



Organic Food Production and Food Additive Using Natural Resources: Nutritional and Health Benefits

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ABSTRACT

Nowadays organic food products are interesting topic in the modern society for the human health safety. It keeps an important role for nutritional value and health benefits rather than hybrid food production. The study was carried out to evaluate the organic food products by using organic means in fruit and vegetables from our own research data compared with different research data which included organic food additives and nutrient contents in food, fruits and vegetables. Organic farming is an agricultural system of organic plant production like fruit, vegetables and cereals that uses biofertilizers of organic origin such as compost manure, green manure and bone meal and places emphasis on techniques such as crop rotation, intercropping, cover crop, bark cutting technology, spacing and companion planting. The European Union, the United States, Canada, Mexico, Japan, and many other countries required producers to obtain special certification for food as organic according to their standards what were noted well and compared with our present research data. However, 100% organic food, at least 95% or more organic food, contains at least 70% organic and less than 70% organic ingredients standards certified by USDA were mentioned well in this study from different research data. Finally, it seemed that organic foods are more effective for the human health benefits.

Keywords: Organic food, fruit, vegetables, natural means, nutrition, health benefits.

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INTRODUCTION

Organic food is referred to the fresh or processed food produced by using organic farming methods. Organic food production is the process of growing without the use of synthetic chemicals, such as human-made pesticides and fertilizers. Organic foods include fresh produce, meats, and dairy products as well as processed foods such as crackers, drinks, and frozen meals. The market for organic food has grown significantly since the late 20th century, becoming a multibillion dollars industry with distinct production, processing, distribution, and retail systems [1].

Organic farming is an agricultural system of organic plant production like fruit, vegetables, cereals etc. that uses biofertilizers of organic origin such as compost manure, green manure and bone meal and places emphasis on techniques such as crop rotation, intercropping, cover crop, bark cutting technology, spacing and companion planting. It was originated early in the 20th century in reaction to rapidly changing farming practices. Organic food produced in following the organic farming is food produced by methods complying with the standards of organic farming. Standards vary worldwide, but organic farming features practices that cycle resources, promote ecological balance, and conserve biodiversity. Organizations regulating organic products may restrict the use of certain pesticides and fertilizers in the farming methods used to produce such products. Organic foods typically are not processed using irradiation, industrial solvents, or synthetic food additives[2].

In the 21st century, the European Union, the United States, Canada, Mexico, Japan, and many other countries require producers to obtain special certification to market their food as organic. Although the produce of kitchen gardens may actually be organic, selling food with an organic label is regulated by governmental food safety authorities, such as the National Organic Program of the US Department of Agriculture (USDA) [3] or European Commission [4].

Categories for organic labelling in organic food: As USDA, there are four different levels or categories for organic labeling: (A): 100% Organic: This means that all ingredients are produced organically. It also may have the USDA seal. (B): Organic: At least 95% or more of the ingredients are organic. (C): It is Made with Organic Ingredients: Contains at least 70% organic ingredients. (D): Less than 70% Organic

Ingredients: Three of the organic ingredients must be listed under the ingredient section of the label. Processed organic food usually contains only organic ingredients. If non-organic ingredients are present, at least a certain percentage of the food's total plant and animal ingredients must be organic (95% in the United States Canada, and Australia), USFD [5]. Foods claiming to be organic must be free of artificial food additives, and are often processed with fewer artificial methods, materials and conditions, such as chemical ripening, food irradiation, and genetically modified ingredients [5]. Pesticides are allowed as long as they are not synthetic. However, under US federal organic standards, if pests and weeds are not controllable through management practices, nor via organic pesticides and herbicides, "a substance included on the National List of synthetic substances allowed for use in organic crop production may be applied to prevent, suppress, or control pests, weeds, or diseases.

Organic food production procedure and technology: There are many methods, materials and technology for organic food production are well known by many research centers in USA, Europe, Canada, Australia, Asia and USDA which are given below:

1. Crop Rotation: The use of planned crop rotations that include forage legumes is the key means by which nitrogen is supplied to an organic system. The most effective of these legumes in most U.S. locations is alfalfa, though other species are also effective.

2. Cover Crops & Green Manures: Growing legumes as green-manure crops is another means of getting more biologically-fixed nitrogen into the rotation to support corn production. Green-manuring fell out of favor with farmers who could not afford to dedicate a full cash-crop season to this soil-improving practice. Fortunately, greenmanuring has been revived in recent years as new interplanting and off-season cover-cropping schemes have emerged. These allow the farmer to grow and use green-manure crops with minimal disruption to the cash-crop cycle.

