> L.	Mango (Am, Amra Parni)	Bark	The bark is recommended against diabetes together with other plant species (G).
<b>ANNONACEAE</b>			
<i>Cananga odorata</i> (Lam.) Hook. f. & Thomson	Ylang-ylang	Flower	Used to make relaxing body oil (M).
<b>APIACEAE</b>			
<i>Apium graveolens</i> L.	Celery	Bulb	Spice (K, G).
<i>Centella asiatica</i> (L.) Urb.	Asiatic pennywort (Brahmi)	Leaf	Ingested in infusions for weight loss. Also traded in capsules because it enhances memory, and relieves mental stress (G). Consumed against catarrh (M).
<i>Coriandrum sativum</i> L.	Coriander	Seed, Leaf	Spice. Anti-cough and anti-fever (K). Cooked as spice. It is also consumed as digestive, against allergies and hay fever. The leaf has good effects in liver problems (G). Herbal supplements against fatigue (M).
<i>Cuminum cyminum</i> L.	Cumin	Seed	Spice (K, G). Herbal supplements against fatigue (M).
<i>Foeniculum vulgare</i> Mill.	Fennel	Seed	Chewed after meals. Spice (K, G). Carminative infusions (M).
<i>Pimpinella anisum</i> L.	Anise	Seed	Herbal supplements against fatigue (M).
<i>Trachyspermum ammi</i> (L.) Sprague	Ajowam (Yavanika)	Seed	Weight reduction species (G).
<b>APOCYNACEAE</b>			
<i>Catharanthus roseus</i> (L.) G. Don	Periwinkle (Sadabahar)	Leaf, White flower	Infusion to control diabetes (K). Chewed or in infusion to control diabetes (G).
<i>Cynanchum stauntonii</i> (Decne.) Schltr. ex H. Lévl.	Dog-Strangling Vine	Rhizome	Chinese herbal medicine against cold and cough (M).
<i>Gymnema sylvestre</i> (Retz.) R. Br. ex Schult.	Cowplant (Gimnema, Gudmar)	Leaf	Consumed against diabetes type 2 (G).
<i>Hemidesmus indicus</i> (L.) R. Br. ex Schult.	Indian sarsaparilla (Sariva)	Root	Infused against kidney stones and urinary tract infections. Traded in mixtures in Ayurvedic medicine. It is also used to wash the hair, against dandruff (G).
<i>Nerium indicum</i> Mill.	Oleander (Arali)	Leaf	Spice used in rice for being digestive (K).
<i>Rauwolfia serpentina</i> Benth.	Indian Snakeroot (Sarpagandha)	Root	Consumed as heart tonic, to lower blood pressure and promote restful sleep. Traded in herbal mixtures for infusion (G).

<i>Tabernaemontana divaricata</i> (L.) R. Br. ex Roem. & Schult.	Crape-Jasmine ( <i>Nandiyarvatta</i> )	Flower	Conjunctivitis. Mixed with cumin seed it is applied against itching and skin ulcers (K).
<b>ARACEAE</b>			
<i>Pinellia ternata</i> (Thunb.) Ten. ex Breitenb.	Pinellia	Rhizome	Chinese remedy against cough and cold (M).
<b>ARALIACEAE</b>			
<i>Panax ginseng</i> C.A.Mey	Ginseng	Root	Consumed against heart diseases. It also relieves mental stress, combating insomnia and irritability. It is part of an herbal remedy against cough (M).
<b>ARECACEAE</b>			
<i>Areca catechu</i> L.	Betel-nut ( <i>Kamugu, Bitel, Supari</i> )	Nut	Chewed with <i>Ocimum sanctum</i> to control diabetes. Digestive (K). Masticatory to strenghteen the teeth together with paan (G). Chewing wrapped by betel leaf prevents halitosis (M).
<i>Cocos nucifera</i> L.	Coconut ( <i>Thengu</i> )	Fruit	Skin burns and herpes. Mixed with aloe it is applied to the hair against scalp problems (K). Coconut juice cleans the completion (G). Used to make healing oil (M).
<b>ASPARAGACEAE</b>			
<i>Asparagus adscendens</i> Roxb.	Musli <i>Safed musli, Safed Musali</i>	Shoot	Used as syrup in male geriatrics against loss of libido together with others (G).
<i>Asparagus racemosus</i> Willd.	Indian Asparagus ( <i>Shatavari</i> )	Shoot, Root	Used in Ayurvedic medicine to improve hormonal balance, post partum bleeding, insufficient lactation. It is diuretic too (G).
<b>ASTERACEAE</b>			
<i>Achillea multiflora</i> Hook.	Yarrow	Flower	Used in anti-stress body oil (M).
<i>Chrysanthemum</i> sp.	Chrysantemum	Flower	Infusions against hypertension, colds, for detoxifying and improving eyesight (M).
<i>Inula racemosa</i> Hook. f.	Pushkarmool	Root	Strong antihistaminic and anti-allergic species. It has cardio protective action and expectorant property. Anti-asthmatic infusion (G).
<i>Matricaria chamomilla</i> L.	Chamomile	Whole plant	Analgesic (K). Infusion for stress relief (G). Component of oils used in relaxation massages (M).
<i>Stevia boliviensis</i> Sch. Bip. ex Griseb.	Stevia	Leaf	Used to sweeten instead of sugar in case of diabetes (G).
<i>Tagetes erecta</i> L.	Marygold	Flower	Ear infection. Haemorrhoids (K).
<b>BIGNONIACEAE</b>			
<i>Jacaranda mimosifolia</i> D. Don	Jacaranda	Bark	Used to treat wounds and dermatitis. In traditional medicine the root is consumed against syphilis (G).
<b>BORAGINACEAE</b>			
<i>Cordia sebestena</i> L.	Scarlet Cordia ( <i>Bohari</i> )	Flower	Infused against urinary incontinence, malaria, cough, catarrh, and venereal diseases (G).
<i>Symphytum officinale</i> L.	Confrey	Root	Used to make healing soaps (M).
<b>BRASSICACEAE</b>			
<i>Lepidium sativum</i> L.	Garden cress ( <i>Chandrashoor</i> )	Whole plant	Consumed to strengthen the bones (G).
<b>BROMELIACEAE</b>			
<i>Ananas comosus</i> (L.) Merr.	Pineapple	Fruit	Digestive fruit cultivated in the gardens (G). Consumed for its anti-tumour effects (M).
<b>CAMPANULACEAE</b>			
<i>Platycodon grandiflorus</i> (Jacq.) A.	Chinese bell flower	Root	Part of Chinese herbal remedy against cough and cold (M).

