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A review on medicinal plants having antioxidant potential with market value of ginger

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Abstract

Natural compounds from plants and different lives (Microorganism, fungi) represent a main supply of molecules with medicinal houses. Antioxidant substances have beneficial to human health. The knowledge of the role that oxidative stress holds in the development of problems as various as: cardiovascular sicknesses, degenerative conditions, rheumatic problems, metabolic syndrome, makes antioxidant potential to a key- feature of present day, it may provide multi potent treatments. Rasayanas are a set of non- toxic polyherbal drug practice, which are immunostimulatory and thereby prevent the causation of disease and promote health and fitness. In this review six plants (*Zingiber officinale*, *Glycyrrhiza glabra*, *Curcuma longa*, *Ginkgo biloba*, *Mentha spicata*, *Acacia catechu*).

Keywords: Antioxidant, crude drugs, plant part, literature, marketing







Introduction

Antioxidant is a substance that inhibits oxidation specially used for prevents the deterioration of stored food. Antioxidant helps organisms deal with oxidative stress, caused by free radicals. Antioxidants are substance that may protect your cells against the effects of free radicals. Free radicals are chemical species which contains one or more unpaired electrons due to which they are highly unstable and cause damage to other molecules by extracting electrons from them in order to attain stability^[1]. Free radical can damage cells, and play a role in diseases like heart disease, cancer and other diseases. High diet in antioxidant from fruits and vegetables is associated with a low risk of cancer, Parkinson's disease. A plant based diet protects against chronic disease. The many number of medicinal plants are used in the cellular and metabolic disease treatment such as diabetes, obesity and cancer. Herbs and species are traditionally defined as any part of plant that is used in the diet for their aromatic properties with no or low nutritional value^[2]. Herbs and species have been identified as sources of various phytochemical, many of which possess powerful antioxidant activity. Herbs and species may have a role in antioxidant defense. Many of this herbal medicine are finding their way into the world market natives to prescribed allopathic drugs currently available to treat various disorders. Reactive oxygen species, such as superoxide anion, hydrogen peroxide are highly reactive. These are continuously produced in the human body as they are essential for energy supply and immune function^[3].

Review literature

1. Baud *et al.*, 1991 *In vivo* methods, the dietary source's sample that is to be checked is often managed to the testing animals at a specific dose diet as recommended by the respective method with a certain period, the animal is often immolated, then, the tissues or blood is used for the analysis^[11].
2. Karpinska *et al.*, 2001 The chemical structures of natural antioxidants are very similar to those which are synthesized commercially. The most common natural antioxidants with phenolic properties include flavonoides, dihydrochromanols and pyrogallol derivatives^[12].
3. Prior *et al.*, 2005 The antioxidant reactivity during the SET assay depends mainly on two major antioxidant functional group preterits namely, the ionization and deprotonation potentials. Under acidic Ph, the protonation on the antioxidant is increased leading to a decrease in the ionization potential and so suppressing the overall antioxidant reducing abilities^[13].

List of antioxidant drugs

Sr. No.	Name of Crude drugs	Biological source & Family of Crude drugs	Plant Part used	Uses	Figures	Reference No.
1.	Ginger	Ginger, consists of peeled or unpeeled rhizome of " <i>Zingiber officinale</i> " belonging to the family Zingiberaceae.	Rhizome	<ol style="list-style-type: none"> 1. Reduce blood sugar. 2. Reduce blood cholesterol level. 3. Reduce the risk of cancer. 4. Have antioxidant properties. 		[4]
2.	Liquorice	Liquorice is an extract from the " <i>Glycyrrhiza glabra</i> " plant which includes glycyrrhizic acid and it belongs to the family Leguminosae.	Root	<ol style="list-style-type: none"> 1. Have antioxidant properties. 2. Enhances liver health. 3. Stimulates hair growth. 		[5]
3.	Turmeric	Turmeric is a fabricated from " <i>Curcuma longa</i> ", belonging to the ginger family Zingiberaceae	Rhizome	<ol style="list-style-type: none"> 1. Have anti-inflammatory properties. 2. Promote weight loss. 3. Helps in wound healing. 4. Have antioxidant properties. 		[6]
4.	Ginkgo	It consist of leaves obtained from dioecious tree " <i>Ginkgo biloba</i> " belongs to the family Ginkgoaceae.	Leaves	<ol style="list-style-type: none"> 1. Improves blood circulation. 2. Improves vision. 3. Enhances memory. 4. Helps overcome depression. 5. Have antioxidant properties. 		[7, 8]
5.	Mint	Mint consists of the dried leaves and flowering tops of " <i>Mentha piperita L.</i> " (Peppermint) belonging to the own family Lamiaceae.	Leaves	<ol style="list-style-type: none"> 1. Helps the process of digestion. 2. Treat asthma. 3. Prevents memory loss. 		[9]
6.	Black Catechu	Black catechu is the dried aqueous extract prepared from the heartwood of " <i>Acacia catechu Willdenow</i> ", belonging to the family Leguminosae.	Bark	<ol style="list-style-type: none"> 1. Antioxidant property. 2. Antiulcer property. 3. Immunomodulatory property. 		[10]