3. Livestock Manures: Farms that produce livestock or are in proximity to confinement operations have the advantage of access to animal wastes that contain nitrogen, other major nutrients, and organic matter. The precise amount of nitrogen in manure varies considerably, depending on livestock species, feed formulation, and manure handling. Proper application and soil incorporation of fresh manures assures the maximum capture and delivery of nitrogen to the crop. Therefore, manuring is often done just prior to corn planting in crop rotations

4. Poultry manure: Chicken, duck, goose etc. manures (feces) are used as an organic fertilizer, especially for soil low in nitrogen. Of all animal manures, it has the highest amount of nitrogen, phosphorus, and potassium. Fresh chicken manure contains 0.5% to 0.9% nitrogen, 0.4% to 0.5% phosphorus, and 1.2% to 1.7 % potassium.

5. Bone meal: Bone meal is a mixture of finely and coarsely ground animal bones and slaughter-house waste products. Due to being rich in phosphorus and calcium. It is used as an organic fertilizer for plants for organic food production and as a nutritional supplement for animals. As a slow-release fertilizer, bone meal is primarily used as a source of phosphorus and protein [2].

6. Blood meal: Blood meal is a dry, inert powder made from blood, used as a high-nitrogen organic fertilizer and a high protein animal feed. N = 13.25%, P = 1.0%, K = 0.6%. It is one of the highest non-synthetic sources of nitrogen. It usually comes from cattle or hogs as a slaughterhouse by-product. Blood meal can be used as a livestock dietary supplement and is mainly added to supply dietary lysine for cattle, fish and poultry. Prior to use, it is sometimes mixed with molasses[6].

7. Shading: The net photosynthetic response to light for plants grown in shade was comparable to responses for plants grown in full sunlight without chemical fertilizer. Plants grown in full sunlight produced more biomass, tillers and leaves, and allocated a larger proportion of their total production to roots than plants grown in shade.

8. Mulching: The process of covering the open surface of the ground by a layer of some external material is called mulching & the material used for covering is called as 'Mulch. ' Mulching is usually practiced when cultivating commercially important organic crops, fruit trees, vegetables, flowers, nursery saplings, etc.

9. Bark cutting: Bark cutting called ring-barking, is the removal of the bark from around the entire circumference of either a branch or trunk of a plant for the development of fruit quality. It is an organic mean of producing organic food.

10. Composting: Composting is a mixture of ingredients used to fertilize and improve the soil for organic food production. It is commonly prepared by decomposing plant and food waste and recycling organic materials. The resulting mixture is rich in plant nutrients and beneficial organisms, such as worms and fungal mycelium.

11. Fish meal: Fish meal is a commercial product made from whole wild-caught fish, bycatch and fish by-products to feed farm animals, like poultry, and farmed fish.[1] Because it is calorically dense and cheap

to produce, fishmeal has played a critical role in the growth of factory farms and the number of farm animals it is possible to breed and feed [7].

12. Leaf extract: Leaf extract is used as biopesticide as organic mean of organic food production in lieu of chemical used. The olive leaf is a staple of the Mediterranean diet, which scientists study for its potential to prevent chronic diseases. Research points to lower rates of illnesses and cancer-related deaths among populations that follow this diet. The positive effect is due in part to the powerful and health-boosting benefits of the olive leaf. Olive leaf extract is a concentrated dose of the nutrients in olive tree leaves.

13. Pruning, light penetration and grafting: It was stated that trees were trained as slender spindle bush types and pruned branch were weighed after every pruning as organic means [8]. Flower bud percent was higher and fruit set percent was lower in inter-stock treated trees than in control. They also reported the results that the pruned shoot weight was higher in summer pruned than winter pruned trees. Leaf chlorophyll (SPAD value) was measured by Chlorophyll meter, SPAD-502. There was no difference in September but chlorophyll was higher in summer- pruned trees than winter-pruned trees in November. Fruit number/tree, and yield were lower in summer-pruned and winter-pruned trees. However, per fruit weight and maturity degree were higher in summer-pruned trees. Soluble solids content (SSC) of harvested fruit in the following season was greater and titratable acidity (TA) was lower in summer-pruned trees than winter-pruned trees. From the present results, it seems difficult to maintain the peach trees grafted on vigorous rootstocks as slender spindle bush type and increased the fruit nutrition (TSS) by winter pruning (Organic mean 2). Grafting involved the joining together of plant parts by means of tissue regeneration without hormone or chemical application as organic mean.

