

Re-emergence of Traditionally Prepared Cold Pressed Edible Oil in Southern India – An Exploratory Study

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ABSTRACT Oil has been an integral part of Indian cooking for centuries. Cold pressed oils were used to prepare traditional food until refined oil started gaining acceptance less than a hundred years ago. Due to several advantages such as higher extraction efficiency, lower production cost, more neutral flavour and the ability to be used in deep frying, refined oils replaced cold pressed oils in several Indian kitchens. This study is an attempt to understand urban public perceptions about the physical, chemical, nutritional, socio-cultural and marketing aspects of cold pressed oil in southern India. As this was an exploratory empirical study, judgemental sampling was used to identify respondents for the administration of the survey instrument. Findings suggest that while the urban public believes that cold pressed oils smell, taste and have high nutritional value compared to refined oils and are also increasingly available through local production, their popular use is impacted by their high prices and unsuitability for deep frying.

INTRODUCTION

Oil has been an indispensable part of every global cuisine for centuries. Extracted from a variety of oilseeds and sometimes of animal origin, edible oil is a source of nutritional components like proteins. In the context of agriculture, oilseeds are extremely important as they help India contribute a large share in global edible oil generation. Large tracts of land have moved under oilseed production to meet the demand for edible oil. Despite this, a significant portion of our oil needs are not met by domestic production. Because of issues such as low yield, dependence on rains, high cost of seeds for cultivation and small sized landholdings that do not permit economies of scale, more than half of the country's edible oil requirements are met through imports. On an average, the Indian per capita consumption of edible oil is 19 kgs per year and this translates to an annual requirement of around 25 million tonnes for the entire country (Sharma 2020).

Recently, the urban Indian consumer has been exposed to a plethora of options in the variety and type of extraction of edible oils. From mustard, groundnut, coconut and other traditionally used varieties to olive oil, canola and rapeseed, the Indian consumer is spoilt for choice. Even in the technique used for generation, the end user can select between oil produced from the ancient cold pressed technique or the present-day refining process that

produces edible oil that is neutralised and deodorised. Given the increase in the access to information about the health benefits of different types of edible oils, urban consumers are now making more informed decisions about the oil they use for cooking. With more consumers opting for cold-pressed edible oils, the current share of this variety in overall oil consumption has gone up to 10 percent (Ganapathy 2019) leading to a lot of interest in the benefits of using cold-pressed vis-à-vis solvent extracted oil.

Oils vary in composition depending on their source and processing, leading to a large diversity in standards associated with it (Zhou et al. 2020). Oils are primarily extracted through either hot or cold pressing techniques. The hot oil extraction process is relatively recent and uses high temperatures and chemical solvents which result in the degrading of certain essential nutrients and bioactive compounds. Once the oil is extracted from the seeds in this technique, it is further refined by degumming, neutralisation, bleaching and deodorisation (Manchanda and Passi 2016) as shown in Figure 1. In contrast, the cold press technique, which is essentially a mechanical process, retains antioxidants, Vitamin E, bioactive phytochemicals and other essential nutrients (Ananth et al. 2019). Older versions of this technique have existed for centuries as is evident from the oil-pressing machine remains found in the ruins of the Indus Valley

Civilisation (Times of India 2021a). However, the efficiency of oil extraction is around half of that in hot oil extraction.

Indian cooking involves heavy use of edible oil. In situations where food has to be deep fried, the cooking temperatures can go as high as 170°C. Another habit, probably caused due to the price of edible oil, is the reusing of oil for frying. When temperatures are very high, certain oils have been known to break down to form free radicals, trans-fats and other toxic compounds that have the potential to cause cell mutations or build up fatty deposits in blood vessels (Manchanda and Passi 2016). This is further exacerbated by repeated frying. Ideally, cold pressed oils should be avoided for deep frying purposes (Times of India 2021a) as they have a low smoking point. Smoking point is the temperature at which oils break down resulting in degradation of flavour and nutrition and the release of bluish smoke (Manchanda and Passi 2016).

Some of the advantages of using oils produced using the cold pressed process include reduction in oxidative stress, activation of the healing process, supporting the immune system and even neuroprotective activity (Boskou 2017). As an abundant source of polyunsaturated fatty acids, these oils can bring down blood cholesterol levels and safeguarding the liver. In contrast, during the refining process, oils lose several valuable nutrients such as phospholipids, proteins, vitamins, antioxidants and lecithin. The latest techniques now involve processes through which some of these nutrients are added back to the refined oil through fortification. In addition, chemicals and preservatives such as sodium bicarbonate, sodium hydroxide, hexane, propyl gallate, butylated hydroxyanisole and butylated hydroxytoluene are part of the refining process.