**CAPRIFOLIACEAE**

<i>Nardostachys jatamansi</i> (D. Don) DC.	Nard, Spikenard ( <i>Jatamansi</i> )	Flower	Constituent of heart tonic used in traditional medicine (G).
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**CARICACEAE**

<i>Carica papaya</i> L.	Papaya	Fruit, Leaf	The leaf is anti-cancer (K). Digestive fruit (G). Nutraceutical used to make healing soaps (M).
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**CLUSIACEAE**

<i>Garcinia gummi-gutta</i> Choisy	Butter Tree ( <i>Gambooge, Kokum</i> )	Fruit	Spice. Purging, digestive it is also consumed for weight-loss (K).
<i>Garcinia mangostana</i> L.	Mangoosteen	Fruit	Used to make skin healing creams (M).

**COMBRETACEAE**

<i>Terminalia arjuna</i> (Roxb. ex DC.) Whight & Arn.	Arjuna	Bark	Used to lower blood pressure, as anti-depressive concoction, and to induce sleep (G).
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Beleric Myrobalan ( <i>Bibhitaki</i> )	Fruit	Digestive, antiasthma, antipyretic and expectorant (G).
<i>Terminalia catappa</i> L.	Indian almond ( <i>Badam</i> )	Nut	Oil is used to soften the skin together with <i>Prunus dulcis</i> (G).
<i>Terminalia chebula</i> Retz.	Chebulic Myrobalan ( <i>Haritaki</i> )	Fruit	Digestive fruit consumed in mixtures together with others, to ease cough, colds, bronchitis. Also ingested with salty water against constipation (G).

**CUCURBITACEAE**

<i>Citrullus lanatus</i> (Thunb.) Matsum & Nakai	Watermelon	Fruit	Nutraceutical with diuretic properties (M).
<i>Curcuma longa</i> L.	Indian turmeric ( <i>Haldi</i> )	Root	Spice. Applied to the skin as antiseptic. Together with honey it is ingested against abdominal pains. It is anti-inflammatory. The root with honey and lime eases cough (G). Used as spice and includes herbal mixtures against catarrh (M).
<i>Coccinia grandis</i> (L.) Voigt	Ivy Gourd ( <i>Tendli</i> )	Fruit	Vine cultivated in the gardens and consumed for its nutritious value and to lower sugar (G).
<i>Momordica charantia</i> L.	Bitter Gourd ( <i>Karela, Punan</i> )	Fruit	Digestive, analgesic, anti-cough and anti-inflammatory vine (G).

**CUPRESSACEAE**

<i>Cupressus lusitanica</i> Mill.	Cyprus	Stems, Leaves	Used in energizing, purifying and body shaping massage oils (M).
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**CYPERACEAE**

<i>Cyperus rotundus</i> L.	Java grass ( <i>Motha</i> )	Tubers	Used for joint pain together with other herbs (G).
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**EUPHORBIACEAE**

<i>Juniperus oxycedrus</i> L.	Cade	Wood	Applied to the skin as essential oil together with neem to cure eczemas, and also with lavender oil against psoriasis (G).
<i>Ricinus communis</i> L.	Castor oil plant	Seed	Used to make healing soaps and anti-inflammatory creams against itching and burns (M).

**FABACEAE**

<i>Acacia arabica</i> (Lam.) Willd.	Cassie ( <i>Babool</i> )	Bark, Fruit	Used to clean the teeth and against bad breath (G). The fruit is consumed to lower cholesterol (K).
<i>Acacia catechu</i> (L. f.) Willd.	Khair	Bark	Used together with others in dental care (G).
<i>Bauhinia variegata</i> L., .B. purpurea L.	Cow's Hoof (Mandara)	Leaf	The leaf is infused against diabetes (K, G).
<i>Cassia auriculata</i> L.	Tenner's Cassia ( <i>Tarwar</i> )	Fruit	Eaten to control sugar levels (G).