14. Fruit extract as organic means: Fruit extract can be used as biopesticide and antifungal component. Handal and olive fruits extract can be used as biopesticide for organic food production. Fruit Extracts are obtained from fruit juices and purees using modern spray drying technology. Powder Fruit Extracts are known to retain all of the originating fruits' nutrients and healthful qualities. Adding Powder Fruit Extracts to natural products enhances their viscosity, texture, and nutrient content. Fruit Extracts are praised for powerful anti-aging and rejuvenating properties making them enormously popular among natural cosmetic makers and cosmetic house giants as organic cosmetic. Fruits contain naturally occurring Alpha Hydroxy Acids that are powerful antioxidants.

15. Thinning: Thinning is the process of removing excess fruit, flower, leaf or root to improve plant growth, flower and fruit size and quality. Fruit thinning is carried out on apples, pears, plums, peaches, nectarines, mango etc. Root, leaf, flower and fruit can be thinned and produced organic food without using hormones or chemicals.

16. Hydroponic: Hydroponics (from the Greek words hydro (water) and ponos (labor) is a method of growing plants using mineral nutrient solutions either organic or inorganic, without soil. Hydroponics is often defined as the cultivation of plants in water. Research has since determined that many different aggregates or media support plant growth. Therefore, the definition of hydroponics has been broadened to read "the cultivation of plants without soil [9]. By hydroponic fruit, vegetable and some cereal crops can be produced as organic food using organic nutrients.

17. Inter-stock grafting for developing organic fruit: It was reported [8] that inter-stocks as organic means without hormone or chemicals was effective in dwarfing peach trees and organic fruit development. Branch weight was lower in inter-stock treated trees probably due to a suppression of mineral and photosynthate movement between shoots and roots the inter-stock. In addition, the inter-stock used in this experiment has been observed to have dwarf characteristics though it is not effective as a dwarfing rootstock. It was found that fruit color and TSS was higher in inter-stock treated than in control trees [10]. It was stated that several cultivars in mango (*Mangifera indica* L.) cv. Manila have been tested as inter-stocks showing tree size reduction as well as earlier initial fruit production but also a lower yield per tree [11]. It was reported that tree size was dwarfed when inter-stocks were used [12] and also reported [13] that growth in peach trees with inter-stocks was suppressed by about 20% in comparison with trees without inter-stocks.

18. Bark ring: It was stated [10] that the effect partial ringing cut one week as organic mean and partial ringing mid cut continuous on new shoot growth was recorded. Growth was lower in partial ringing mid cut one week and partial ringing mid cut continuous than control trees. However, the lowest shoot length was recorded in partial ringing mid cut continuous. There was a big difference in shoot length between control and partial ringing mid cut one week and mid cut continuous treated trees. Bark growth was measured for 12 weeks (May-August) to study the relationship between bark and shoot growth. In partial ringing mid cut continuous bark width remained 2mm, all plants withered due to the razor blade barrier which prohibited the cambial re-combinations. In partial ringing mid cut one week, bark width increased after the razor blade barrier was removed. The increase was slow in the beginning and later slowed down and stopped completely. The weight of shoot removed by winter pruning was measured for all

treatments. The lowest shoot weight was recorded in partial ringing mid cut one week treated trees. In mid cut continuous treated trees there was no shoot weight because all shoots were withered due to disconnection of cambial layer by razor blade.

19. Food additives and nutritive values from bougainvillea bract: Bougainvilleas are popular ornamental plants due to its colorful petal which bears a lot of pigment and used as indoor and outdoor flowers in most areas with warm climates, including Australia, India, Malaysia, the Mediterranean region, Mexico, South Africa, Taiwan and the United States in Arizona, California, Florida, Hawaii and southern Texas [14]. It can be used as organic food additives by applying organic materials and technology.

