

Health Potential of Thai Traditional Beverages*

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Abstract

Thai people have, over the centuries, adapted their living conditions in the hot and humid tropics through their housing, clothing, food and beverages. Traditional beverages, the subject of the present paper, have played an important role, not only in quenching the thirst, but also in providing healthy therapy for everyday ailments.

This paper discuss the health potential of Thai traditional beverages (or 'Nam' in Thai). It considers the preparation and techniques involved in making these beverages. These include infusion, decocting, concocting, expression and exudation, among others.

The paper then describes a range of Thai traditional beverages, including "Nam Krachiep Daeng" and "Nam Kek Huai" from tropical flowers; "Nam Thapthim", "Nam Noina" and "Nam Makham" from tropical fruits; "Nam Takhrat", "Nam Toei Hom", "Nam Bua Bok" from tropical plant leaves; "Nam Oi" from sugar cane; "Nam Maphrao" from coconut fruit; and "Nam Tan Maphrao" by tapping the inflorescence of the coconut.

The juices from leaves and the vines of the purple-flowered variety of "Rang Chuet" and the boiled leaves of the same plant, for example, are considered an antidote to some forms of chemical poisoning, as well as in lowering blood sugar levels. From roots and rhizomes beverages can be made into "Nam Khing" (ginger), "Nam Rak Bua" (lotus), "Nam Ya Faek" (vetiver), which have health effects ranging from fever reduction to bile and gall bladder treatments.

Through the use of traditional and local wisdom and knowledge of local tropical plants, the Thai people, since ancient times, have developed effective methods of preparing traditional beverages with healthy and refreshing properties.

1. Introduction

Living in the climate with hot weather almost all year round, Thai people have adjusted their living conditions by various means through their housing, clothing, food and beverages. The latter, the subject of this paper, has played an important role, not only in quenching the thirst, but also in providing medical therapy for ailments, many symptoms of which do not need major medication. By drinking herbal teas or herbal drinks, for example, these symptoms can disappear. Herbal juices and herbal milks made from

various local plants contribute to the nutrition of the people, in addition to their normal refreshing action.

It should be noted at the outset, that the term "herb" is used here to mean at least three different things. One is the commonly understood term which is synonymous with medicinal plant; the second is the leafy or non-woody parts of plant containing flavoring ingredients used for culinary purposes; the last simply means vegetation, although botanically speaking, it means a non-woody plant which dies down every year.

2. Preparation Methods of Thai Traditional Beverages

Through the use of traditional and/or local wisdom and local plants, Thai people

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since ancient times have invented several methods of herbal preparations, to make health beverages for remedying certain symptoms, either as refreshing drinks, or for other purposes. Among these preparation methods are:

2.1 Infusion (*in-* = in + *fundere* = to pour)

2.1.1 Definition: The liquid extract that results from steeping a plant material in water or adding a plant extract to boiled water, similar to making tea. The resulting extract is known as an 'infusion'.

2.1.2 Preparation: Pour boiling water over dried plant material and allow it to steep for a period of time. In such cases, plant material and the water are not boiled together. Time of steeping is important, for many of the desired components are not water soluble. For example, in the case of chamomile where much of the desired activity is present in the volatile oil, even a prolonged steeping of ten minutes extracts only about 10 to 15% of the desired components (Roberts *et al.* 1996). The products are known as beverage tea or *tisane*.

2.2 Decocting (*de-* = down + *coquere* = to cook)

2.2.1 Definition: Extracting the essence, flavor, etc. of a single plant part by boiling. The resulting extract is known as 'decoction'.

2.2.2 Preparation: Put a plant or its parts in water, bringing the mixture to a boil, and allowing it to simmer for a period of time. The liquid is then cooled and strained for use, normally by drinking the decoction, but sometimes the decoction can be used to mix with other ingredients. Examples are boiled coffee and most herbal drinks.

2.3 Concocting (*con* = together + *coquere* = to cook)

2.3.1 Definition: Extracting the essence, flavor, etc. by boiling many plant parts together. The resulting extract is known as 'concoction'.

2.3.2 Preparation: Put various ingredients in water, bringing the mixture to a boil, and allowing it to simmer for a period of time. The liquid is then cooled and strained for use.

2.4 Expression (*ex-* = out + *premere* = to press)

2.4.1 Definition: Pressing or squeezing out by pressure or other mechanical means of a plant material resulting in juice or other extract. The resulting extract is known as 'expression'.