<i>Cassia senna</i> L.	Sen ( <i>Senna</i> )	Leaf	The species keeps stomach clear and helps prevent skin problems. Used to purge from ancient times (G).
<i>Caesalpinia pulcherrima</i> (L.) Sw	Peacock Flower	Bark, Leaf	Infusion of the leaf cures colds, fever, and skin ailments; it breaks kidney stones, heals malaria and bronchitis. The bark is beneficial against mouth ulcers (G).
<i>Caesalpinia sappan</i> L.	Sappan lignum	Wood	Part of a Chinese herbal remedy against catarrh (M).
<i>Clitoria ternatea</i> L.	Clitoria ( <i>Shankapushpi</i> )	Flower, Leaf, Root	Consumed against insomnia. Plasters of the leaf and root are rubbed against rheumatic pains (K).
<i>Delonix regia</i> (Roger ex Hook.) Raf.	Flame tree	Flower	Used against gynecological problems (G).
<i>Erythrina variegata</i> L.	Coral Tree ( <i>Badisa</i> )	Leaf	It cures cuts and rashes (K).
<i>Glycyrrhiza glabra</i> L.	Liquorice ( <i>Jyesthamadh, Mullathi</i> )	Root	Chewed against sore throat. It is part of Ayurvedic skin creams (K). It is the component of anti-asthmatic infusion. The root is used to rub and massage the teeth and gums. Combined with others is consumed in infusion against cough and colds (G). Part of a Chinese herbal remedy against cold and cough (M).
<i>Mimosa pudica</i> L.	Mimosa	Seed	The oil is rubbed in healing body massages (K).
<i>Mucuna prurita</i> Wight	Kapikachu	Aerial part	Against loss of libido. Tonic for male geriatrics (G).
<i>Peltophorum pterocarpum</i> (DC.) Backer ex K. Heynes	Golden flamboyant	Bark	Used to make a lotion against eye troubles. Also applied against muscular pains (G).
<i>Pterocarpus marsupium</i> Roxb.	Indian Kino Tree ( <i>vijay sar</i> )	Wood	Consumed in herbal mixture to control diabetes (G).
<i>Pueraria tuberosa</i> (Roxb. ex Willd.) DC.	Indian kudzu ( <i>Vidarikand</i> )	Tuberculated Stem	Male tonic. It is part of Ayurvedic herbal mixture to recover libido and recommended against premature ejaculation (G).
<i>Saraca indica</i> L.	Ashoka tree ( <i>Ashok Sal</i> )	Bark	Used in traditional medicine against uterine bleeding, menopausal disturbances and leucorrhoea (G).
<i>Trigonella foenum-graecum</i> L.	Fenugreek ( <i>Methi</i> )	Seed	Spice. It is used to relief constipation, to lower cholesterol and blood sugar levels. It is analgesic (K, G), digestive (K), anti-fever, anti-cough (G).
<b>GENTIANACEAE</b>			
<i>Gentiana kurroo</i> Royle	Katuki	Root	Natural sedative with anti-stress activity. Used against viral infections, for its strong liver and kidney functions. It is usually sold in capsules together with Krishna tulsi in order to strengthen the immune system (G).
<i>Ophelia chirata</i> Griseb.	Chiraita	Leaf	It purifies the blood and keeps it toxin free for better skin conditioning (G).
<b>GERANIACEAE</b>			
<i>Geranium</i> sp.	Geranium	Flower	The oil is applied in healing massages, particularly body shaping and energising therapies (M).
<b>IRIDACEAE</b>			
<i>Crocus sativus</i> L.	Saffron	Flower	Spice also used to beautify the skin (G). Applied against skin affections (K).
<b>LAMIACEAE</b>			
<i>Lavandula stoechas</i> L., <i>Lavandula officinalis</i> Chaix	Lavender	Flower	Used in drops as sedative, against back and neck pains. Also applied to wounds, burns, acne, and inflammation topically or in healing baths (G). Used to make relaxing oils and soaps (M).
<i>Leucas aspera</i> (Willd.) Link	Medicinal Dondokolash ( <i>Thumba</i> )	Leaf	Analgesic rubbed against ant bites. Ingested against cough (K).
<i>Mentha arvensis</i> L.	Mint	Herb	Part of a Chinese herbal remedy against cough and cold (M).