They also observed that TPC (Total phenol) and TFC (Total flavonoid) contents were clearly increased following growth regulator application compared to the organic means. For AOA 100ppm treatment, the highest phenol and flavonoid contents were recorded. The control and organic means had the lowest levels of phenols and flavonoids. As shown in the results the application of various growth regulators had significant effects on the anthocyanin and carotene. For phloem stress as an organic treatment, the highest amount of anthocyanin was observed. Antioxidant Content (DPPH) was measured in flower bract extracts affected by different growth regulators and organic means, as shown in results. It has been showed that the flower that treated with the polemic stress (Bark cutting) and 3% sucrose solution was exhibited the best results for the field. In comparison to other treated flower, flowers treated with bark cutting showed the highest number of flowers, low number of leaves, bigger size of bracts and highest fresh weight. Antioxidant, phenol content, anthocyanin, chlorophyll and flavonoid were found higher in AOA 100ppm and organic means (bark cutting) compared to the 3% sucrose and control treatments [15]. Therefore, from this research results it can be recommended that bougainvillea petal can be used as organic food additives.

20. Thinning technology for organic nutritional development and prosective food additives from hibiscus flower: Hibiscus flower plants can be an excellent source of natural antioxidants and can be effectively used in the food industry as a source of dietary supplements/food additives or as natural antioxidants to preserve the quality and improve the shelf-life of food products [16,17]

From the result, the control treatment showed the highest content of chlorophyll a, while GA3 treated flowers then organically treated like thinning and bark cutting (phloem stress) contained highest amount of chlorophyll b and carotenoid. This is why it can be recommended that hibiscus can be used as food additives for its containing pigments (Chlorophyll and carotenoid).

21. Nano size composting: Composting farm manure and other organic materials is an excellent way to stabilize their nutrient content. A significant portion of raw-manure nutrients are in unstable, soluble forms. Such unstable forms are more likely to run off if surface applied, or to leach if tilled into the soil.

Composting for plant growth and nutritional development: A mixture or composition of decaying organic matter from crop waste like leaves, straw, fruit waste and manure used to improve soil structure and provide nutrients is termed as composting. When these are used as nanosize particle called nanocomposting. Agricultural waste like fruit waste, crop waste like rice waste has been used for promoting composting and also nanocomposting can be done by using the same biomaterials following the nanosize particles preparation techniques.

Preparation of composting from rice straw and fruit and vegetable waste: Since rice straw contains few of the nutrients that the plant need, they are being used as organic fertilizer by in situ composting. Farm biomass recovery system shows that rice straw composting can improve soil fertility, reduce the need of chemical fertilizers, and increase yields to some extent. Based on the study, composting can be prepared by two (2) ways. One is in situ composting and the other one is rapid process composting [18].

In situ composting of rice straw is made with the use of EMBI or Effective Microorganism Microbial Inoculant with the EM activated solution. It was applied in the rice straw after spreading it in the field during land preparation at a rate of 500kg/ha and 5L/ha, respectively. Preparation of nanocomposting: In the case of nanocomposting, nanosize particles can be made from all biomaterials in composting preparation using the methods described above and others procedure are same as composting.

22. Comparative studies of organic and inorganic potato production: It was conducted [19] an experiment on organic potato production located in the village Narayanpur under the area of SSWRDS Project, LGED, Khulna. Manure fertilizations (organic) were applied at the rate of 10 t/ha cowdung 300 kg mustard oil cake (MOC) 138kg N, 120 kg P2O5 130 kg [20]. The experiment was conducted in a Randomized Complete Block Design (RCBD) maintaining three replications were control (T1) cowdung + mustard oil cake (MOC) (T2), N + P2O5 + K2O (T3) and cowdung + MOC+N +P2O5+K2O (T4). From the results, they reported that plant height of potato at different days after emergence (DAE) was statistically significant. Maximum plant height (71.2 cm) was observed at 100 DAE in T4 compared to that of other treatments.

It was reported [21] that yield was 9.78, 13.51, 25.90, 39.07, 31.86 and 230.37 t/ha in Bangladesh, Korea, Japan, Netherland, England & USA respectively. It was conducted an experiment with different combination of fertilizers of potato cv. eigenheimer and found that the maximum yield and number of largetuber observed when the crop was grown with N + P2O5 + K2O. It was reported [22] 2at Quetta in Pakistan conducted an experiment on the effect of different levels of NPK fertilizer on potato and reported that among the different combination of NPK fertilizer doses 125kg N + 75kg P2O5 + 75kg K2O t/ha shown highest tuber yield of 18.8 t/ha compared with 9.9 t/ha without NPK. It was 21.2 & 12.6 ton per ha with and without NPK in the present research work. It was stated [23] that 125kg N + 100kg P2O5 + 120kg K2O along with other organic fertilizer increased the tuber yield significantly.