Cold pressed oils, on the other hand, are free from preservatives and other chemical additives, making them better for human health. Additionally, as their extraction process involves manual filtering, they are more viscous. This higher viscosity reduces our consumption of the oil (by around 20%) during cooking (Shankar 2018). Even though the shelf life of cold pressed oils is not as high as that of refined oils, under proper conditions, they may be preserved for up to six months.

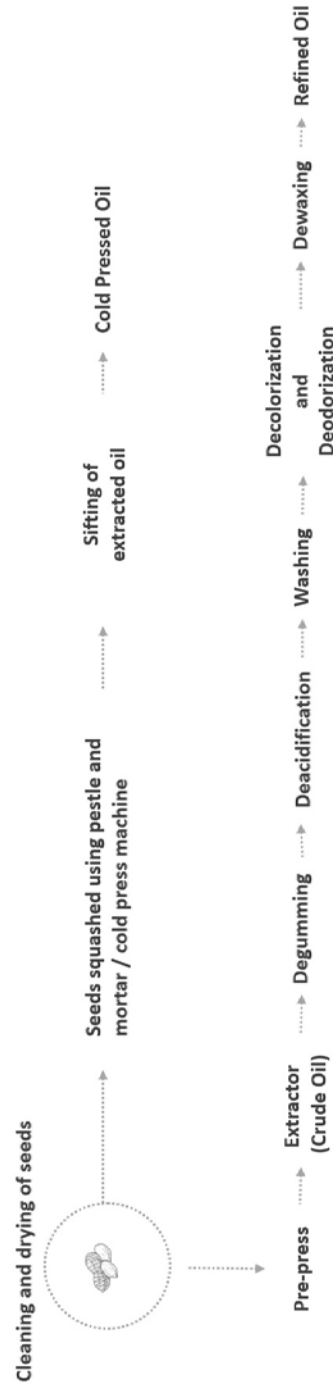


Fig. 1. Typical cold pressed process vs. refining of oil
Source: Authors

Objectives

- The objectives of this study are:
- ♦ To evaluate cold-pressed edible oil consumption patterns in southern India (urban)
 - ♦ To understand urban public perception of cold-pressed oils with respect to their physical, chemical and nutritional properties
 - ♦ To assess the impact of socio cultural and marketing influences on urban public perception of cold pressed oils.

METHODOLOGY

As the purpose of the study was to understand urban CPO consumption patterns and public perception, an ex-post facto research design has been followed. This is an empirical study that largely depends on primary data collected through an online survey instrument which covered subjects like health condition, cooking and eating hab-

its, oil consumption habits, perception about the different properties of cold-pressed oil and the impact of socio-cultural, economic and marketing influences on urban respondents as mentioned in Figure 2. As this was an exploratory study, judgemental (purposive) sampling was used to identify 400 urban respondents from the southern states of Kerala and Tamil Nadu, out of whom 298 returned completed questionnaires, resulting in a response rate of 74.5 percent. Respondents were selected across varying income levels, occupations, gender, education levels and health conditions and were from 5 districts in Kerala and 11 districts of Tamil Nadu. The questionnaire was pre-tested on 40 participants and internal consistency was confirmed with a Cronbach’s alpha value of 0.76.

As it was a descriptive study, an effort was made to quantitatively identify any relationships between the different variables that were being recorded. Although causality was not being es-

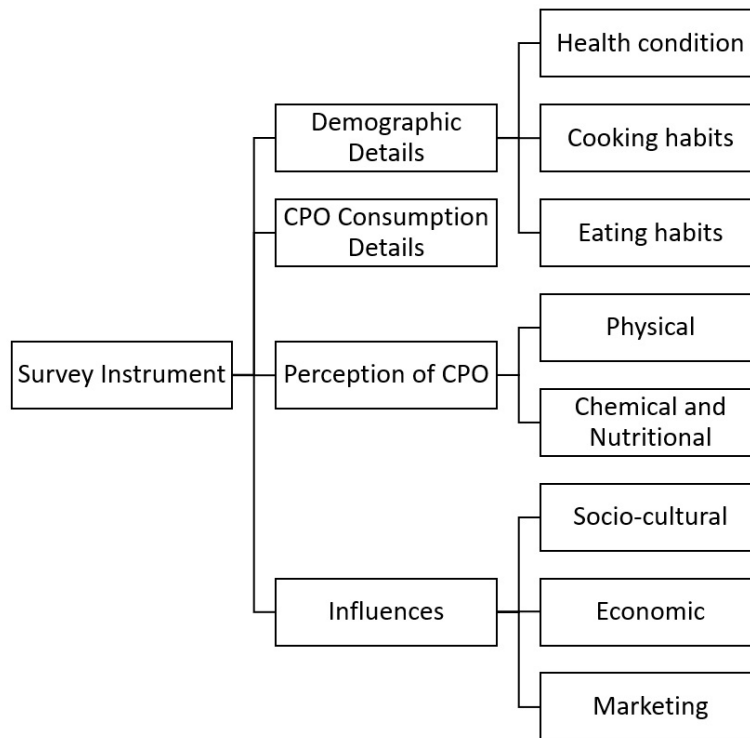


Fig. 2. Data collection heads (CPO=Cold Pressed Oil)
 Source: Authors

tablished in this cross-sectional study, it does give an indication of the strength and direction of association between different variables connected to usage of cold-pressed edible oil.