2.4.2 Preparation: Pass the plant material through a pressing apparatus or by squeezing the plant material by mechanical mean, then collect the juice of extract and strained for use.

2.5 Exudation (*ex-* = out + *sudare* = to sweat)

2.5.1 Definition: Sugary sap passed out in drops through pores, an incision, etc., of a plant part through the force of root pressure (as in toddy) or stem pressure (as in maple syrup). The resulting extract is known as 'exudate'.

2.5.2 Preparation: Incision of palm inflorescence results in the oozing of sap (toddy) dropping into cylindrical container, or insertion of a tube into the phloem results in the oozing of syrup.

3. Preparation of Thai Traditional Beverages

In olden days, Thai people prepared health beverages in traditional ways, which were laborious and time consuming. In the modern world, people nowadays have less time to prepare these traditional beverages, thus the habit of drinking such beverages is disappearing from among city folk. It is very satisfying that a revival of the importance of drinking traditional beverages has been taking place in Thailand through the introduction of modern technology. As more and more people are "returning to nature", drinking traditional beverages is becoming more widespread since it has several advantages over coffee, tea, or soda pop,

which are popular drinks of our present society.

There are many kinds of Thai traditional beverages, some of which contain alcohol, which are not considered particularly healthy to drink, thus are being excluded from this paper. There are many types of Thai traditional beverages based on the methods of preparation listed in Section 2 above. Certain types required more than one method of preparation. Originally, they were prepared at home, based on primitive types of equipment, now non-existent. Even if they did still exist, they are too laborious to be used at present. Thus, all types of Thai traditional beverages described below are prepared by the use of modern equipment.

3.1 Herbal Drinks

These are drinks flavored with herbs, adding pleasant flavor and/or fragrance as well as certain medicinally active compounds. Traditional herbal drinks are made by pounding fresh herbs; other ingredients such as sugar, salt, etc. may be added to give specific taste. Among the popular healthy Thai traditional herbal drinks are:

A. From the Flowers:

3.1.1 Roselle Drink or 'Nam Krachiep Daeng': Roselle or "Krachiep Daeng" (*Hibiscus sabbdariffa*) is a tropical plant of wide distribution. It is related to a fibre crop, kenaf (*Hibiscus sabbdariffa* var. *altissima*).

The calyx and epicalyx of the flower of roselle (*Hibiscus sabbdariffa*) is high in contents of vitamin C and B complex, both are indispensable for human growth, well-being and resistance to infections. It can be used to make jam, jelly, as well as herbal drinks. Its juice is used to reduce high blood pressure, to activate digestion and keep the intestines in good condition, to boost resistance to colds and similar infections, and even to prevent cancer. Some of the properties of roselle, but not the reputed last one, have been tested.

The method of making roselle drink includes to wash roselle calyx, strain, pour into a pot, boil, putting roselle calyx in, boil until

red color develops and the calyx is softened, filter out calyx, place the liquid on a hot plate and boil; add sugar, salt, simmer until sugar dissolves; take the pot off the heat, cool down; bottle and keep cool in the refrigerator.

Roselle drink is good for decreasing body temperature, alleviation of thirst, treatment of fatigues, biliary diseases, reduces painful or difficult urination (Saralamp *et al.* 1996; Farnsworth and Bunyapraphatsara 1992).

3.1.2 Chrysanthemum Drink or 'Nam Kek Huai': Chrysanthemum or "Kek Huai" (*Chrysanthemum indicum*) is related to the ornamental chrysanthemum and has similar botanical features except for its medicinal property. The ingredients include dried chrysanthemum flowers, seeds of Chinese plum (*Ziziphus jujuba*) and sugar. Wash the dried chrysanthemum flowers and place them in pot with water, bring them to the boil for five minutes; add sugar to taste. The resulting liquid is pale yellow. To obtain a more attractive color, add seeds of Chinese plum and boil until the color is bright yellow. Serve hot or cold.

Chrysanthemum drink is used as medication for stomachic, alterative, laxative, vertigo, fever, headache, hypertension and phlegmon (ITTM n.d.; WHO 1990).

3.1.3 Safflower Drink or 'Nam Dok Kham Foi': Safflower (*Carthamus tinctorius*) is an annual plant with orange-yellow coloured flowers whose dried part, when infused in hot water, makes safflower drink.

Safflower drink is a cardiac tonic, nerve tonic, blood tonic, emmenagogue, alterative, hypercholesteremic (Saralamp *et al.* 1996; Farnsworth and Bunyapraphatsara 1992).