<i>Mentha x piperita</i> L.	Peppermint	Leaf	Consumed in digestive infusions. Spice (G). Used to make skin healing oils and creams. It is part of a Chinese remedy against pimples, skin rashes and bruises (M).
<i>Ocimum basilicum</i> L.	Basil ( <i>Ramathulasi</i> )	Leaf	Digestive concoctions (K). Analgesic (earaches), anti-pyretic, anti-malarial and, when crushed with honey, the leaf cures bronchitis, alleviates bites and reliefs asthma (K, G).
<i>Ocimum gratissimum</i> L.	Vana Tulsi	Leaf	Infused together with <i>Ocimum sanctum</i> in relaxing mixtures. Consumed with others in capsules for arthritis relief (G). Consumed in digestive decoctions. Applied to the skin together with <i>Leucas aspera</i> , to solve ant bites. Ingested against flu, the fresh leaf or in infusion (K).
<i>Ocimum sanctum</i> L.	Sacred Holy Basil ( <i>Tulsi, Tulasi, Krishna Tulasi</i> )	Leaf	Eaten raw, in infusion or concoction against cough, throat infections (K, G) and asthma (G). Anti-diabetes and diarrhoea (K). Chewed against bad breath. Applied to the skin as wound healing and anti-septic. It improves blood circulation and helps improve shine on skin. Together with others makes relaxing infusion. The flower may be added to coffee or boiled in water against colds. The oil plus honey purifies the blood and resolves kidney infections (G). Eaten against diabetes. The concoction is consumed for detoxifying, three times a day. Concoction of the leaf further cures back pains. The infusion is recommended in the morning against stomach problems (M).
<i>Origanum majorana</i> L.	Marjoram	Leaf	Used to make relaxing body oils (M).
<i>Orthosiphon aristatus</i> (Blume) Miq.	Cat's Whisker	Leaf	Consumed in teas good for kidney problems (M).
<i>Plectranthus amboinicus</i> (Lour.) Spreng.	Indian Borage ( <i>Panikoorka</i> )	Leaf	Analgesic, anti-fever, anti-cough and anti-flu (K).
<i>Plectranthus barbatus</i> Andrews	Indian Coleus	Leaf	Consumed in infusion against cough and sore throat (M).
<i>Pogostemon cablin</i> (Blanco) Benth.	Patchouli	Leaf	Used to make body shaping oils and perfume (M).
<i>Rosmarinus officinalis</i> L.	Rosemary	Whole plant	Used to make healing body oils (M).
<i>Thymus vulgaris</i> L.	Thymus	Whole plant	Used to make body healing oil (M).
<b>LAURACEAE</b>			
<i>Cinnamomum camphora</i> (L.) J. Presl	Camphor	Leaf	Oil applied against rheumatic pains (G). Used to make creams and healing oils (M).
<i>Cinnamomum zeylanicum</i> Blume	Cinnamon ( <i>Kayumanis, Dalchini</i> )	Bark, Leaf	Ingested with honey prevents heart attacks, and in infusion it controls cholesterol (K). Spice. Oil extracted from the bark is applied against rheumatism, arthritis and muscular pains. Leaf infusion lowers cholesterol (G). Also used to make anti-inflammatory creams against itching and burns (M).
<i>Persea americana</i> Mill.	Avocado	Fruit	Nutraceutical also used to make soaps, creams and skin oils, because of its healing properties (M).
<b>LILIACEAE</b>			
<i>Fritillaria cirrhosa</i> D. Don	Fritillaria	Bulb	Part of an herbal remedy against cough and cold (M).
<b>LYTHRACEAE</b>			
<i>Punica granatum</i> L.	Pomegranate ( <i>Dalimb</i> )	Fruit	Used to make toothpowder together with others (G). Used to make skin-healing soaps and creams (K, M).
<b>MALVACEAE</b>			
<i>Sida acuta</i> Burm. f.	Common wireweed ( <i>Khurunthotti</i> )	Leaf	Squeezed it is ingested against fever and flu (K).

**MELIACEAE**

<i>Melia azederach</i> L.	Neem, Pride of India ( <i>Vepu maram</i> )	Leaf, Fruit	Chewed against diabetes. Applied against smallpox and other skin diseases. Mixed with <i>Curcuma longa</i> it is rubbed against itching. Fresh leaf is used against lice and the infusion against flu (K). The oil is applied as anti-septic against dandruff. Together with cade and lavender oils it cures psoriasis. Mixed with cade oil it cures eczemas in 3 months. The fruit is eaten to control diabetes. The leaf is boiled and the concoction cures boils and rashes. It purifies the blood and resolves gout together with others in Ayurvedic mixture. In syrup also cures colds and flu (G). Eaten against diabetes. The concoction is consumed for detoxifying (M).
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**MENISPERMACEAE**

<i>Tinospora cordifolia</i> (Wild.) Miers ex Hook. & Thomson	Gulvel	Stem	Used as heart tonic, to lower blood pressure, against depression. Also against bleeding gums. Consumed in capsules together with <i>Phyllanthus niruri</i> and amalaki to lose weight (G).
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**MORACEAE**

<i>Artocarpus integer</i> Merr, A. <i>heterophyllus</i> Lam.	Jack Tree ( <i>Plavu</i> )	Fruit	Consumed against dysentery (K).
<i>Ficus religiosa</i> L., F. <i>carica</i> L.	Figs ( <i>Arasu</i> )	Fruit	Consumed against menopause troubles and against haemorrhages (K).