- Anandjiwala *et al.*, 2008 The reducing potential of a sample is measured by its ability to convert Fe³⁺ to Fe²⁺. The increase in the absorbance is correlated with reducing potential (Power) of the sample ^[14].
- Karadag *et al.*, 2009 The target of our food system is to determine the relative antioxidant efficiency. However the evaluation of the total antioxidant capacity of a certain antioxidant should apply to water-soluble and lipid soluble antioxidants ^[15].
- Carlsen *et al.*, 2010 A plant-based diet protects against chronic oxidative stress related diseases. Dietary plants contain variable chemical families and amounts of antioxidants. The plants vegetables, fruits, nuts and spices have been reported to be a major source of dietary active antioxidants ^[16].
- Alam *et al.*, 2013 The free radicals in the forms of reactive oxygen species are continuously produced in the human cells. These cells are also well equipped with an efficient antioxidant system that is composed of both enzymes and other non-enzymatic molecules that can neutralize the adverse effect of these free radicals ^[17].
- Apak *et al.*, 2013 The evaluation of the total antioxidant power and health benefits of an individual antioxidant is not an easy process especially when a collaboration between diverse antioxidants is required to achieve the desired effect ^[18].
- Moharram and youssef *et al.*, 2014 *In vitro*, the most common techniques to assay the antioxidants include an antibody, fluorescence, folin-ciocalteu spectrophotometric chromatography, and light emission based techniques ^[19].

10. Rubio *et al.*, 2016 The term total antioxidant capacity refers to the overall antioxidant status in the biological samples and measures the total amount of scavenged free radicals ^[20].
11. Pizzino *et al.*, 2017 Oxidation stress is defined as an increase in cellular free radicals generation to the cell antioxidant levels which create an imbalance toward shifting the cellular environment toward an oxidant ^[21].
12. Couttolenc *et al.*, 2020 The antioxidant activity describes the kinetics of any reaction that is formed between the antioxidant and the target radical which reflects the ability of an antioxidant to block the propagation stage in the oxidative chain ^[22].

Marketing Strategy

Marketing strategy is a construct that lies at the heart of the field of strategic marketing and is central to the practice of marketing. Marketing strategies used in the selling herbal products in global market. In the current era because of COVID-19 pandemic, which has affected the world economic and global market drastically. During the pandemic there is sudden increase in sales of herbal products and new marketing strategies are needed to be developed. Better understanding the state of marketing strategy knowledge is also important for developing theoretical understanding in marketing. The sales marketing strategy can be done if company conducts research so that the company can expect and examine the capacity to be able to increase within the future.

Marketing Strategy of Ginger

Ginger is one of the treasured spice crop grown in the mid hills. It is one of the excessive cost spice which can contribute to enhance the reputation of rural people through raising their profits.

Market Margin: It is the difference between the farm gate price i.e. price obtained by the procedure and retailer’s price i.e. the price paid by the consumer is known as marketing margin. It was calculated as:

$$\text{Marketing margin} = \text{Retailer’s price (P}_r\text{)} - \text{Farm gate price (P}_f\text{)}$$

Procedure’s share: It is the price which is received by the farmer expressed as a percentage of the retail price, i.e. the

price paid by the consumer. It was calculated by the following formula.

$$P_s = (P_f/P_r) \times 100$$

Where,

P_s = Procedure’s share

P_r = Retailer’s price

P_f = Procedure’s price (Farm gate price)

Gross margin analysis: It is the difference between the revenue and cost of goods sold (production cost not including indirect fixed cost like office expenses, rent or administrative costs) for any enterprises. The gross margin of the ginger in this study was calculated as below:

$$\text{Gross margin} = \frac{\text{Revenue} - \text{cost of goods sold}}{\text{Revenue}} \times 100$$

Benefits cost analysis

Cost benefit analysis was done after calculating the total variable cost and gross return from the ginger cultivation. So the benefit cost analysis was carried out by using formula:

$$\text{B/C Ratio} = \text{Gross return} / \text{total variable cost}$$

$$\text{Gross return} = \text{Total quantity of ginger marketed (Kg)} \times \text{Price per unit of ginger (Rs)}$$

$$\text{Total variable costs} = \text{Summation of all variable cost items.}$$

Marketing Channel

Marketing Channel was based on the information obtained from producer level to consumer level. All linkage and coordination among all levels i.e. input supplier, grower, collector, retailer and final consumer were analyzed for the marketing channel.