B. From the Fruits

3.1.4 Pomegranate Drink or 'Nam Thapthim': Pomegranate (*Punica granatum*) is a much branched shrub with reddish orange flowers which turn into reddish brown or blackish purple globose fruits whose pulp can be used to make drinks by boiling with water. The content is then allow to pass through muslin cloth; boil for 5 minutes. Syrup and salt

are added to make a perfect blend of sweet, sour and salty taste.

Pomegranate drink contains high amounts of vitamin C, phosphorus, and calcium and is used as mild laxative, cardiac tonic and refreshing drink (ITTM n.d.)

3.1.5 Sugar Apple Drink or 'Nam Noina':

Sugar apple (*Annona squamosa*) is a small-sized tree with round fruits covered with round knobs, easily separable. A white, custard-like, sweet, granular pulp surrounding the small, glossy black seeds is edible. After extracting the seeds out, it can be made into a sugar apple drink by using the blender and adding syrup and salt.

Sugar apple drink is high in vitamin C, phosphorus and calcium. It is a refreshing drink.

3.1.6 Tamarind Drink or 'Nam Makham':

Tamarind tree (*Tamarindus indica*) is native to tropical Asia including Thailand. Its pods contain a sour pulp that is used in the kitchen to add flavor and taste to the dishes as well as to make a refreshing beverage. For the latter, traditionally, the following ingredients are used: 200 g of fresh pulp, 500 g of sugar, 2 tablespoonfuls of salt, and 3 L of water. Wash the pulp and put in the pot, pour water and place on the hotplate, stir until boiling; remove the pot from the heat. Filter, and pour the filtrate into the pot; place the pot on the heat once again; after boiling, add sugar, salt, and stir until both are dissolved. Allow to boil for a while, and remove from the heat. Allow to cool, filter into the bottle and keep in the refrigerator. Place ice cubes into a glass, pour tamarind filtrate onto the ice and use as a refreshing drink. A modern version would contain less sugar and salt.

Tamarind drink is used for improvement of menstrual blood quality, treatment of constipation, coughs, as a laxative, expectorant, enema, carminative, and blood tonic (Farnsworth and Bunyapraphatsara 1992).

3.1.7 Lime Drink or 'Nam Manao': Lime (*Citrus aurantifolia*) is native to Thailand. It is one of the most important ingredients in Thai cooking. Its sour taste is different from lemon and is unique. It is indispensable to Thai

cuisine. No other sour-taste sources can replace lime. Its juice is squeezed from fruit cut in half or quarters and is added to most dishes. Adding lime juice to a glass of water with sugar or honey to make it sweet, results in a sweet and sour refreshing drink.

3.1.8 Carambola Drink or 'Nam Mafueang':

Carambola (*Averrhoa carambola*) is a small-sized tree bearing five prominent ribs on cross section, with light yellow color fruit. To make carambola drink, its mature fruit is sliced and put in the blender together with syrup, salt and boiled water. Served chilled or with ice.

Carambola drink is expectorant, diuretic and is used to dispel stagnant blood (Saralamp *et al.* 1996).

3.1.9 Longan Drink or 'Nam Lamyai':

Longan (*Dimocarpus longan*) is a sub-tropical, medium-sized fruit tree with globose brownish yellow fruits whose dried pulp, after removal of seeds, can be used to make longan drink. Longan drink is made by putting the dried pulp in water and allow to boil for 5-10 min, then sugar is added. Serve chill or with ice.

Longan drink is useful for the treatment of neurasthenia, insomnia, amnesia and mental deficiency (WHO 1990), and as neurotonic, (ITTM n.d.).

3.1.10 Mulberry Drink or 'Nam Luk Mon':

Thai people have used mulberry (*Morus alba*) leaves to feed silk worms from time immemorial. Its fruit is sweet with a pleasant flavor and aroma. It can be used to make fruit drink by boiling in water with sugar.

Mulberry drink is good for anemia and dysopia. Syrup made of ripe fruits serves as a mouth wash in cases of sore throat and ulcerous stomatitis (WHO 1990).

3.1.11 Native Apricot Drink or 'Nam Bui':

Native apricot or "Bui" (*Prunus mume*) is subtropical fruit tree related to apricot of the temperate zone. Its fruit is either pickled with salt for use in steaming of fish, or dried with syrup. The pulp of the pickled fruit can be made into drink by boiling with sugar.

It is used as emmenagogue (ITTM n.d.).