**MORINGACEAE**

<i>Guilandina moringa</i> L.	Drumstick tree ( <i>Sahijan</i> )	Stick	Used to strengthen the bones (G).
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**MYRISTICACEAE**

<i>Myristica fragrans</i> Hoult.	Nutmeg, Mace	Nut, Fruit outer part	Spice (K, G). Ingested against stomach aches. Nutmeg mixed with water is applied against wrinkles or to the forehead against headaches. Ingested with honey it is analgesic and digestive (K). The nut is crushed and added to water to resolve diarrhoea, particularly in case of children. Infused in lemon juice it is applied in case of joint pains, and rheumatism (G). The flesh is used against dysentery. The oil is calming balm (M).
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**MYRTACEAE**

<i>Eucalyptus</i> sp.	Eucalyptus	Leaf	Oil used to moisturize and heal the skin, particularly in relaxing body massages (M).
<i>Eugenia cumini</i> (L.) Druce	Jambolan ( <i>Jamun</i> )	Fruit	Sedative fruit appreciated in Goa. Digestive, anti-inflammatory, against stomachaches (G).
<i>Syzygium aromaticum</i> (L.) Merr. & L.M. Perry	Clove	Flower	Chewed improves bad breath. Pressed it is applied to the forehead against headaches (K). Spice (K, G). The oil is effective against toothaches. It can be used as insect repellent, too (G).

**NYCTANGINACEAE**

<i>Boerhaavia diffusa</i> L.	Red Spiderling ( <i>Punarnava</i> )	Root	Diuretic and renal regenerative, used in hepatic and urinary tract infections (G).
<i>Bougainvillea spectabilis</i> Willd.	Bougainvillea	Flower	Consumed in tea to control sugar levels (G).

**NYMPHAEACEAE**

<i>Nymphaea stellata</i> Willd.	Sinhalese Nil Mahanel ( <i>Neelkamal</i> )	Flower	Anti-stress and digestive tract friendly plant. Traded in capsules together with ashwagandha, vana tulsi, and katuki against low immunity, chronic viral infections and chronic fatigue (G).
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**OLEACEAE**

<i>Jasminum sambac</i> (L.) Aiton	Jasmine	Flower	Ingested in sedative scented infusions, sometimes with Krishna and vana tulsi, ginger and chamomile (G).
<i>Olea europaea</i> L.	Olive tree	Leaf	Body oils (M).
<i>Myxopyrum serratum</i> A.W.Hill.	Indian Jasmine ( <i>Chaturamulla</i> )	Leaf	Applied to skin problems as anti-septic (K).
<i>Nectanthes arbor-tristis</i> L.	Night-Flowering Jasmine ( <i>Rath K'Rari</i> )	Leaf	The juice together with honey relieves cough and expels intestinal worms (G).

**OXALIDACEAE**

<i>Averrhoa carambola</i> L.	Star fruit	Fruit	Consumed against cough (K).
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**PASSIFLORACEAE**

<i>Passiflora edulis</i>	Passion Fruit	Fruit	It lowers blood pressure (K).
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**PEDALIACEAE**

<i>Sesamum indicum</i> L.	Sesame (Til )	Seed	The oil is applied against skin troubles in Ayurvedic medicines. When chewed it fortifies the gums and strengthens the teeth (K). Consumed to strengthen the bones, for its rich calcium supply. Also used as spice (G).
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**PHYLLANTHACEAE**

<i>Emblica officinalis</i> Gaertn.	Indian gooseberry ( <i>Amalaki, Amla</i> )	Fruit	Antioxidant, lowers blood pressure, improves vision, mild laxative, anti-ulcer (G).
<i>Phyllanthus niruri</i> L.	Stonebreaker	Whole plant	The plant is used to make kidney stone breaking teas (G, M). The powdered leaf is added to milk and consumed cold against jaundice (M).

**PLANTAGINACEAE**

<i>Plantago ovata</i> Forssk	Blond Psilium ( <i>Isabgol</i> )	Leaf	Irritable bowel syndrome and constipation (G).
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**PIPERACEAE**

<i>Piper betle</i> L.	Betel vine ( <i>Sirih, Paan</i> )	Leaf	Used to wrap areca nut and other hallucinogenic mixtures, supposedly good for the teeth (K, G, M).
<i>Piper longum</i> L.	Long Pepper ( <i>Pippali</i> )	Seed	It is used to relief cough and as expectorant. It is also traded in capsules together with bibhitaki, Krishna tulsi and pushkarmool against asthma (G).
<i>Piper nigrum</i> L.	Black Pepper ( <i>Lada Hitham</i> )	Seed, Root, Leaf	Grained pepper is anti-fever. The leaf is inhaled against bronchial congestion (K). Used against constipation (G). Spice. The root is anti-fever (M).

**POACEAE**

<i>Cymbopogon citratus</i> (DC.) Stapf	Lemongrass	Aerial part	Digestive infusion alone or mixed with others (K). Infusion against cough and colds. Also used as spice. The oil is applied to open pores, against acne, and as skin tonic. Two drops of oil plus ten of almond oil are useful against depression (G). Used as spice in Malaysia and to make soap for its skin healing effects (M).
<i>Vetiveria zizanioides</i> (L.) Nash	Vetiver ( <i>Ramachan</i> )	Root, Aerial part	Consumed against diarrhoea and fever (K). Used to make healing soap (M).