23. Intercropping and line spacing for organic vegetable production:

Intercropping is one kind of organic mean to produce organic vegetable or fruit production without chemicals use. Intercropping is the practice of growing two or more crops in proximity. The most common goal of intercropping is to produce a greater yield on a given piece of land by making use of resources that would otherwise not be utilized by a single crop. Other way, it can be defined as intercropping is a multiple cropping practice that involves growing two or more crops in proximity. In other words, intercropping is the cultivation of two or more crops simultaneously on the same field. The most common goal of intercropping is to produce a greater yield on a given piece of land by making use of resources or ecological processes that would otherwise not be utilized by a single crop [24]. It was observed [25] an experiment on intercropping mixing okra and rice and okra and leafy vegetable stated that inter-cropped showed better yield than non-intercropping (Okra alone).

24. Organic food additives production from fruits, vegetables and cereals crops:

Food additives are an essential part of the contemporary food system, providing definite advantages in terms of people’s way of life. Organic food additives can be made from fruit, vegetable, and cereal crops. Although different authorities have different ways to define food additives, but to give a working definition, food additives are substances added to food to preserve flavor and/or enhance taste and/or appearance [1,2] The European Commission on food safety regulation, food additives are defined as any substances ‘not normally consumed as food itself’ which are added to food to perform a specific technological purpose e.g. preservation. Although many reports, books, monographs, articles, etc. are available on this topic, but only a few of them focus on catering primarily to an organic chemistry audience who has little or no prior exposure to systematic food additive chemistry

1.Acids

As shown in Table 1, most of the food acids are tracked down to the fruits such as grapes, lemon, orange, berries, plums, etc. While the human metabolic system readily adjusts to most of the natural food acids, there are some acids that the human body does not naturally recognize and are unhealthy thus leading to irritation and inflammation.

Table 1. Different fruits acids and sources

Acid	Source
Citric Acid	Citrus fruits – Lemon, Orange
Malic Acid	Apple
Tartaric Acid	Grapes, Pineapples
Acetic Acid	Vinegar
Oxalic Acid	Tea, Pepper
Tannic Acid	Tea
Caffeotannic Acid	Coffee
Benzoic Acid	Cranberries, Plums
Butyric Acid	Decomposition of Butter
Lactic Acid	Butter Digestion

2. Acidity regulators: Acidity regulators are required to maintain a balance between an extreme acid flavor and an extreme alkaline flavor. For instance, citrus fruits, juices, or yogurt are some commonly used acid foods while egg white and baking soda exemplify alkaline foods

3. Anti-caking agent: Anti-caking agents inhibit lump formation in food items thereby facilitating food products’ transport. Examples of anticaking agents are starch, magnesium carbonate (MgCO3), and silica.

4. Antioxidants: An antioxidant is a molecule that inhibits or prevents the oxidation of other molecules. Traditionally, antioxidants are compounds that are believed to promote health by removing reactive chemical species that cause harmful effects when metabolized in the body. 13 Oxidation is a chemical reaction resulting in addition of oxygen to, or removal of hydrogen from, or removal of electrons from a substance

5. Bulking agents: Bulking agents increase the bulk or volume of a food without altering its taste or its available energy e.g. starch is a popular bulking agent. Starch or amyllum is a member of the carbohydrate family (a chemical group of compounds made up of C, H, and O only and having the empirical formula CH₂O) consisting of a number of glucose units. Since it contains large number of glucose units joined together it is classified as a polysaccharide and interestingly, it is synthesized by all green plants as an energy storage source.

6. Food coloring: Any additive which may be in the form of a dye, pigment, or a chemical compound, that imparts color to the food can be termed as a color additive (Table 2).¹⁴ Usually, addition of colors can make the food look more attractive and it can also influence the observed flavor e.g. launching of the green ketchup^[26]. The reasons for adding color to food could be various; such as to compensate for the loss of color due to atmospheric exposure to light, air, extreme temperatures, etc. FDA authorizes colors to be classified as allowable either with certification or exempt from certification. In either case, stringent safety standards are applied before these colors are officially endorsed and allowed to be added.¹⁵ Organic food additives color can be made from bougainvillea, hibiscus flower, allamanda flower and dragon fruit and skin etc.

