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## Cost Benefits Ratio of Organic Horticultural Products and Comparison with Conventional Products

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### Abstract

Recently, the quality and safety of organic products is the topic of prime concern. While this demand increases since consumer considers organic products are healthier and harmless than conventional products. In the country like India, organic agricultural is not novel and are effectively performs in varied climates such as tribal mountains, mountainous areas and rain-fed zones of the country. According to the government of India, domestic market for organic product is growing but not as expected. As, previous studies shows that high prices of organic products create obstacles for consumers to adopt organic food. Therefore, this study aims to prepare cheaper organic products through devising horticulture products and conduct cost benefit analysis between organic and conventional products. Results demonstrate marginal price difference between organic and conventional products. This study will encourage both manufacturers and consumers to incline towards organic food.

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Keywords: Cost benefit analysis, Organic horticultural products, Conventional products

### 1. Introduction

The superiority and safety of industrially produces foods have been an increase in consumer worries. Foods that are produces in a defensible way are more looking by the consumers. People internationally turns extra

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sensible about their health, eminence of the diet they eat and the environment in which the foodstuff are grown (EUFIC, 2013). The environment which do not damage are biodiversity preservation, animal wellbeing, environmental manufacture practices and safe working conditions for workforces make organic products an appropriate choice for the concerned consumers. In additional means, indorsing the agricultural practices that endorse on natural soil fertility, shielding a whole agricultural agro-ecosystem and eliminating damage chemical products is the major goal of organic farming (Mäder et al., 2002; Teizzi, 1999). Various researcher have declared that the key purpose for the buying of organic products is the trust that these foodstuffs are healthier and harmless than the conventional products (Bonti Ankomah and Yiridoe, 2006; Hemmerling et al., 2015; Naspetti and Zanoli, 2009; Shafie and Rennie, 2012). This is how the consumers are conscious of organic and conventional products, which demonstrate that consumers' temperament to pay for organic products will upsurge in future (Adamic, 2000; Mikola, 2004).

In many countries, horticultural crops not only offer human beings with healthy and nutritional foods but also major source of income for growers. Horticultural crops contain tender quality, great moisture and high perishability. In last few decades convoluted machineries have been developed and used in post harvesting of horticultural crops but still in numerous Asian countries have not been able to practice due to owing to cost, lack of adaptability and being advance equipment. Due to which is causes great post-harvest losses. To control such losses there are various steps such includes grading, packaging, precooling, storage and transportation. Products also requires some more major treatments such as garnish, cleaning, curing, insects or disease control, polishing and ripening. Horticultural crops contains vegetables, fruits, flowers and ornamental crops, but for this paper we have taken some major products which people use frequently and according to availability.

Conventional food products are widely available in the markets due to huge production by the manufacturer company. Maximum people would prefer buying those product due to lack of option and unaware of its effect in their health. One of the other reason is also that the productivity of conventional farming is higher than organic (Offermann and Nieberg, 2000). Living aside the health and environmental issues created by the conventional products, development of organic farming could be overturned. So to overcome those, organic farm inclines to be effectual both on economic and productive verges. Two significant facets that prompt consumers to prefer organic over conventional foods are nutrition and safety. According to Galgano et al. (2016) explained the controversial debate between superiority between organic and conventional product.

The country like India confronting larger profusion towards agriculture with the upsurge use of artificial agrochemicals such as fertilizers and pesticides, larger mistreatment of irrigation potential and such use of high energy to boost product growth have led to the worsening of soil health as well as environment. Which is main anxiety issues towards food security. Organic cultivating tends to soil, human and ecological wellbeing's and along these lines might be one of the choice for sustainability (Singh, 2007). India has carried 4.72 million ha under organic confirmation systems, with 0.6 million ha of developed horticultural land and 4.12 million ha for wild gather accumulation in forest, as of March 2014 (Wani et al., 2017). Which we can see the changes towards certified farmers with upsurge in the numbers and where organic farmers associations have carried the principal in the distribution technology in India. India has the major number of organic manufacturers on the planet most with slight possessions.