**POLYGALACEAE**

<i>Polygala tenuifolia</i> Willd.	Polygala	Root	Used in Chinese remedy against cough and cold (M).
<i>Rheum emodii</i> Wall.	Rhubarb ( <i>Revand Chini</i> )	Root	Purifies the blood, improves liver function and promotes cell repair (G).

**ROSACEAE**

<i>Eriobotrya japonica</i> (Thunb.) Lindl.	Loquat	Leaf	Used in Chinese remedy against cough and cold (M).
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<i>Fragaria</i> sp.	Strawberry	Fruit	Nutraceutical consumed against hypertension (M).
<i>Malus sylvestris</i> Mill	Apple	Fruit	Together with honey cures depression (G).
<i>Prunus dulcis</i> (Mill.) D.A. Webb.	Sweet Almond	Fruit	Used to make appreciated body oil (M).
<i>Prunus mume</i> (Siebold) Siebold & Zucc.	Ume plum	Fruit	Digestive and analgesic fruit, also consumed in pickle (M).
<i>Rosa moschata</i> Mill.	Rose hip	Flower	Used to make healing oils and soaps (M).
<i>Rosa</i> spp.	Rose	Flowe	The oil of the petals of rose is used in healing massages (M).
<b>RUBIACEAE</b>			
<i>Morinda citrifolia</i> L.	Noni	Fruit and Leaf	Diuretic fruit (K). Used to make skin healing and relaxing creams (M).
<b>RUTACEAE</b>			
<i>Aegle marmelos</i> (L.) Corrêa	Golden apple, Holy fruit (Bilwa, Vilvan)	Fruit	Consumed as anti-dysenteric (K).
<i>Citrus aurantiifolia</i> (Christm.) Swingle	Lime	Fruit	The juice is ingested fresh in the morning for weight loss, without sugar but sometimes with honey (G).
<i>Citrus x aurantium</i> L.	Petigrain	Leaf, Flower	Used to make oils used in relaxation massages (M).
<i>Citrus x bergamia</i> Risso & Poit	Bergamot	Fruit	Used to make soap (M).
<i>Citrus limon</i> (L.) Burm. f.	Lemon	Leaf, Fruit	Used in energising and body shaping massage oils. The juice of the fruit is added to home remedies (M).
<i>Citrus reticulata</i> Blanco	Mandarin	Fruit and Leaf	Part of a Chinese remedy against cough and cold. The leaf is used to make relaxation oils for body massages (M).
<i>Citrus x sinensis</i> (L.) Osbeck.	Sweet Orange	Fruit, Leaf, Flower	Nutraceutical. Used to make healing oils (M).
<i>Murraya Koenigii</i> (L.) Spreng.	Curry tree ( <i>Kariveppela</i> )	Fruit and Leaf	Spice (K, G, M). Chewed leaf resolves cough and lowers cholesterol (K, G). The leaf is also chewed against diabetes. The oil is rubbed to strengthen the gums, against toothache. When applied to the skin it is insect repellent (G). A handful of leaves are eaten in order to improve vision. The fruit and the leaf are boiled in water and recommended once a week against diabetes and hypertension (M).
<b>SAPOTACEAE</b>			
<i>Mimusops elengi</i> L.	Spanish cherry (Bakul)	Bark	Used in dental care (G).
<i>Vitellaria paradoxa</i> C.F. Gaertn.	Shea Butter	Nut	Component of anti-inflammatory body oil (M).
<b>SANTALACEAE</b>			
<i>Santalum album</i> L.	White Sandalwood Tree ( <i>Sandhanam</i> )	Seed	Used to make soaps and healing oils (M).
<i>Santalum spicatum</i> (R. Br.) A. DC.	Australian Sandalwood	Leaf	Used in relaxing body massages (M).
<b>SAXIFRAGACEAE</b>			
<i>Bergenia ligulata</i> Engl.	Pashanbhed	Root	Consumed against urinary tract diseases, kidney stonebreaker (G).
<b>SCHISANDRACEAE</b>			
<i>Illicium verum</i> Hook. f.	Star Anise (Saunf, Thakkolam)	Seed	Consumed in carminative decoction after meals (G, K).
<b>SIMAROUBACEAE</b>			
<i>Eurycoma longifolia</i> Jack	( <i>Petala Bumi</i> )	Root	Mixed with other plant species as an herbal supplement against fatigue (M).

**SIMMONDSIACEAE**

*Simmondsia chinensis* (Link) C.K. Schneid. Jojoba Seed Used to make relaxing body oil (M).

**SYMPLOCACEAE**

*Symplocos racemosa* Roxb. Lodhra Bark Used to improve hormonal balance. It is also used in dental care (G).

**SOLANACEAE**

*Solanum tuberosum* L. Potato Tuber Raw it is applied against burns (K).

*Solanum xanthocarpum* Schrad. & J.C. Wendl. Thai eggplant (*Khantakari*) Fruit Consumed against asthma attacks (G).

*Withania somnifera* (L.) Dunal Ashwagandha Root Antioxidant, anti-stress, prevents cancer (G).

**STEMONACEAE**

*Stemona sessilifolia* (Miq.) Miq. Stemona Root Part of an herbal remedy against cough and cold (M).