3.1.12 Bael Fruit Drink or 'Nam Matum': Bael fruit tree (*Aegle marmelos*) is a member of the Aurantioides, the citrus subfamily. Its fruits are oval in shape, about the size of mango, with a hard shell outside. In making 'Matum Drink', the fruit is cleaned and grilled over the fire until the fragrance is released. Boil the water. Then put the grilled fruit into it, and simmer for 30 min. until the flavour and colour come out into the water. Remove the fruit, add sugar and stir to dissolve. Allow to cool and serve chilled or with ice. If served hot, there is no need to put sugar.

Bael fruit drink is antidiarrhoeal, and if consumed after meal, it helps in indigestion, and is a mild laxative (Anon. n.d.).

C. From the Leaves:

3.1.13 Lemongrass Drink or 'Nam Takhrai': Lemongrass (*Cymbopogon citratus*) is one of the most common culinary herbs for Thai cooking. The ingredients used include the leaves and false stem (made up of leaf sheaths) that have been chopped into small pieces. They are either boiled together with sugar, or put in the blender.

Lemongrass drink is diuretic for dysuria patients who do not have a swelling problem (Saralamp *et al.* 1996), for stomach discomfort (Farnsworth and Bunyaphatsara 1992), carminative, diuretic (Anon. n.d.).

3.1.14 Asiatic Pennywort Drink or 'Nam Bua Bok': Asiatic pennywort (*Centella asiatica*) is a creeping herb with long stolon and rosette, reniform leaves. The fresh whole plant can be used to make a drink by putting in the blender with water and syrup. It is excellent to quench thirst, and treatment of sore throat; it is antipyretic, diuretic and antidiarrhoeal (Saralamp *et al.* 1996); cardiac tonic, anti-dysentery, and blood purifier (Farnsworth and Bunyaphatsara 1992).

3.1.15 Aloe Drink or 'Nam Wan Hang Chorakhe': Aloe (*Aloe barbadensis*) is a short-stemmed herb with densely rosette succulent leaves whose mucilage is used extensively in Thai traditional medicine, especially for burns, sunburn, radiation burns, wound and eczema.

Aloe drink can be prepared by selecting a large leaf, peel off the outside layer and wash of the yellow latex. Put in the blender with boiled water, sieve through a muslin cloth and add syrup to taste.

It is used as antipyretic, laxative, diuretic (Farnsworth and Bunyaphatsara 1992).

3.1.16 Thunbergia Drink or 'Nam Rang Chut': The juices from the leaves and the vines of the purple-flowering variety of 'Rang Chut' (*Thunbergia laurifolia*) and the boiled leaves generate the desired effects as antidote to chemical poisoning. It also lower blood sugar levels (Anon. 1995). It is antipyretic and detoxificant (Saralamp *et al.* 1996).

3.1.17 Aromatic Screw Pine Leaf Drink or 'Nam Bai Toei': Aromatic screw pine (*Pandanus odoratus*), a dwarf pandanus with fragrant leaves, is commonly used in making Thai desserts. The ingredients used include the leaves which have been chopped into small pieces, fresh or dried and sugar. Boil the water and put the leaves in it, keep covered for 5 minutes, then filter through muslin cloth. Discard the leaves. Put brown sugar and stir until dissolves. Filter once more and the liquid is ready to drink with ice or chill.

Aromatic screw pine drink is a refreshing drink and is a cardiac tonic (Anon. n.d.).

D. From the Root/Rhizome:

3.1.18 Ginger Drink or 'Nam Khing': Ginger (*Zingiber officinale*) is native to South East Asia and is one of the most common spices of trade from the Region. The ingredients include a few rhizomes (two cups) of not-so-old ginger (as old ginger will give a too-hot taste), 9 cups of water, and 1 ½ cup of sugar. Peel off the outer layer of the rhizomes, wash and pound until bruise. Place it in boiling water for a while then filter; add sugar into the filtrate to taste. Remove the content from the heat and pour into the bottles. Sterilize for 20-30 min. After cooling, place the bottles in the refrigerator. Prolonged boiling results in the loss of essential oil, the main constituent for aroma and flavor of the ginger drink. Serve hot or cold.

3.1.19 Lotus Drink or 'Nam Rak Bua':

Lotus (*Nelumbo nucifera*) is a tropical aquatic plant with pink or white flower. When a flower is fertilized, a torus is formed embedding with numerous edible seeds. The underground (and also underwater) rhizomes are also edible. One preparation is to make a lotus drink by slicing the rhizomes and boiling in water. Sieve through muslin cloth, add sugar and keep boiling. This pink liquid is very refreshing to drink. It is used as antipyretic and alterative (IITM n.d.).

