

Antioxidant-Rich spices: Consumption trends

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■ **ABSTRACT** : Spices are known to be rich sources of antioxidants which contribute to our health by preventing chronic diseases like cancer, cardio-vascular disease, diabetes, etc. However, the consumption practices of spices at the ground level need to be assessed for material information. Thus, the present study was conducted to assess the consumption practices of aromatic spices among the population of Udaipur city of Rajasthan state. The sample comprised of 100 respondents who were homemakers and could provide crisp and authentic information. A questionnaire was prepared and the respondents contacted personally. Results revealed that though consumption of aromatic spices was noteworthy among the population, the use was largely attributed to the taste and flavour imparted by spices in food and the therapeutic or medicinal value of spices was not recognized by the majority of respondents.

■ **KEY WORDS** : Aromatic spices, Antioxidants, Consumption practices

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The focus on health benefits of commonly available foods has never been so strong before. The philosophy that food can be health promoting beyond its nutritional value is gaining acceptance within the public arena and among the scientific community as mounting research links diet/ food components to disease prevention and treatment (Farmakalidis, 1999). Among food components with protective effect on chronic diseases, phytochemicals, a class of plant-derived molecules endowed of strong antioxidant properties, have received great attention. The additive and synergistic effects of such bioactive molecules present in plant food are responsible for their potent antioxidant properties (Pellegrini *et al.*, 2006).

According to Halliwell (1994), phenolic compounds, phytochemicals widely distributed in plants, scavenge free radicals, enhance immune system, prevent disease and improve general health and quality of life. Free radicals (superoxide, nitric oxide, hydroxyl radicals, etc.) and other reactive species (hydrogen peroxide, peroxy nitrile, hypochlorous acid, etc.) are produced in the body primarily as a result of metabolism. These species create chain reactions, which cause cell membrane damage, DNA mutation, lipid and protein damage, immune cell damage and cell death, leading to chronic diseases

such as cancer, cardio-vascular diseases, diabetes, etc. (Arouma, 1994).

Dietary phenolic compounds – major components in spices – have generally been considered as non-nutrients, but their strong antioxidant effect is of medicinal and nutritional interest. Active principles derived from numerous spices block production of reactive oxygen species (ROS) in several *in vitro* and *in vivo* systems. Halliwell (2002) and Aggarwal *et al.* (2002) revealed that owing to their antioxidant properties, various therapeutic effects have been assigned to spices and spice-derived ingredients.

Spices are plants with intensive and distinctive flavours and aromas used as natural additives in food in fresh and dry form. They are a prized group of minor components and have been an integral ingredient of Indian diet. Spices form an important part of the Ayurvedic Pharmacopoeia (The Indian system of medicine). India enjoys the distinction of being the largest producer and consumer of spices as well as the fastest growing spice market in the world (Anonymous, 2010).

As per the recent researches, it is evident that the consumption of spices in the daily diets has become more important. The shift in preferences of domestic consumers, increasing urbanization, rising incomes, demographic and

social factors, change in productivity of spices and increasing knowledge about medicinal benefits have brought about changes in pattern of consumption. However, the consumption practices regarding spices at the ground level need to be assessed for material information. Hence, the present study was undertaken specifically to gain knowledge about frequency and type of use among the populations and purchase and storage practices were also assessed. Of the 4 categories of spices in terms of degree of taste, aromatic spices were used for the purpose (Peter, 2001).

■ RESEARCH METHODS

The present investigation was undertaken in Udaipur city of Rajasthan state. Different areas of the city were identified on the map for survey. One hundred homemakers willing to participate were selected for gaining crisp and authentic information regarding consumption practices of spices.

Collection of data :

Enquiry into various aspects of spice consumption including information on frequency, pattern of consumption, purchase and storage was made by contacting the respondents personally using a structured questionnaire. The information collected was compiled, tabulated and analyzed using frequency distribution and percentages of variables studied.