**THEACEAE**

*Camellia sinensis* L. Green Tea Leaf Infusion against cold and headaches (G). Consumed for weight-loss (M).

**UMBILICARIACEAE**

*Umbilicaria esculenta* (Myoshi) Minks Umbilicaria Rhizome Used in Chinese herbal medicine against cough and colds (M).

**VITACEAE**

*Cissus quadrangularis* L. Bone Setter (*Harjor, Changalam-paranda*) Shoot, whole plant Consumed against haemorrhoids, osteoporosis and bone fractures (K). Consumed in capsules to strengthen the bones. Also to lower cholesterol and blood glucose levels, as anti-inflammatory, analgesic and antioxidant. It is consumed for weight-loss (G).

*Vitis vinifera* L. Grape Seed Used to make soaps and healing creams (K, M).

**ZYGOPHYLLACEAE**

*Tribulus terrestris* L. Bullhead (*Gokshur*) Fruit Used against urinary tract infections and kidney stones (G).

**ZINGIBERACEAE**

*Alpinia galanga* (L.) Willd. Greater Galangal Root Spice. Consumed in herbal supplements against fatigue (M).

*Curcuma longa* L. Indian Turmeric Root Skin affections, in plasters against bruises. Powdered is applied to skin rashes as anti-septic (K).

*Curcuma zedoaria* (Christm.) Roscoe Zedoary Root Consumed in herbal supplements against fatigue (M).

*Elettaria cardamomum* (L.) Maton var. major and minus Cardamom Seed, leaf Spice (G, K), in the varieties green and white. Also ingested in infusion for weight-loss. The crushed seed boiled in water improves memory. Powdered seeds are boiled in water against depression (G).

*Zingiber officinale* Roscoe Ginger Root Mixed with others for weight-loss (K). Consumed in relaxing concoction. Also ingested against cough, colds, indigestion, arthritis and circulatory problems (G). Consumed in herbal supplements against fatigue, in herbal remedies against flu and cough, in healing oils applied in energising massages (M).

**XANTHORRHOEACEAE**

*Aloe vera* (L.) Burm. f. Aloe (*Kattarvazha*) Sap The sap is used to heal skin rashes, burns, lesions (K, G.). It is also ingested for heart diseases, and applied to the scalp to eliminate dandruff and beautify the hair. The gel is traded for its anti-wrinkle property and to promote hair growth (G). Used to make healing creams, the sap is applied to the skin as anti-septic and as healing balm. Ingested with water as digestive and analgesic, against stomach aches, and also as preventive of digestive tract diseases (M).

and flower of petit grain chamomile, lavender and mimosa flowers from Europe,<sup>16</sup> the leaf of Australian eucalyptus, and the universal lemongrass, common to all tropical environments. The Chinese community prefers the oils extracted from mandarin leaves and jojoba seeds, in Malacca.<sup>17</sup>

Plants applied in all sorts of skin ailments are next (18%), particularly those species used against rashes, bruises, burns, itching episodes (ant or mosquito bites), but also cuts and boils, wounds and more serious lesions. Most of these species are anti-septic plants, for external usage, only. Examples are

Indian turmeric and comfrey roots; sacred, vana tulsi and basil, Indian jasmine, coral tree leaves; Jacaranda bark, native liquorice root, and mangoosteen fruit. They further include exotic noni and coconut fruits (Pacific island species); American avocado and potatoes. Castor oil is another occurrence, a Mediterranean species already mentioned in the Bible.<sup>18,19</sup> These simples are directly applied to the affected skin or used as balms, oils, creams and healing soaps.

Aloe sap is squeezed alone or combined in herbal mixtures, in frictions or plasters, in all urban environments, as it is widely gardened.

Garlic is cooked or eaten to improve any possible skin disease, in Goa.

In India, there are aqueous extracts of native Asian flora (chiraita, neem, sacred tulsi, revand chini and sena) ready to be ingested in drops, alone or in water, against pimples and red skin. In both studied countries there is a good array of herbal mixtures to beautify and heal skin diseases of any sort. It is important to stress that some of these TMK ointments are domestic prescriptions transmitted from generation to generation, such as the application of *Leucas aspera* and *Ocimum gratissimum* against ant bites, recorded in Kochi. Some mixtures include exotic plant species, namely the ones diffused by Portuguese navigators in Asia. Mediterranean Rosehip (*Rosa moschata*), sweet almonds, rosemary, cade, and peppermint are good examples of preferred healing body oils.

Plants consumed against digestive diseases rank fourth (13.5%). The kattarvazha sap (aloe) was consumed during Renaissance.<sup>4-7</sup> Then the preferred species was *Aloe succotrina* All, also a biblical plant. These days Aloe vera is the most commonly used, ingested with water as digestive and digestive diseases preventive in Malacca. Ginger root is also recommended against indigestion. Star anise concoctions and fennel carminative infusions are the normal preference, and the seeds of fennel are also chewed

after meals in India. There is a good number of fruits that possess digestive properties – the nutraceuticals – such as beleric and chebulic myrobalan, the watermelon, jambolan, and the ume plum. Exotic Portuguese imports are the pineapple and the papaya; both are gardened species in India, these days, the last being preferred, with 30% occurrences in Goa and 24% in Kochi.