3.1.20 Vetiver Root Drink or 'Nam Ya Faek':

A handful of vetiver roots and leaves in equal proportion are boiled with four glasses of water until the liquid is concentrated to a quarter of a glass, it is taken as a herbal drink (Anon. 1996). Normally, vetiver root is used in the treatment to dissolve gallstones, reduce fever, and in treating diseases related to bile and gall bladder, and healing stomach discomfort.

3.2 Herbal Teas

Although Thai people do not drink as much tea (ordinary type from *Camellia sinensis*) as some other peoples of Asia, they are fond of drinking herbal teas made from fresh or dried herbs (leaves or other plant parts) infused in boiling water to enable the flavor to come out. It is believed that herbal teas also have medicinal properties, e.g. roselle tea, chrysanthemum tea, bael tea, lemongrass tea. (Note that the term 'herbal' is replaced by the kind of herb used when referred to a particular herbal tea). In fact it has been a traditional practice for the Thais of the olden days to prepare herbal materials for brewing into herbal teas. This is a heritage of the nation that has been adopted into their culture.

Thai people have their own methods of preparing their herbal teas. These include acquiring plant materials, drying, then boiling them, and after boiling, straining and imbibing. These are quite tedious processes, but nevertheless many people do them because of their beneficial effects.

Several herbs can be made into herbal tea, the same way Chinese tea is made. Although most teas are intended as refreshing drinks, some are particularly noted for their medicinal and soothing qualities. Chrysanthemum, ginger, roselle, tamarind, bael, lemongrass are good examples. Most are brewed in the same manner as ordinary tea and are taken either hot or cold with a little sugar. In addition, some herbs can add fragrance to conventional tea, like jasmine tea (which is a tea flavoured with dried jasmine flowers).

The benefits of herbal teas include being caffeine-free and containing no artificial colours, flavouring, or preservatives. But most important of all, in addition to being "natural", herbal teas are delightful, refreshing, health-promoting drinks. Some even claim to promote longevity, vigor, energy and memory

With the advance of technology of production, herbal teas can further be processed into powder form. It is hoped that producers of these herbal teas keep up with their advances in order to sustain the popularity of this natural heritage.

At present, many herbal teas have been manufactured, either at the cottage level or small- to medium-scale factories. There are at present about a score of factories producing herbal teas, mostly sold in domestic markets. They are available in two types, in the tea bags or powder form made by spray drying or by dehydrating with sugar and air drying (Chomchalow 1996a, 1998a), the preparation method of each is presented below:

Tea Bags: These are made by drying the herbs and fragmenting the material (normally leaves, but other parts like flowers, filaments, fruits, barks, or whole plants are also used) into coarse or fine particles, and packed into ordinary tea bags. The bags are then packed into a package of set quantities, normally 50 or 100 bags/package. The package is artistically designed and labeled with facts and figures of the contents.

Spray Drying: This is the result of advanced technology in which the decoction or concoction brewed from dried herb is spray-dried with special apparatus. The

resulting products are in powder or granular form, sometimes called “instant powder” and are advertised as “Instant Powder Drink”. The spray-dried tea is normally sealed into a small plastic bag, or a foil package to prevent moisture from entering the contents, or sachet with contents of about 5-20 g sufficient to make one cup (150 ml) of tea. Bottles are also used as containers for a larger quantity. Most products in Thailand have added sugar to suit the taste of Thai people, but others often complain that it is too sweet. In

preparing such tea for drinking, the contents of a packet, or 2-3 teaspoons of the powdered tea (if bottled), are placed in a cup and boiling water is poured onto it, stirred with a spoon; some can be dissolved in cold water.

