

# Quality Assessment of Fortified Edible Oil Samples from the Open Market

## Research Brief

KHPT conducted an open market quality assessment of fortified edible oils during the December 2020-April 2021 period across eight states of India to understand the quality assurance aspects of edible oil fortification. This initiative is supported by the Global Alliance for Improved Nutrition (GAIN) under the “Scaling-up and Sustaining Edible Oil Fortification in Select Geographies of India” project.



### Structure

The fortified oil samples were collected from eight states, namely Madhya Pradesh, Maharashtra, Rajasthan, Gujarat, Punjab, Haryana, Andhra Pradesh and Telangana. Samples were collected only from those industries which were trained on fortification by GAIN-KHPT and other implementation partners of GAIN: Indian Institute of Health Management Research (IIHMR), Vatsalya and Centre for Community Economics and Development Consultants (CECOEDECON).

A total of 239 samples were set as a target for pick -up, out of which 144 fortified edible oil samples were collected from the open market during the study period. GAIN-KHPT have experience working with leading analytical National Accreditation Board for Testing and Calibration Laboratories (NABL) laboratories of India for the analysis of fortificants in fortified food samples. All the samples collected from the open market were sent to a NABL-accredited laboratory only for the analysis of fortificants.





## Key findings of the assessment

### Types of fortified oil being sold in the market





Out of the **144** edible oil samples collected, most (**23.61%**) were refined soybean oil, followed by mustard oil (**21.53%**), refined sunflower oil (**15.97%**), filtered groundnut oil (**11.81%**), refined cottonseed oil (**8.33%**), refined rice bran oil (**6.25%**), refined palmolein oil (**5.56%**), blended edible vegetable oil (**2.78%**), sesame seed oil (**2.08%**), refined corn oil (**1.39%**) and refined groundnut oil (**0.69%**).

### Standards for fortification in collected edible oil samples

About **11** samples, mainly from the states of Rajasthan, Maharashtra and Madhya Pradesh, were found to be still following the 2016 operational standards and mentioning IU as units for both the added vitamins on their labels. As per the 2018 gazetted standards, units for the added vitamins should be mentioned preferably as mcg RE (micrograms Retinol Equivalent) for Vitamin A and mcg (micrograms) for Vitamin D.

### Quality of fortification of the samples

Of the **144** samples collected, only **43** samples were found to be as per gazetted standards of FSSAI. Out of **101** samples not compliant with standards:

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| <p><b>1</b></p> <p><b>55</b> oil samples were fortified below the minimum prescribed levels of Vitamin A and D</p>  | <p><b>2</b></p> <p>Both vitamins A and D were not detected at all in <b>41</b> oil samples</p>  | <p><b>3</b></p> <p>Either of the vitamins were detected in <b>2</b> samples</p>  | <p><b>4</b></p> <p>Vitamin A concentrations were found to be exceptionally high in <b>3</b> samples.</p>  |
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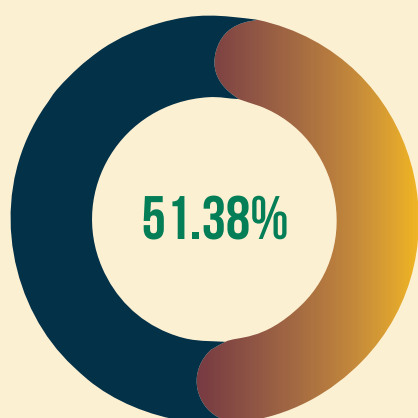
### Fortification quality and types of oils

If the type of oil is considered, mostly refined oils [**36.80% (N=53)**] failed to conform to the prescribed standards for both the vitamins, followed by kacchi ghani [**20.13 % (N=29)**] and filtered oils [**11.80 % (N=17)**].