In contradiction of this background, the accusative of our study was to know the consumer behavior towards organic horticulture product in comparison to the conventional. The organic horticultural product had been bought from Indian market and prepared in lab, which is compared with the conventional product sold in Indian market. For this purpose cost benefit ratio model haven been used. It observed that in India even the higher price of the organic product the consumers are more likely to buy than conventional products. From our daily life experience as well as study period of this research, we observed that the organic products must be processed, make aware to people and marketing in order to be sold successfully.

We focused on preparation on 10 products i.e. bitter gourd chips, ginger candy, mixed pickle, green chilli pickle, ginger garlic paste, pineapple candy, lime soda, tomato ketchup, lemon marmalade and pineapple squash. Empirical research study was conducted and latter accosted consumer attitude towards products and suggestion regarding market strategy.

The section below of this paper include methods used for analysis and the preparation of organic horticultural product in lab, present the result and discussion and conclusion.

## 2. Methods

History told us that in the field of security investigation in the period shortly after World War II cost-benefits analysis (CBA) raised out of the research program of the RAND Cooperation and related organizations (Casebeer et al., 1997). CBA is used for dealing with opportunity costs, prices, discount rates, distributional weights and evaluation criteria (Makowsky and Wagner, 2009). Analysts suggest that for estimating the economic aspects associated with regulations and investment judgment CBA was the ideal methodology (Ergas, 2009). To assist decision makers in making the finest judgments for the public good, CBA must be understood as one means (Ergas, 2009). The procedure of directing CEB (Cost-effectiveness analysis) and CBA is greatly difficult than it may sounds from a summary explanation (Cellini et al., 2010). Cellini et al. (2010) have explained all steps with procedure in paper about CBA.

ü NPV (Net present Value) =  $PV(B) - PV(C)$ , where, PV - present value, C-cost, B-benefits. The adaptation method can be applied if NPV is greater than 0. The most effectual and economic adaptation method indicates the high NPV.

ü CBR (Cost benefits ratio) =  $PV(B) / PV(C)$ , where ratio of present value of product with benefits and the present value of cost of product. The method is satisfactory if the ratio is larger than 1.

In our study, we have calculated total preparation cost, the net profit and cost benefits ratio of horticultural products. Total preparation cost until packaging for all products includes total cost (input ingredient cost, packaging cost, transportation and marketing cost), 10% of total cost is managerial cost, 10% of total cost is labor cost, 8% of total cost is interest on utensils and 12% of total cost is security cost. Expected profit price had been kept 10% additional in total preparation cost until packaging, but sold in higher price than expected. Gross market price is the product sold in the market. Experimental learning of products and its preparation is summarized below.

### 2.1. Preparation of bitter gourd chips

Those chips are crispy, spicy and mild bitterness. For the preparation, variety of bitter gourd used is Co1.



Fig. 1. Steps followed for preparation of bitter gourd chips.

Its consumption has various health benefits regardless of its bitter taste. It is excellent remedy for curing respiratory problems like asthma, cold, cough etc. Its juice helps to overcome type 2 diabetes. It helps to maintain healthy liver, bladder and also curing kidney stones. For heart it is most effective by reducing bad cholesterol level and also lower blood sugar. Bitter gourd prevent cancer cells from multiplying, purify blood and prevent skin problems (Krawinkel and Keding, 2006).

### 2.2. Preparation of ginger candy

Ginger is among the healthiest spices added in various food as well as medicine ingredient. Due to its nutrient and bioactive compound nature helps as powerful benefits of body and brain.



Fig. 2. Steps followed for preparation of ginger candy.

Ginger contain gingerol, which is useful for medicinal properties. It can treat nausea, morning sickness, reduce muscle pain and soreness, lower blood sugar and improve heart disease risk factors, reduce cholesterol levels and improve brain function as well as protect against Alzheimer's disease (Malhotra and Singh, 2003).