There are about a score of herbal tea products available in the market. They are of two types, a single ingredient in which only one kind of herb is used, and a blend of many ingredients in which 2-5 kinds of herbs are mixed in certain proportion. Among the most popular of the former type are:

| Thai | Plant name | | Part used | Method* |
|------------------|---------------------|---------------------------------|--------------------|-----------|
| | English | Scientific | | |
| Matum | bael | <i>Aegle marmelos</i> | fruit | SD/AD |
| Khing | ginger | <i>Zingiber officinale</i> | rhizome | SD/AD |
| Fa Thalai Chon | - | <i>Andrographis paniculata</i> | whole plant | SD/AD |
| Kek Huai | chrysanthemum | <i>Chrysanthemum morifolium</i> | flower | SD/AD |
| Bua Bok | Indian pennywort | <i>Centella asiatica</i> | leaf | SD/AD |
| Takhrai | lemmongrass | <i>Cymbopogon citratus</i> | leaf | SD/AD |
| Toei Hom | aromatic screw pine | <i>Pandanus odoratus</i> | leaf | SD/D |
| Krachiep Daeng | roselle, hibiscus | <i>Hibiscus sabdariffa</i> | calyx and epicalyx | SD/AD, TB |
| Leng Chue | ‘Lingzhi’ | <i>Ganoderma lucidum</i> | mushroom | SD/AD |
| Rang Chuet | - | <i>Thunbergia laurifolia</i> | whole plant | TB |
| Thong Phan Chang | - | <i>Rhinacanthus nasutus</i> | whole plant | TB |
| Kham Foi | safflower | <i>Carthamus tinctorius</i> | filament | TB |
| Ya Dok Khao | - | <i>Vernonia cinerea</i> | flowering branch | TB |
| Bai Mon | mulberry | <i>Morus alba</i> | leaf | TB |

* AD = air dry, SD = sprayed dry, TB = tea bag

As for the blends with many ingredients, different producers have their own formulae as to the species and amount of each herb to be blended, e.g. blend of five ingredients, viz. Rang Chuet (*Thunbergia laurifolia*), Thong Phan Chang (*Rhinacanthus nasutus*), Kham Foi (*Carthamus tinctorius*), Ya Dok Khao (*Vernonia cinerea*), and roselle (*Hibiscus sabdariffa*), produced by the Friends of Nature Club, in a carton of 50 tea bags.

Preparation of Thai Traditional Herbal Teas

A. From the Flower:

3.2.1 Roselle Tea or ‘Cha Krachiep Daeng’: Details of the roselle plant and its properties have already been discussed in the

section on Roselle Drink (3.1.1). Roselle tea is prepared from its dried, ground calyx and epicalyx of the young flowers, either putting in a tea bag or spray dry.

3.2.2 Chrysanthemum Tea or ‘Cha Kek Huai’: Details of chrysanthemum plant and its properties have already been discussed in the section on Chrysanthemum Drink (3.1.2). Chrysanthemum tea is prepared from its dried flowers, either putting in a tea bag or sprayed dry.

3.2.3 Safflower Tea or ‘Cha Dok Kham Foi’: Details of the chrysanthemum plant and its properties have already been discussed in the section on Safflower Drink (3.1.3). Safflower tea is prepared from its dried flowers, either putting in a tea bag or sprayed dry.

B. From the Fruits:

3.2.4 Bael Fruit Tea or 'Cha Matum':

Processing bael tea is done by slicing the fruit cross-wise, using a sharp knife; each slice is dried in the sun until the pulp dries out. They are then further dried in the oven for 20 min until they become crispy. This crucial step makes the bael slices fragrant. The completely dried slices are then ground into fine particles, which are then packed into a normal tea bag.

In preparing bael tea, boiling water is poured into a cup with a bael tea bag and left for 2-5 min. Add sugar according to taste.

Bael tea is a refreshing drink with medicinal properties, including heart stimulant, infusion, antidiarrhoeal, and antidyenteric.

3.3 Herbal Milks

3.3.1 Soybean Milk or 'Nam Tao Hu': A water extract of soaked, ground, boiled mature soybean seeds, normally white in color, with characteristic, strong beany flavor; prepared by soaking soybean seeds overnight, grinding the soaked beans while adding small amounts of water. The resulting liquid is heated to boiling and then filtered to separate the milky liquid (i.e. soybean milk) and the residue (meal). Served as a refreshing drink, hot or cold. Sugar and other flavors may be added to taste, particularly to mask the beany flavor. Several new techniques have been invented to eliminate this undesirable flavor (Chomchalow 2000).

3.3.2 Young Rice Milk or 'Nam Khao Yakhu': This traditional drink is obtained by pounding the young rice inflorescence (at the milk stage), then add water and squeeze to remove the extract that is then passed through a sieve. Add sugar to taste.

3.4 Juices

Juice is another herbal beverage which is quite different from herbal teas and herbal drinks in that it is prepared differently, and is not only refreshing but also nutritious, since it is extracted from whole fruit (fruit juice) or other plant part (vegetable extract).