7. Flavors

Flavor is mainly a sensory response to the stimulation of taste buds and olfactory organs when food strikes them and it is possible to alter the flavor of the food to affect the senses.¹⁷ Interestingly, food, drinks, or other dietary objects are identified mainly by the senses of smell and sight (visual), not taste (Small, 2008). Hence, the main element of a food item's flavor is its smell although we have to consider sympathetically the case of people suffering from anosmia i.e. odor blindness ¹⁸.

25. Nutrition facts of Broccoli:

Raw broccoli contains almost 90% water, 7% carbs, 3% protein, and almost no fat. Broccoli is very low in calories, providing only 31 calories per cup (91 grams). The nutrition facts for 1 cup (91 grams) of raw broccoli are: Calories: 31, water: 89%, protein: 2.5 gm, sugar: 1.5 gm, fiber: 2.4 gm, fat: 0.4 gm. Vitamin C: An antioxidant, this vitamin is important for immune function and skin health. A 1/2-cup (45-gram) serving of raw broccoli provides almost 70% of the DV and also potassium, manganese and iron

Table 2. List of additives for products from the broccoli

Additive	Products
E322 - Lecithins	1
E270 - Lactic acid	1
E407 - Carrageenan	1
E322i - Lecithin	1
E415 - Xanthan gum	1
Antioxidant	1
Flavonoid	1

It was reported [27] that natural source of organic food additives keeps a significant role in improving human health conditions. However, importance and application of these additives have been widely neglected in food industry. They introduced innovative Dragon Fruit Coloring Powder named (DFCP) as a natural food additive using dragon fruit albedo. It is expected to be tremendously healthy and attractive especially for consumer, since, dragon fruit is an edible fruit with water-soluble fiber and has high source of vitamin C. The albedo of dragon fruit was dried using conventional method to color rice, milk, yoghurt, juice, and pastry. Developing DFPC as the natural food colorants is not only healthy for human body, but also is friendly for society and environment. DFPC is estimated to be cost effective, as it is sourced from the only disposable part (peel) of the fruit.

26. Training, Pruning and grafting for organic tomato production:

In determining how to prune your tomato crop, consider the growth habit (determinate or indeterminate) of your plants. Indeterminate tomatoes are more heavily pruned than determinate ones, but even determinate tomatoes often require some level of pruning. Pruning is usually started as the plants are first being staked or supported, sometimes before stringing them to avoid interference with the lines. Tomato plants are pruned by selectively removing suckers, the shoot that grows between the main

stem and a leaf. Suckers should be broken off while they are still small, between 2-4 inches in length. Prune plants only when the leaves are dry to reduce the spread of disease.

Grafting: Grafting or graftage is a horticultural technique whereby tissues of plants are joined so as to continue their growth together. The upper part of the combined plant is called the scion (σαῖον) while the lower part is called the rootstock. Plants of two different cultivars, grafting allows a grower to reap the benefits of both cultivars in a single plant. While grafting has been widely used in agriculture for centuries, mainly in woody plants, its application to non-woody plants such as tomatoes is more recent [28]. In Europe and Asia, grafted tomatoes currently account for a substantial proportion of total tomato production. For example, Spain utilizes ~ 50 to 70 million grafted plants per year, accounting for about 40% of the country's tomato production. In contrast, grafted plants have yet to constitute a major portion of the commercial field-based tomato market in the USA, and published field trials with grafted tomatoes in the USA have only appeared in the past decade or so on [29,30].

27. Organic sugar production from fruits:

Organic sugar is a type of sugar found most commonly in natural food stores since it is less processed than more conventional sugars. It can be made from mixing fruit flesh without chemicals..[1][2][3] Date sugar is made from the date palm plant, date sugar is a less refined sugar than typical white sugar. Date sugar can be substituted in many foods and beverages.[4] Date sugar is made by first making a paste from raw dates. Then, the paste is mixed with a substance called maltodextrin (a common food additive). This mixture is oven dried and ground into granules. The proportion of maltodextrin to date paste determines the properties of the sugar.[4] There are many recipes for making date sugar at home, but it can also be purchased. There are many methods looking to automate the process of date sugar production. Dates have a few stages of development: khalaal, rutab, and tamr. The best dates to make into date sugar are tamr dates, as they have a very low moisture content (about 30%) and are very sweet.[4] Studies are currently in progress on how best to determine sugar content of a date. This could help identify the best dates to use for date sugar.