### 2.3. Preparation of lime soda

It is popular drink as a refreshing basically lime juice and soda water.

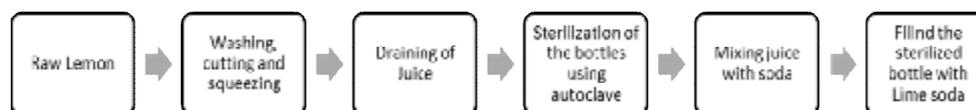


Fig. 3. Steps followed for preparation of lime soda.

There are various benefits of lemon such as treatment of throat infections, indigestion, constipation, dental problems, internal bleeding, burns, rheumatism, obesity, cholera, respiratory disorders, high blood pressure, blood purifier, useful for hair and skin care etc. (Van Duyn and Pivonka, 2000). It is also known as useful treatment for kidney stones, lowering body temperature and kidney stones. In summer session it is helpful for refreshing, stay calm and cool.

### 2.4. Preparation of tomato ketchup

Tomato ketchup is a condiment more highly with salt, sugar/corn syrup, vinegar and more spices. According to the desirable flavour can be added to the ketchup, whereas this is the simple and basic items. To give peppery flavour to the ketchup can add spices like clove, onion, cinnamon, mint and many others ingredient. Tomato ketchup can be used for multi-purpose such as vegetable sauce, Mexican, Spanish, Chinese cuisines etc. It is also used universally because of fermented source and sweet pungent taste which is not only delicious but also healthier due to its safe organic ingredients. For preparation needed various ingredient such as tomatoes, garlic, ginger, red chillies (deseeded and halved), cup golden raisins, white vinegar, rock salt, organic unrefined sugar and sodium benzoate dissolved in hot water. Those all required according to the amount of preparation and taste.

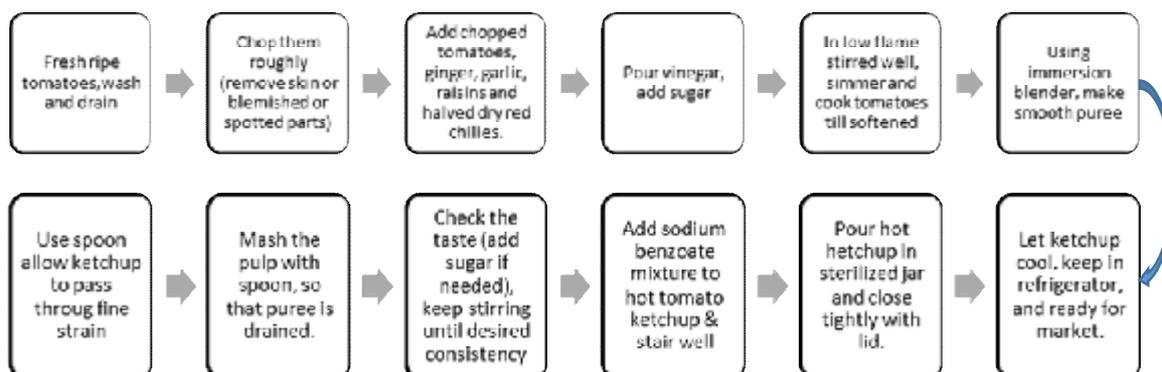


Fig. 4. Steps followed for preparation of tomato ketchup.

### 2.5. Preparation of mixed pickle

From variety of vegetables mixed in the pickling process and then mixed pickles are prepared. In various different world cuisines mixed pickle is used and also to add small amount of flavour or to accent a meal. Ingredient used to mixed pickle preparation are available local vegetables like cauliflower, carrot, chilly along with ginger and garlic, mustard, cumin, fennel, thyme seeds, red chili powder, mustard oil, rock salt, table salt, dry mango powder and turmeric powder.