■ RESEARCH FINDINGS AND DISCUSSION

The findings obtained from the present study have been discussed under the following sub-heads:

Socio-economic and family profile :

The data on age, educational status, occupation, income, type of family, category, religion and food habits were collected. Majority of the respondents selected for the study were of 41-50 years of age (34 per cent) and 25 per cent of 31-40 years of age. Further, it was found that all the respondents were literate with 35 per cent under graduate and 33 per cent post graduate. The percentage of non-working housewives of the selected respondents for the study was 75. The result indicated that of the selected respondents of Udaipur city, 28 per cent were belonging to Rs. 11,000 to Rs. 20,000 monthly income range and 20 per cent to the Rs. 21,000 to Rs. 30,000 range. The data revealed the majority of homemakers belonged to nuclear families (77 per cent) and from joint families were 23 per cent. Seventy two per cent respondents belonged to general category 26 per cent to OBC. Majority of selected respondents were reported to be consuming vegetarian food (83 per cent) and 15 per cent consuming non-vegetarian.

Consumption practices of spices :

The consumption practices of spices were assessed

under frequency of consumption and pattern of consumption including seasonal variations, reason, in food item, form and purpose of consumption. Table 1 depicts the variation in frequency of consumption among the respondent families. It is evident that overall cardamom and cumin were consumed by 100 per cent of the families, whereas, cinnamon (94 per cent), clove (93 per cent), fennel (93 per cent), coriander (90 per cent), ajowan (87 per cent), cassia (86 per cent) and fenugreek (85 per cent) were the other commonly consumed spices.

Seasonal variations in frequency of consumption of spices:

The data recorded in Table 1, further show that the consumption of spices did not vary much according to seasonal change and the respondents preferred to consume most of the spices daily. All round the year, consumption of fennel (79.6 per cent), coriander (58.9 per cent) and clove (45.2 per cent) on daily basis; cinnamon (42.55 per cent) weekly and ajowan (44.8 per cent) fortnightly were among the prominent.

Pattern of consumption :

The pattern of spice consumption was studied under 4 sub-heads:

Reason of consumption :

The data in Table 2 show that maximum use of spices was attributed to their contribution in taste of the food prepared, of which cumin, fennel, cassia and cardamom were opted by majority (63.97, 58.82, 58.59 and 56.52 per cent, respectively). Cumin (13.24 per cent) and coriander (13.18 per cent) were reported to be used as per the traditional practices. Among the spices used for their medicinal value, cardamom, ajowan and clove (23.60, 21.15 and 20.42 per cent, respectively) were reported. It can be noted that use of dill (2 per cent) was for its medicinal value only. Cumin (17.65 per cent), fennel (17.65 per cent) and fenugreek (16.79 per cent) consumption was reported as recipe ingredients.

Consumption according to food item :

The data of Table 3 depict the highest consumption of spices reported for preparation of vegetables. Ajowan use for Indian bread preparation (64.23 per cent), cardamom use in hot beverages (29.95 per cent), fennel as mouth freshener (24.02 per cent), cassia in rice preparations (19.38 per cent) and fenugreek in curry preparation (17.95 per cent) were among the other commonly reported uses of spices in various foods.

Form of consumption of spices:

Data collected revealed highest use of spices as whole and in ground form (Table 4). Maximum use of fennel and cumin was in whole form (65.25 and 64.29 per cent) whereas use of cinnamon and coriander was seen in ground form (59.29 and 51.72 per cent).