RESULTS AND DISCUSSION

On analysing the respondents as shown in Table 1, it was found that 72.48 percent of them belonged to families with 2-4 members. A smaller proportion of respondents (22.48%) belonged to 4-6 member size families and very few belonged to larger family sizes. This is crucial information as it has a direct bearing on the consumption of edible oil. This is also in keeping with the observed urban trend of large number of nuclear families as opposed to the earlier predominantly joint family system (Reddy and Raju 2010). The other major factor that would impact use of edible oil is the income level. As the National Council for Applied Economic Research has suggested that the typical income of a middle class family in India would range between 2 and 10 lakh Rupees per annum (Krishnan and Hatekar 2017), the respondents were grouped into three categories of annual incomes less than 2 lakh rupees (11.07%), between 2 and 10 lakh Rupees (83.56%) and greater than 10 lakh Rupees (5.37%).

Table 1: Family size of respondents

| <i>Family size</i> | <i>No. of respondents</i> |
|--------------------|---------------------------|
| 2-4 members | 216 |
| 5-6 members | 67 |
| 7-8 members | 10 |
| >8 members | 5 |

Further, in order to understand the general consumption patterns of edible oil and the potential for growth of the cold pressed oil industry, the consumption of certain oil varieties that are available as both refined and cold-pressed was recorded. Bearing in mind that a larger proportion of respondents belong to families with under 6 members or less, and that it is a common practice in southern India (as reinforced by data collected in the study) to purchase different varieties of oil for cooking different dishes, it was found that gingelly oil consumption was higher than that of coconut or groundnut oil. A large section of the respondents (87.58%), consumed up to 2 litres of gingelly oil per family per

month. Comparing this with groundnut, it was found that roughly 67 percent of the respondents used up to 2 litres per family per month and the same stood at around 75 percent for coconut oil. It has to be noted in Table 2 that not all respondents purchased all of the oils and many purchased a combination of oils per month. Some of these (22.48%) were purchased from cold pressed sources rather than as refined oils.

Table 2: Oil usage pattern

| <i>Oil usage (in litres per month)</i> | <i>Gingelly</i> | <i>Ground-nut</i> | <i>Coco-nut</i> |
|--|-----------------|-------------------|-----------------|
| Up to 1 litre | 183 | 152 | 197 |
| 1-2 litres | 78 | 48 | 26 |
| 2-3 litres | 9 | 14 | 6 |
| >3 litres | 0 | 2 | 3 |

Apart from groundnut, gingelly and coconut oil, the other oil varieties that were regularly purchased included sunflower oil, castor oil, olive oil, rice bran oil and mustard oil. Except for sunflower oil which was purchased by 90.94 percent of the respondents, the other oil varieties were purchased far lesser. This is also in keeping with the national trend of increasing per capita consumption of edible oil which has gone up from a mere 3kg in 1950 to around 19.2 kg in 2019-20 (New Indian Express 2021). This has however, helped to establish that in southern India:

- ◆ Families purchase multiple varieties of edible oil simultaneously
- ◆ Consumption of refined and cold pressed oils occurs concurrently

Out of the 298 respondents, 170 (57.05%) were purchasing at least one variety of cold pressed oil for cooking. Of these, 83 (48.82%) were using cold pressed oils for under 4 years, showing that it has been re-emerging as a trend in the last few years as depicted in Table 3. The perceptions of both, the urban users as well as those who do not use cold pressed oils were recorded as this may give an insight into why they are non-users.

Considering the physical properties of cold pressed oils, it is evident that most of the respondents believe that cold pressed oils have better smell, taste and physical appeal than refined oils. This could be because refined oils undergo various processes such as neutralising, bleaching and deodorising which removes the natural fragrances and even alters the taste (Healthline 2021). Ironi-

cally, the very same processes help in increasing the shelf life of refined oils, sometimes as high as 2 years in unopened packaging, as the usual rancidification and oxidation that is a problem with cold pressed oils does not occur. Public opinion reinforces the fact.