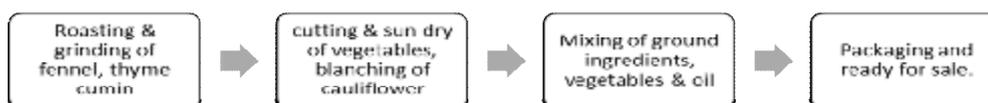


Fig. 5. Steps followed for preparation of mixed pickle.

Pickles give decent supply of necessary vitamins, minerals, and antioxidant, develop digestion, liver protection, subsidizes to modest diabetes control, supply of pro-biotic and have capability to heal ulcers.

## 2.6. Preparation of green chilli pickle

Green chilli contain vitamins A & C, surprisingly it have more vitamin C per gram in compare to oranges. Those vitamin are beneficial for health.

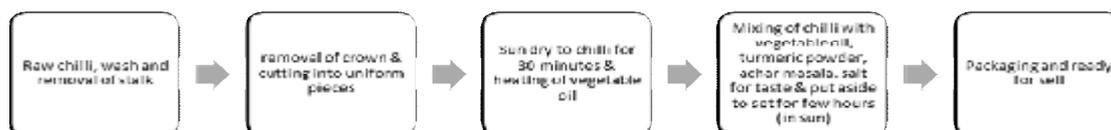


Fig. 6. Steps followed for preparation of chilli pickle.

Chilli helps in reducing pain and affect emotions because brain release natural opiates endorphins. Capsaicin chemical compound contain in chili pepper which is used in preparation of balms, scrubs and tinctures for their astringent, counterirritant and painkilling properties. In the treatment of swollen discomfort, post herpetic neuropathic pain, sore muscles there creation have been used.

## 2.7. Preparation of ginger garlic paste

Due to loaded nutrients and bioactive compounds, it benefits to our body and brain.



Fig. 7. Steps followed for preparation of ginger garlic paste.

## 2.8. Preparation of lemon marmalade

A fruit preserve made from the juice and peel of citrus fruits boiled with sugar and water is refer to as marmalade. It can be prepared with various citrus fruits or any combination of them such as kumquats, lime, lemon, mandarins, grapefruits, sweet oranges, bergamots etc. A lively bitter taste to the marmalade occurs due to peel imparts.

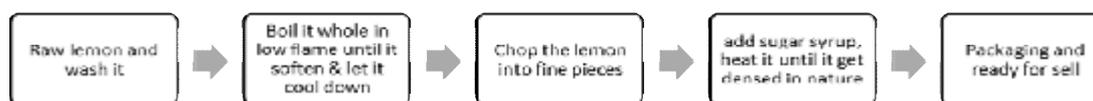


Fig. 8. Steps followed for preparation of lemon marmalade.

## 2.9. Preparation of pineapple squash

For various beverage making squash is used, which is non-alcoholic. It is made from fruits juice, water, sugar substitute, that's why it is fruit flavored. Most notably ginger squash contain herbal extract, which is also known as traditional squash.

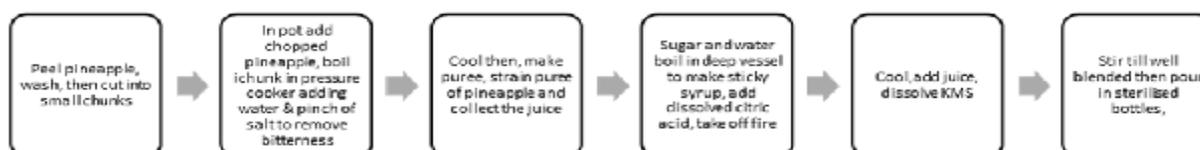


Fig. 9. Steps followed for preparation of pineapple squash.

## 2.10. Preparation of pineapple candy

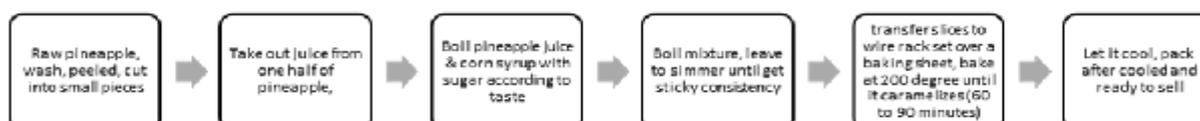


Fig. 10. Steps followed for preparation of pineapple candy.