Market Channel

Ginger marketing includes all the activities involved in the transfer of farmer’s product, either fresh or processed, to the consumers at both domestic and international level. Different channels were involved in the transfer of different forms of ginger from farmers to consumers. The common marketing channel found in the flow of ginger from producers of Salyan is presented in the figure below:

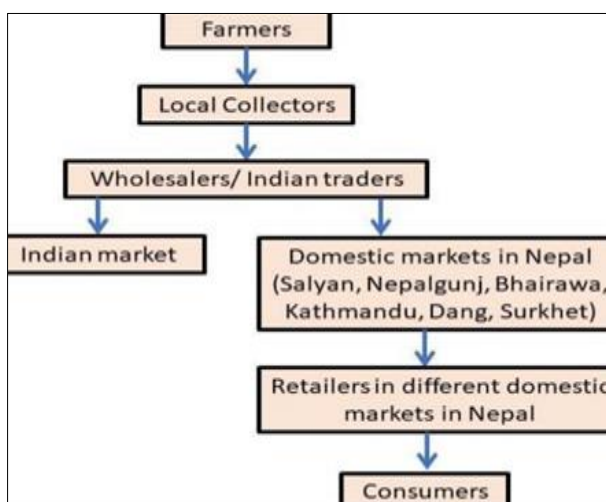


Fig 1: Marketing Channel of Ginger in Salyan District

Market margin and procedure share of zone vicinity area: Lower marketing margin and higher producer share

on retail price indicates an efficient market system.

Table 1: Market margin and producer share of zone vicinity area (Prices in NRs.)

Form of Ginger	Farm gate price (P ₀) per kg	Retailer's price (P _r) per kg	Market margin (M _m)	Market margin (%)	Producer's share (P _s)
Fresh ginger	29.34	55	25.66	46.65	53.34
Dried ginger	201.42	270	68.58	25.4	74.6
Mother rhizome	68.87	90	21.13	23.47	76.52
Seed rhizome	80.41	110	29.59	29.59	73.1

Production and Market problems: The obtained results were then added and then divided with total number of

respondents i.e. 60 multiplied by the highest weightage value i.e. 5 and then index value was obtained.

Table 2: Problems in ginger production as ranked by ginger producers in study area

Sr. No.	Problems	Frequency					Total	Weightage	Index	Rank
		P1	P2	P3	P4	P5				
1	Rhizome rot	48	9	2	0	1	60	56.6	0.943333	i
2	Dry rot	5	28	19	4	4	60	41.2	0.686667	ii
3	Availability of quality rhizome	5	19	19	6	11	60	36.2	0.603333	iii
4	Post-harvest loss	3	2	8	30	17	60	24.8	0.413333	iv
5	Input availability	1	3	11	19	26	60	22.8	0.38	v

Where, P = Priority level

Marketing problems of ginger: Each of the problems were given a weightage from 1-5 and then obtained frequencies

were multiplied with the respective weightage. The ranks were assigned in accordance with the obtained index value.

Table 3: Marketing problems as ranked by ginger producers in the study area [23]

Sr. No.	Problems	Frequency					Total	Weightage	Index	Rank
		P1	P2	P3	P4	P5				
1	Low market price of Ginger	11	26	12	10	1	60	60.8	1.013333	i
2	Lack of shortage	36	13	7	4	0	60	52.2	0.87	ii
3	Lack of Transportation	5	10	14	17	14	60	31	0.516667	iii
4	Lack of processing facilities	4	8	16	15	17	60	29.4	0.49	iv
5	Quality issue	4	3	11	14	28	60	24.2	0.403333	v

Where, P = Priority level

Conclusion

Natural compounds from plants and different lives (Microorganism, fungi) represent a main supply of molecules with medicinal houses. Antioxidant substances have beneficial to human health. Plenty of medicinal plant life, historically used for lots of years is founding a collection of herbal arrangements of the Indian traditional health care machine (Ayurveda) name Rasayana proposed for their thrilling antioxidant sports. The five different market problems were listed in the interview schedule and 60 ginger producers were asked to rank the problems in accordance with their prescription. The first problem as ranked by the producers was "Low market price of ginger" followed by "Lack of shortage facilities" and the "Quality issues" was ranked last indicating consumers preferred the prevailing quality of ginger.

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List of abbreviation

Sr. No.	Abbreviation	Full form
1	P _r	Retailer's price
2	P _f	Farm gate price
3	P _s	Procedure's share
4	B/C	Benefits cost
5	NRs.	Net Rupees
6	USD	US Dollar
7	P	Priority level
8	Kg	Kilo grams
9	%	Percentage
10	Rs	Rupees
11	i.e.	that is
12	SET	State Eligibility tests