A. From the Fruits:

Normally fruit juices are marketed in pure form without adding other substances. They may be diluted, concentrated, or blended (with other juices) or with sugar added; they are then known as "Fruit Drinks".

3.4.1 Mandarin Juice: Mandarin or "Som Khieo Wan" (*Citrus reticulata*) is quite a common citrus fruit in Thailand. Its juice can be extracted from the fruit by squeezing the fruit cut into halves. Various recipes are known, one of which is to add a little bit of lime juice and sugar (ITTM n.d.). The juice, rich in vitamin C, is used as alterative, antiscobutic, expectorant (ITTM n.d.).

3.4.2 Orange Juice: Thai orange (*Citrus sinensis*) are quite different from other temperate-zone oranges in that its rind is green instead of orange. Many varieties are known, viz. 'Som Cheng', 'Som Tra'. 'Som Chuk', all of which contain juice in the pulp that can be squeezed out by the process similar to mandarin juice. Having high amount of vitamin C, it effects are the same as mandarin juice.

3.4.3 Pineapple Juice: Thai Pineapple or "Sapparot" (*Ananas comosus*) is very sweet and this has made pineapple canned products of Thailand very popular in the world market; such that Thailand ranks first in the world in terms of pineapple export products.

Pineapple juice is made by peeling off the rind, taking out the eyes and the core, and made into cubes. Using the muslin cloth, squeeze the juice off. Add sugar and salt, bring to boiling for 5 min. Allow to cool, then filter through muslin cloth. The juice is ready to drink, either by adding ice or keeping in the refrigerator.

Pineapple contains bromelin, and an enzyme for digesting protein. It is good as alterative, anthelmintic, and diaphoretic.

From the Stem:

In contrast to other plant stems, sugarcane (*Saccharum officinarum*) stem is not only juicy, but sweet and with distinct flavor

Thailand. At present Thailand is the largest producer of sugarcane and its main product, sugar, in Southeast Asia.

3.4.4 Sugarcane Juice: Thai people have traditionally used sugarcane juice since the olden days. This is done by passing a few canes through a home-made screw press a few times, each time the screw is tightened down in order to squeeze more and more such that at the end of about 3-4 passes, no juice is left. The juice obtained is passed through muslin cloth and the resulting juice is bottled and kept cool. Normally, sugarcane juice is consumed fresh, since the taste and flavor are best if consumed fresh. It is a refreshing drink with sweet taste and distinctive flavour and aroma. It helps in quenching thirst, and is said to stimulate the heart and cure certain fevers (ITTM n.d.)

3.5 Toddies

Toddy is a sweet aromatic sap exuded out, through root pressure, from the cut surface of the inflorescence of certain palm trees. The common toddies are obtained from the coconut or "Maphrao" (*Cococs nucifera*) and the sugar palm or "Tan" (*Borassus flabellifer*).

3.5.1 Coconut Toddy: Toddy tapping starts when the coconut palms are about five years old. Palms are selected to give a high concentration of sugar in the toddy, and for high yield, often as much as four liters per spathe each day. The inflorescence, thick and long, should grow regularly and frequently. Tapping is done from the unopened inflorescence when the second spathe emerges. When this spathe is 40 cm long, it is squeezed by hand to soften it and gradually pulled down and held in place with a string, so that eventually the toddy in the spathe can flow downward into a container. After six days the spathe should be in position for tapping. It is then cut about 6 cm from the tip. The sheath is peeled off, exposing the spikelets, which are tied with a string to keep it from expanding. A cylinder of bamboo or aluminum is attached to the cut end of the spathe to collect the sap which is oozing out. Toddy collection is made between 6 and 9 a.m. and again between 3 and

5 p.m. every day; about 3 mm of the spathe is cut off at every collection. A single spathe may be tapped for about one month. The toddy is prevented from fermenting by placing a small piece of bark of 'Khiam' (*Cotylobium lanceolatum*) or 'Phayom' (*Shorea floribunda*) in the collecting cylinder. The collected toddy is a ready-to-drink beverage once the bark and the inflorescence debris have been filtered out, but boiling is normally done to prolong its shelf life. Toddy has a unique aroma and flavor. It is one of the most refreshing and nutritious drinks around. Villagers sometimes prepare alcoholic beverage (known in Thai as *Nam Tan Mao*) from coconut toddy through fermentation (Chomchalow 1999).