It was observed [31] an experiment on sugar production from dates fruit and stated that a mixing technique was developed to produce free flowing powder granules from date. This method involved preparation of the paste from raw date, mixing with maltodextrin powder followed by an oven drying. In order to determine an optimum proportion of date paste and maltodextrin (DE 6) to produce stable granules, mixing was carried out at various levels of maltodextrin (MD) ranging between 0.54 kg and 1.0 kg per kg of date paste (dry weight basis). The date pastes dried with 1.0 kg of maltodextrin/1.0 kg of date paste produced non-sticky and free flowing powder. Several physicochemical parameters such as water activity, bulk density, color, hygroscopicity and glass transition temperatures of date powders were measured. The caking of date powders during storage at room temperature was explained using the concept of glass transition temperature.

28. Organic biomedicine and biopesticide: Medicinal, herbal and nutritional Plants:

Organic herbal and medicinal plants are an important and can be used as organic biomedicine and biopesticide in many cases. They riches mineral and nutrition, medicinally important tree species of different families. It has a wide range of culinary applications and has bioremediation, nutritional and medicinal properties. Biotechnological approaches can develop its quality by treating with many modern techniques as organic means.

a. Garlic: Botanically recognized as *Allium sativum*, Garlic is used to flavor food. Usually, its bulb is used in cooking, however some people use its leaves as well. Garlic consists of volatile oil, which has sulphur-containing compounds, and other useful compounds. It also contains enzymes including allinase, vitamins B, and minerals, flavonoids. Garlic at 85 g extract/ 9l water was as effective as the standard Dimethoate 40 EC in controlling aphids in cotton as organic pesticide and the two aphids control treatment had comparable yield. Therefore, garlic is recommended as a biocontrol agent as organic mean for aphids in cotton production [32].

b. Onion: Botanical name is *Allium cepa*, Onion is used to flavour food. Its bulb is used as cooking, salad, , volatile oils are useful compounds. It also contains enzymes including allinase, B vitamins, and minerals flavonoids. Bio-medicinal and nutritional uses: Onion is anti-microbial, antifungal [33] diaphoretic, the volatile oil is an effective agent and as it is largely excreted via the lungs. Whooping cough and as part of a broader approach to bronchitic asthma, hypotensive.

c. Ginger: *Zingiber officinale* or Ginger is a plant of which, the rootstock is mostly used. Pharmacologically important constituents include Volatile oil, containing mainly zingiberene and a mixture of phenolic compounds. Ginger may be used as a stimulant of the peripheral circulation in cases of bad circulation and cramps. In feverish conditions, Ginger acts as a useful diaphoretic, promoting perspiration. Ginger has been used world-wide as an aromatic carminative and pungent appetite stimulant.

d. Ginseng: Ginseng herb has a long history of use as an alternative medicine going back over 5,000 years, and appears on several continents.

Organic Medicinal and nutritional uses: The root is adaptogen, cardiogenic, demulcent, panacea, sedative, sialagogue, stimulant, tonic and stomach. It's remarkable ability to help the body adapt to mental and emotional stress, fatigue, heat, cold, and even hunger is confirmed and documented. Ginseng contains various pharmacological and nutritional components, including a series of tetracyclic triterpenoid saponins (ginsenosides), polyacetylenes, polyphenolic compounds, antioxidant and acidic polysaccharides [34].

e. Thankuni: It has long been used for its medicinal properties and as an aid to meditation. It is recommended by the World Health Organization (WHO) as one of the most important medicinal plant species to be conserved and cultivated.

Organic Medicinal and nutritional uses: In Malaysia, although it has been used by traditional healers in their herbal remedies, but its popularity is confined more as traditional vegetable or 'ulam' especially among the Malay communities rather than a medicinal plant. It contains carbohydrate, protein, mineral and vitamins.

CONCLUSION

It can be concluded that fruit, vegetables and cereals food could be produced by using organic means like compost manure, green manure and bone meal based on techniques such as crop rotation, intercropping, cover crop, bark cutting technology, spacing and companion planting. Training, pruning and grafting can be used for organic tomato production. Organic food additives could be successfully produced from fruits, vegetables and cereals crops. In addition, organic biomedicine and biopesticide, medicinal, herbal and nutritional plants and organic sugar could be produced using organic means without using chemicals. Finally, it can be recommended that organic foods are more effective for the human health benefits.

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