### 3. Results

Organic horticultural products have been prepared in lab in order to ensure a lower risk of interference and its validity. Total 10 horticultural organic product had been prepared i.e. bitter gourd chips, ginger candy, lime soda, tomato ketchup, mixed pickle, green chilly pickle, ginger garlic paste, lemon marmalade, pineapple squash and pineapple candy. Total preparation cost is been fixed coalescing all expenses until final packaging i.e. total expenses (input ingredient cost, processing cost, packaging cost, transportation and marketing cost), managerial cost (10% total expense), labor cost (10% of total expense), interest on utensils (8% of total expenses), security cost (12% of total expenses) and cost of packaging. Final selling price is been fixed with profit by adding with total preparation cost and its 10%. But while selling in market the product have been sold in higher price than its final selling price fixed including profit (Fig. 1).

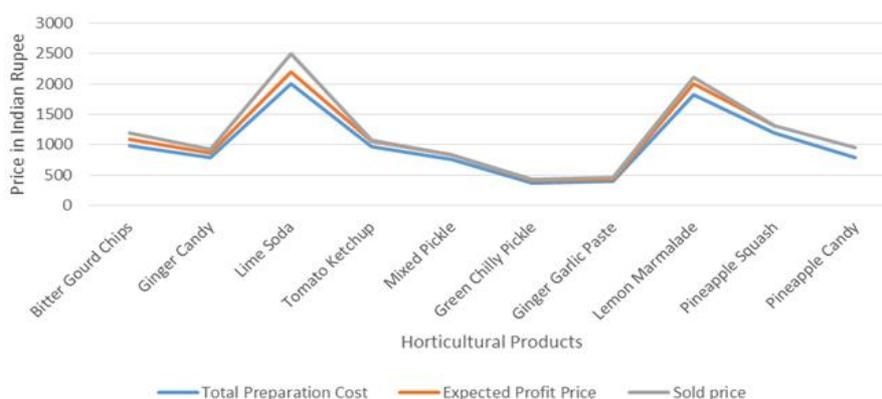


Fig. 1. Price fluctuation of horticultural products.

Cost benefits ratio had been calculated by taking account of product sold in market and the total preparation cost.



Fig. 2. Cost benefit ratio (CBR) of organic horticultural products.

The result shows positive impact on the product prepared and sold (Fig. 2). Cost benefits analysis result figure explains the all organic horticulture product prepare and sold was benefited such as bitter gourd chips 1.212, ginger candy 1.17, lime soda 1.249, tomato ketchup 1.12, mixed pickle 1.11, green chilly pickle 1.15, ginger garlic paste 1.17, lemon marmalade 1.155, pineapple squash 1.109 and pineapple candy 1.22. From this we can also perceive the demand of organic product by the consumers. From this result we can also assume that demand of organic horticultural product and profit can be made by any organization.

The price of organic horticultural product sold in market have been compared with the conventional product in market of India. The current price of all conventional product is take from indiamart ([www.indiamart.com](http://www.indiamart.com)) website. Bitter Gourd Chips priced by Sowbhagya Foods (Bengaluru) is Rs 180/1000g, Ginger candy priced by Janhavi Dry Fruits is Rs 550/1000 gram, Fresh Lime Soda priced by Amar Ice-cream (Chennai) Rs 15/250 ml, Tomato Ketchup priced by Agriculture Product Market Committee Rs 138/1000g, Mixed pickle priced by Patidar Agro and Food Products Rs 120/1000g, Organic Green Chilly Pickle priced by Taste Mantra Food Associate Rs 115/ 900 gram, Ginger Garlic Paste priced by Pkm Fine Foods and Spices Pvt (Verified Supplier) Rs 450/1000g, Lemon Marmalade priced by Place of Origin ([www.placeoforigin.in](http://www.placeoforigin.in)) Hand made in Himachal India Rs 300/ 470g, Pineapple Squash priced by Quality Food Product Rs 200 / liter and Pineapple Candy priced by Kewal Traders Rs 1,500 / 11 kg.