3.5.2 Sugar Palm Toddy: Due to its naturally-grown status (not cultivated) with tall stature, sugar palm toddy is losing its significance in terms of commercial toddy production although the tapping process is similar to coconut toddy. It is mainly produced in Nakhon Pathom, Ratchaburi and Phetchaburi Provinces and sold along the roads to tourists as a refreshing beverage. Freshly obtained sugar palm toddy is to be boiled with a little salt, cooled, poured into a bottle and served cold. Its nice aroma makes drinking it most refreshing.

3.6 Coconut Water

Coconut water is the liquid endosperm of the coconut. It nourishes the young embryo during its early stage of development. It is clear, clean, mild sweet water that is stored in the large fruit cavity. Although both young and mature fruits contain water, only the young ones give better-tasting water. Thailand is unique in having many dwarf coconut varieties grown mainly for their young tender fruits whose water is consumed as a refreshing drink (Chomchalow 1999). The two most popular varieties are:

Nam Wan, a selection of a standard dwarf variety, *Musi Khieo*, bearing green small nuts with sweet water. It is mainly grown for its young tender fruits whose water is consumed as a refreshing beverage. On the average, the sweetness is in the range of 6.5-7.0°Brix.

Nam Hom, a mutant of *Musi Khiao* originated in Nakhon Chaisi District of Nakhon Pathom Province, south of Bangkok. It has a unique flavor and, especially aroma, in which no other coconuts in the world possess, although its water is not as sweet as the *Nam Wan* variety. It is by far the most common variety grown on a large scale in Thailand for both domestic and export markets of its young tender fruits.

In general, coconut water is used as a health beverage, especially in hot weather. Possessing a group of chemical compound known as kinetin, coconut water stimulates cell division, thus considered a beverage to stimulate the body.

4. Health Potentials

Traditional beverages have been used by the Thai people from time immemorial. Their health potentials are: (i) as medicinal remedies, and (ii) as health food supplements.

4.1 As Medicinal Remedies

Many Thai traditional beverages contain active ingredients used in folk remedies. These include, among others, the following: "Nam Rang Chuet" is used as antidote; Nam Wan Hang Chorakhe (aloe) as antipyretic, laxative, diuretic; roselle drink is good for the treatment of fatigues, biliary diseases, reduces painful or difficult urination, etc.

4.2 As Health Food Supplements

Nutritional benefits of health food supplements include giving the consumer a sense of health and well-being. Health food supplements are rich sources of nutritive elements that can benefit everybody. Their best use, however, is for prevention and maintenance, rather than for therapy. They can provide essential vitamins, minerals and other nutrients that will energize the consumers, make them feel good, and impart them with a sense of well-being. Many of the Thai traditional beverages can be classified as

health food supplements since they contain active ingredients that protect or promote health.

5. Discussion

5.1 Back-to-Nature Campaign

As more people are going 'back to nature', traditional beverages are gaining more popularity. This is evident by the numerous brands of traditional beverages available in the markets, many of which are packed in very attractive packaging materials, or in bottles, or other containers.

5.2 Marketing

Although several products are available in the market (e.g. instant powder, tea bag, concentrated syrup, tablet, etc.), yet they don't receive much attention from the public such that their sales volume is quite small. There is a need of a regional and/or national campaign for the people to drink these products. At the same time, makers of these products should have strict quality control, providing the listing of active ingredients, proper dosage, expiry date, how to prepare for consumption, etc.

The most important tactic is to design attractive packages and containers, using quality material (e.g. appropriate kind of paper for tea bag, aluminum foil for instant powder). In order to make them different from ordinary drink, they should be labeled as "Herbal Drink" which not only attains a higher price from the target consumer, but, in some countries at least, including Thailand, attracts less duty/tax than ordinary drinks.

Herbal Juices: Such products should be promoted since they are: (i) considered more wholesome than the popularly consumed carbonated soft drinks, (ii) refreshing with pleasant flavor and aroma as well as having medicinal properties, (iii) derived from plants originated within the country. They should be labeled "Fruit Juices" which not only attain higher price from the target consumers, but also attract less duty/tax than ordinary drinks.

5.3 Precautions

Most traditional beverages have added sugar to suit the taste of Thai people. Thus diabetics and those who are overweight or have high levels of cholesterol should be warned about the presence of sugar in a traditional beverage. The second precaution is that many products are losing their medicinal properties in a short time, unless certain pharmaceutical modifications have been made; hence expiry dates should be given. The third precaution is the lack of information regarding trade of traditional beverages and the means of access of these products. These constitute the major obstacles to their development.

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