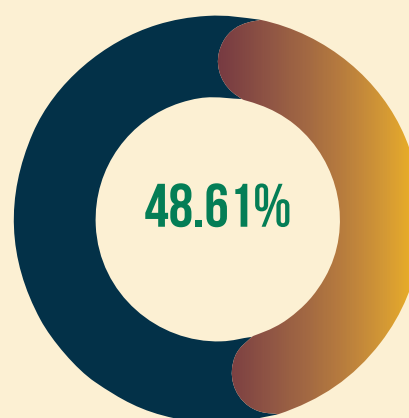


## Antioxidant addition status

Of the total oil samples collected from the open market



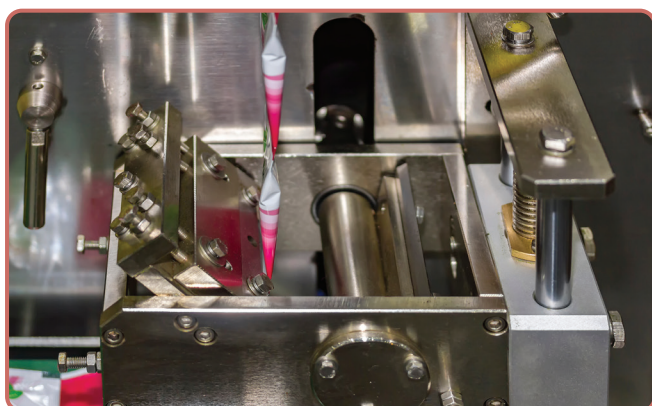
Samples clearly indicated the addition of permitted antioxidants to the oil on their packaging



Samples had no mention of added antioxidants on their packaging

## Packaging and labelling regulations with respect to fortification

Of all 144 samples, **141** samples had the + F logo on their packs; **143** samples had mentioned added values of Vitamins A and D on the nutri-panel of their packs and **141** samples had mentioned Vitamins A and D in their ingredient list as well. Only **13** industries used nutrition health claims allowed for fortified oils on their labels.



### Impact analysis of added antioxidant and Vitamin A concentrations of the oil samples

Edible oil samples with added antioxidants were found to be more compliant, as a higher proportion of them were found to have levels of Vitamin A and D as per the prescribed range, in comparison with those edible oil samples which did not report the addition of permitted antioxidants.

We found that that in many edible oil samples fortified with Vitamin A and D but with no addition of

antioxidants, levels of Vitamin A could not be detected at all. This suggests that added Vitamin A may have performed its antioxidant action, thus attributing to its loss in the samples. The storage conditions, transparency of containers and temperature are very important factors contributing to the loss of Vitamin D in the edible oil samples. It was noted that a high proportion of these samples were of kacchi ghani mustard oil, which is an unrefined oil and more susceptible to oxidation.





## Key Learnings

- Due to COVID-related restrictions, many of the industries were found to have either stopped or temporarily halted the production of fortified oils, and few industries were found to have closed permanently. Due to reduced production during the lockdown period, getting samples from fresh batches was not possible in some cases.
- A large proportion of fortified brands were found to be non-compliant with FSSAI standards for Vitamin A and D. Among them, refined oil category results were better than other categories, indicating that large industries with refining capabilities have better technical capacities and resources in comparison with Micro, Small and Medium Enterprises (MSME) industries, which generally produce filtered oil and other categories of oils.
- Non-compliance of a large number of industries to fortificant standards across geographies indicates many possible reasons, including the quality of premix being used, laboratory protocols followed to assess levels of fortificants etc., in addition to the fortification procedures being followed by the industries themselves.
- Generally, a large proportion of filtered oil (kacchi ghani) brands have reported not adding antioxidants. At the same time, a large proportion of these brands have either shown no presence or suboptimal level of Vitamins A and D. This again establishes the relationship between antioxidants and the presence of Vitamin A and D.
- The peroxide values were found to be consistently within the permissible range across all samples. This is surprising, given the established relationship between peroxide value and levels of fortificants in edible oil, as a large proportion of samples were found to be non-compliant with fortification standards. This needs further investigation with regard to laboratory methods adopted for evaluation.



## Conclusions

This market assessment revealed that most of the packaged fortified oil brands have reported either low or no addition of fortificants. The study also revealed that many of the brands were not available in the local geographies where they are being produced, and if available, only pack sizes of more than 5 kilograms were available, which were beyond the sample inclusion criteria of this assessment study. This market assessment fills an information gap by identifying different fortified edible oil types and variants available in the open market, their quality in terms of added micronutrients, fortification labelling regulations as prescribed by the FSSAI and the impact of added antioxidants on vitamin levels of fortified edible oil. The assessment also tries to explore possible measures to be taken to improve the quality of fortified edible oil available in the open market.

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