Comparing price of both it seems that some conventional product price is higher than that of organic product (Fig. 3).

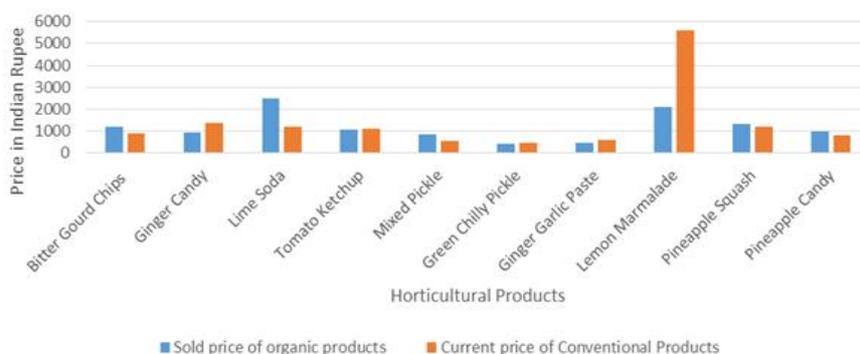


Fig. 3. Price of organic products prepared in lab vs present market price of conventional product.

Price of some conventional products seems higher such as ginger candy rupees 1375 (2.5 kg), tomato ketchup rupees 1104 (8 kg), green chilly pickle rupees 447.23 (3.5 kg) and ginger garlic paste rupee 607.5 (1.35 kg), whereas organic product ginger candy rupees 925 (2.5 kg), tomato ketchup rupees 1072 (8 kg), green chilly pickle rupees 434 (3.5 kg) and ginger garlic paste rupee 459 (1.35 kg). The apparent price performance ratio of the conventional foodstuffs was healthier than that of organic foodstuffs, for portions of irregular organic consumers. From field it is also experience that consumers are more sensitive towards price rather than health and some of them are even unaware of the usefulness of the organic product.

Mondelaers et al. (2009) explains that irregular organic purchaser are dissimilar in their predilections i.e. some are less price sensitive and desire organic foodstuffs and others are extra price sensitive rather desire conventional foodstuffs. It is also suggested that organic marketing should take place to make aware to the consumers about its benefits. Marketing should also take interpretation of the price compassion of portions of infrequent organic customers and upsurge the perceived amount performance ratio of organic foodstuffs by means of appropriate announcement and pricing schemes. Auspicious advertising strategy for both organic and conventional food traders is signified by the communicating quality attributes. From practical experience while selling organic product to consumer those who were aware about its benefits, it senses that uttering a longing for more organics over non-organics and this affirms a probability of mounting market for organics.

#### 4. Conclusion

Recent development towards thinking of consumers about organic and conventional products shows buyers the more concern towards their health rather than prices. It is also observed that consumers those are well known about organic products demands more and encourage to prepare additional. But in few cases it is found that due to lack of knowledge about organic products benefits, consumers prefer conventional product because of price. Result in this paper shows the positive attitude towards cost benefits of organic horticultural products prepared in lab. The price comparison of organic and conventional products shows slight difference in which some cases conventional price were higher and more cases organic price were higher. Those price were taken from Indian market because organic horticulture product were prepared and bought from Indian market.

The perception of sustainable agricultural have enthused up attention after the current progresses in the agriculture but still it is problematic to determine the amount to which certain farming practices can be considered sustainable or not. One more point of view is in dilemma that weather farmers are encourage towards organic or non-organic farming. Regarding this issues, it is believed that research should be conducted on the consumer's point of views towards organic and conventional products. Before doing this, it is also encourage to do marketing and give knowledge to consumers regarding merits and demerits about organic and conventional products.

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