Table 1: Seasonal variations in consumption practices of 16 popular spices*

S.No.	Name	Summer				Winter				Razay				All round the year						
		C	W	V	D	W	V	D	V	W	V	D	W	V	D	V	W	V	D	
1.	Allspice	0	0	0	0	2.3	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0
2.	Allspice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.	Allspice	0	0	0	0	2.63	2.63	0	0	2.63	2.63	0	0	0	0	0	0	0	0	0
4.	Cerewey	0	0	0	0	2.78	0	0	0	2.78	0	0	0	0	0	0	0	0	0	0
5.	Cinnamon	100	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.	Cassia	86	0	0	0	2.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.	Cinnamon	97	0	0	0	1.06	0	0	0	1.06	0	0	0	0	0	0	0	0	0	0
8.	Clove	93	0	0	0	3.23	1.08	0	0	1.08	0	0	0	0	0	0	0	0	0	0
9.	Cinnamon	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.	Cinnamon	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11.	Cinnamon	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12.	Cinnamon	93	0	0	0	1.08	0	0	0	1.08	0	0	0	0	0	0	0	0	0	0
13.	Cinnamon	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14.	Vanilla	55	0	0	0	20	0	0	0	20	0	0	0	0	0	0	0	0	0	0
15.	Nutmeg	76	0	0	0	1.55	0	0	0	1.55	0	0	0	0	0	0	0	0	0	0

Note: Number of respondents participating in survey, D=Daily, W=Weekly, V=Monthly, *Values are in grams/100g

Table 2: Seasonal variations in consumption practices of 9 spices*

S.No.	Name	Spring				Summer				Monsoon				Winter			
		C	W	V	D	C	W	V	D	C	W	V	D	C	W	V	D
1.	Cassia	50.67	0	30.77	28.83	56.52	58.59	56.25	57.23	55.87	63.97	58.82	58.82	50.36	36.73	37.26	37.26
2.	Cinnamon	12.82	0	0.86	0.90	6.83	8.59	5.56	6.97	13.18	13.27	10.29	10.29	10.95	10.95	10.95	10.95
3.	Vanilla	21.15	0	0.86	0.90	23.60	1.56	18.75	20.72	3.10	7.77	2.00	2.00	3.95	3.95	3.95	3.95
4.	Saffron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.	Cinnamon	2.56	0	17.66	10.81	11.80	16.77	17.58	11.97	17.83	17.65	17.65	16.79	13.27	13.27	13.27	13.27
6.	Black Seed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.	Cinnamon	17.9	0	0.90	0.90	1.27	3.97	0.69	2.11	3.10	0.77	1.76	1.76	1.02	1.02	1.02	1.02
8.	Nutmeg	8.33	100	53.75	57.66	10.97	10.97	11.77	7.93	7.75	98.00	51.5	10.95	10.95	10.95	10.95	10.95

*Values are in grams/100g

Purpose of spice served in food :

Spices were reported to be used majorly for garnish/ flavour purposes. Cumin (96.97 per cent) was the highest and cinnamon, cardamom, clove and fennel were the next in order (Table 5).

Purchasing pattern of spices :

The purchase of spices was also assessed (Table 6) and it was evident that 37.74 per cent respondents purchased spices in bulk (1kg), whereas 55.32 per cent purchased spices in lesser quantity (250g) or as and when required.

Table 6: Purchasing pattern of spices*

Weight (g)	Spices	
	In bulk (n=53)	As and when required (n=47)
50	0	0
100	1.89	31.91
250	16.98	55.32
500	30.19	10.64
1 kg	37.74	2.13
>1 kg	13.21	0

*Values depict percentage

Storage practices of spices :

Table 7 shows that 93 per cent of the respondents stored spices at room temperature and the most commonly used packaging/ container for spice storage was stainless steel containers (56 per cent).

Table 7: Storage practices of spices* (n=100)

Temperature of storage for spices :	
Room temperature	93
Refrigeration	7
Freezer	0
Packaging/container for storage of spices :	
Glass jar	8
Plastic box	36
Stainless steel container	56
Paper packet	0

*Values depict percentage

Conclusion :

The study concluded that the practice of consuming aromatic spices was common among the study subjects of

Udaipur city. Most of the spices were consumed all round the year with fewer seasonal variations and mainly used as garnish/ flavour to enhance the palatability of food prepared. However, owing to the medicinal significance of aromatic spices, notable use could not be seen. Hence, it can be said that though majority were found consuming these spices and thus deriving their medicinal benefits, the population lacks awareness regarding the fact. India has a rich heritage of spices which have been proved to be a pool of antioxidants with numerous health benefits. Therefore, measures need to be taken to inform or make aware the public at ground level about the antioxidant richness leading to therapeutic benefits of spices.

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