Medicinal flora consumed for circulatory problems and against heart diseases rank fifth (10.5%), closely followed by the analgesic plants (10%), anti-inflammatory, anti-rheumatic, anti-arthritic species (9.4%) and the natural sugar regulators, consumed by diabetic patients (9.4%). Table 1 provides extensive usages and gives evidence of the plant parts applied or ingested by the interviewed. The bone setter (*Cissus quadrangularis*) deserves special mention. In India, it is recommended to lower cholesterol and blood glucose levels, as well as for its anti-inflammatory, analgesic and antioxidant properties. The nard flower, a biblical heart tonic,<sup>20,21</sup> is consumed in Goa for this purpose. The curry tree leaf and fruit, boiled in water, are consumed once a week against diabetes and hypertension. In all the researched gardens the omnipresence is the periwinkle, because the white flower and the leaf are infused or chewed against diabetes. However, in Malacca they prefer the dried chrysanthemum flowers, against hypertension and for detoxifying.

Ranking ninth in order of usage, we list fourteen species used to strengthen the gums and the teeth, some of which were consumed during Renaissance, namely the betel-nut wrapped in the leaf of betel vine. All urban environments researched by the IICT maintain this usage.<sup>10-12</sup> There is controversy about these plants among biology and pharmacological experts, though, because betel-nut is a strong hallucinogenic and might provoke cancer.<sup>22</sup> In Kochi the sesame seeds are also chewed to strengthen the teeth and gums. In Goa they prefer the friction of clove oil in the gums.

Urinary tract diseases and sexual enhancement plant species rank tenth (6.4%) and eleventh (5.8%), respectively, most of them consumed in India, recommended in Ayurvedic treatments. We emphasise the consumption of two species, in Goa: the Ashoka tree bark used to resolve uterine bleeding, and menopausal disturbances,<sup>23</sup> gokshur is a fruit consumed as diuretic and to break kidney stones. In Malacca watermelon is consumed for its diuretic properties and strawberries to lower blood pressure.

Weight-loss flora is the next most frequently used (5.3%) and includes cardamom seeds and leaves, followed by the

already mentioned anti-asthmatic preferences. Hepato-protective species rank fourteenth, namely revand chini (rhubarb) that is also consumed in herbal preparation for skin disorders.<sup>24</sup> Plants recommended to lower cholesterol are rare, (4 species), yet we list the consumption of babool fruits in Kochi and the leaf of cinnamon, in infusion, in Goa. Cinnamon is a millenary medicinal and culinary plant, which includes several species, namely *Cinnamomum zeylanicum* and *C. cassia* Blume, but the Ceylon species is the preference<sup>8,20</sup> It appears mentioned in the earliest Chinese herbal, around 2700 BCE.<sup>25</sup>

## CONCLUSION

Malacca is located near the Equator (2° N). Kochi and Goa have littoral locations, built in tropical humid environments (10° and 15° N). Therefore, it is quite natural that all the researched urban settlements possess biodiverse gardens, where fruit trees, spices and medicinal bushes flourish. In India the most abundant plant species is native Krishna tulsi, used in Hinduism for prayer and as medicine. The Lamiaceae has 30 occurrences in Kochi and<sup>26</sup> in Goa, meaning 75% of and 58% of the gardeners grow the herb, respectively. Fruit culture ranks first in Goa (39.3%), but second in Kochi (24%) and Malacca (32%), where the sample accounted for 100 different taxa. Because the Malaysian survey prioritised trade, the most consumed plant registered was ginger, used as spice, against respiratory ailments, fatigue and applied in energising massages, in the form of oil.

This observation leads us to the second conclusion: spices are used for therapeutic purposes which are also

referred to in the old manuscripts examined.<sup>4-7</sup> Thus, they can be added in a single group and they rank first in Kochi and in Malacca. From a total of 88 taxa documented during fieldwork in Kochi, only cardamom and cumin were not used as medicines. The third conclusion is that most fruits gardened or traded are nutraceuticals, meaning they also have dual applications as food and medicine. In fact, fruits constituted the first and most important plants introduced by the Portuguese colonisers, in Renaissance times, from America and from Europe. This is because the ships followed the Cape of Good Hope sea route, which frequently obliged them to visit Brazilian ports, in order to get the most favourable winds.<sup>26</sup>

The early diffusion of flora around the world was the consequence of the long sea routes that both Iberian Peninsula navigators had to overcome, so as to get the spices from remote locations where they were produced and transport them back to Europe. The paper presents evidence of a good number of exotic medicinal vegetable species integrated in India and in Malaysia. The IICT claims this process to have been the first globalisation, initiated in the 15<sup>th</sup> century; followed by the Dutch and the British, two centuries later; and by the Americans that lead the current globalisation, the third in Western History.<sup>2</sup> The preferences in consumption of medicinal flora evolved through times. Indeed some vegetable species that were mainly used to purge, a common therapeutics during Renaissance, lost their commercial value. However, we stress that the interviewed prefer Asian medicinal plants and the exotic fruits.

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