Table 3: Length of usage of cold pressed oil

| <i>Length of usage (in years)</i> | <i>No. of respondents</i> |
|-----------------------------------|---------------------------|
| Up to 4 years | 83 |
| Up to 7 years | 51 |
| Up to 10 years | 14 |
| >10 years | 22 |

On considering the chemical and nutritional properties of cold pressed oils, respondent perception tended to agree with the fact that refining oil involves more chemical processes than cold pressed production, and that refining reduces both the flavour and the nutritional value. This is in sync with facts established during the review of literature (Times of India 2021b; Shankar 2018).

With respect to whether or not cold pressed oils are suitable for cooking at high temperatures, most urban respondents were neutral in their responses. Amongst those who used cold pressed oils, one popular response was that CPO was not highly suited to deep frying. On using certain varieties of cold pressed oil such as that obtained from groundnut, deep frying causes smoke to emerge from the heated oil. This is because the smoking point of cold pressed groundnut oil is low at 160°C. The smoking point is the temperature at which the oil breaks down into its constituent glycerol and free fatty acids. Acrolein, which is a component of glycerol, is released as part of the smoke and may cause eye and throat irritation (Manchanda and Passi 2016) leading to people not using cold pressed oil for deep frying purpose.

Popular opinions recorded in the study suggest that the respondents are primarily neutral about reusing cooking oil multiple times. Cold pressed oils have been recommended for use by family members, especially elders, as it was a part of traditional cooking for a long period of time. While most respondents agreed that high usage of refined oils may have a correlation with conditions such as obesity and heart ailments, they felt that a variety of oils need to be consumed in order to access a host of nutrients. As cold pressed oils have been positioned as a healthier alternative to

refined oil, most respondents also opined that it would aid in weight loss. Similar results have been suggested in literature related to health benefits of cold pressed oil (Chandra et al. 2020; Rokosik et al. 2020).

As cold pressed oils have been used for long periods of time in traditional cooking, they are associated with adding flavour and taste to food. It is only recently that they have also been used to cook non-traditional food or food from other cuisines. Most respondents agreed that cold pressed oils were available for purchase in their neighbourhoods and that the oil was most likely sourced from locally produced seeds. While there was not much in terms of media advertisements for cold pressed oils, there was an awareness among the public about the availability of cold pressed oils. Despite the awareness and general leaning towards the advantages of using cold pressed oils, one possible reason for CPO not having a higher adoption rate could be the fact that these oils have been perceived to be very expensive. A market survey confirmed this fact as in some cases, refined oils were up to three times cheaper than cold pressed oils.

In order to assess the impact of socio cultural and marketing influences on public perception of cold pressed oils (Objective 3), a correlation test was performed between the Socio-Cultural Score and the average cold pressed oil usage per month. The test indicated a weak positive relationship with a correlation coefficient of 0.342 suggesting that as traditional familiarity, sensory appeal of CPO usage in traditional food items and influence of family and friends increases, so does consumption of CPO. With respect to marketing, as factors such as ready local availability of good quality CPO and supplier trust went up, average monthly consumption of CPO also went up (correlation coefficient of 0.293).

CONCLUSION

Cold pressed oils have been a part of traditional cooking in southern India for centuries and have only recently been replaced by refined oils. Many studies have been conducted to analyse the health impacts of both types of oils. Among the consumption patterns, this study has helped to establish that both refined and cold pressed oils are used simultaneously by urban families. Also oils from multiple sources (such as groundnut, coconut, gingelly and so on) are used concurrently. With

respect to the physical, chemical and nutritional properties, urban public opinion in Southern India agrees that cold pressed oils smell, taste and have a better physical appeal than refined oils. There is awareness that cold pressed oils have a higher nutritional value and is therefore better for health. Such oils are also locally produced and easily accessible for purchase. Despite the lack of advertisements in the media, there is an awareness about the availability and impact of using cold pressed oils. The two main reasons for inadequate adoption of such oils could be high cost of such oils as well the unsuitability of using the same for deep frying which has now become a part of popular cooking.

RECOMMENDATIONS

In order to increase the consumption of cold pressed oils among urban consumers, manufacturers may focus on increasing awareness through the use of advertisements and social media. As most manufacturers are in the small/medium scale category, they may target consumers who are within close geographical proximity through the use of pamphlets/brochures. They would be advised to focus on influencers such as the elderly in the family.

LIMITATIONS

As this was an exploratory study to understand prevalent perceptions and consumption patterns of edible oils in urban areas of southern India, judgemental sampling was used in data collection. Although 400 potential respondents were contacted across the southern Indian states, only 298 responded yielding a response rate of 74.5 percent. Responses were collected online due to the ongoing pandemic. Future studies could focus on using probability sampling spread over a wider area to produce generalisable results that would aid to increase the consumption of healthier cold pressed oils.

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