

# Evaluation of Food Labels of Bakery Products for Compliance with FSSAI Guidelines

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**ABSTRACT** **Background:** Food labels are useful tools that help us make need-based choices. Food Safety and Standards Authority of India (FSSAI) has laid down guidelines for labelling foods concerning nutrition facts panel (NFP), allergen information, ingredients and additives, serving size, quality symbols and logos. Bakery products are most widely consumed across various age and population groups. **Aim:** The present study was undertaken in 2018, which examined and evaluated the labels of selected bakery products for compliance with the FSSAI Guidelines. **Methods and Material:** One local brand and one national brand of bakery products with food labels were purposively selected from supermarkets in Vadodara, Gujarat. Fifteen products from all the batches available in the market from each brand were collected, and the labels were examined and evaluated for compliance with FSSAI guidelines for food labelling. **Results:** The NFP was presented either as “per 100 g” (67%), “per serving” (27%), “per 100 g” and “% DV” (3%) and “Per serving” and “% DV” (3%). The reporting of five mandatory nutrients was adhered to by 76% of the bakery products. The serving sizes were unrealistic that is either too small or too large. Of the total products containing fat sources (n = 24), 63% (n = 15) reported trans-fat sources in the ingredients list with alternative names like Hydrogenated Oils, Partially Hydrogenated oils/Fats, shortening, margarine. Of the 30 products, 37% (n = 9) of the products carried allergen advisory/precautionary declaration on food products. Only 63% of the products declared manufacture and best before date together at the same place. **Conclusion:** Majority of the products studied complied with the FSSAI guide-lines.

**Keywords:** Food labels, Nutrition Fact Panel, Labelling compliance, confectionaries, FSSAI, Bakery

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## INTRODUCTION

The bakery industry in India is the largest of the food processing segments, with an estimated annual turnover of about \$7.60 billion in 2020. India is the second-largest biscuit manufacturing country and considered the manufacturing house for bakery products. The rise of urbanisation and the growth of income and expenditure levels have attracted consumers to purchase bakery products, leading to the growth of international bakery chains and an influx of foreign bakery companies. From 2006 to 2019, there were sky-high sales of sweet and savoury snacks, confectioneries, cakes and pastries

in India. Sweet snacks, namely snack bars, sweet biscuits, ice creams, were most preferred by the population.<sup>[1]</sup>

According to the report by the IMARC Group, in 2020 the Indian bakery market reached a value of US\$ 9,626 million and is projected to reach \$13.3 billion by 2025.<sup>[2]</sup>

The dietary transition has led to a surge in demand and consumption of processed foods, namely bakery

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products. This dietary transition has led to a nutrition transition characterised by diets high in energy but low in micronutrients. These poor-quality diets are the leading cause of the increased prevalence of diet-related chronic diseases globally. Various disadvantages linked with bakery products are high Transfat, sodium, and sugar content, contributing to the risk of various non-communicable diseases.

Bakery products are popular due to easy accessibility, palatability, consistency in organoleptic quality and variety. The ingredients of concern in bakery products are sodium, added sugar, fat and trans-fat in particular. The fat added to bakery products acts as a shortening agent and imparts the desired texture. Partially hydrogenated vegetable oil (PHVOs) are commonly used in bakery products and are a trans-fat source. Several health risks are associated with high fat (including trans-fat) sodium, sugar (HFSS) foods. WHO (2020) in its report "Countdown to 2023" recommends that total Trans Fatty Acid intake be limited to <1% of total energy intake, which translates to less than 2.2 g/day in a 2,000-calorie diet.<sup>[3]</sup>

Ultra-processed foods like biscuits, chocolate milk, and baby food are often introduced early in a child's diet. Twelve per cent of children < 2 years of age (n = 1604) were found to be overweight who were breastfed and were consuming ultra-processed foods.<sup>[4]</sup>

Food labels serve as an essential tool that provides information on the product's nutritional content and help us make need-based choices. As per the FSSAI (2011) guidelines for food labelling, every pre-packed food should contain a list of ingredients with an appropriate title, such as the term "Ingredients". The ingredient name mentioned in the food product should be listed in descending order of their composition. The nutrition information on NFP should be given as "per 100 gm" or "100 ml" or "per serving" of the product on the label. It is mandatory to report energy value (kcal), protein (g), carbohydrates (g) and sugar (of the total carbohydrates) (g) and fat (g or ml) on NFP. It is mandatory to mention on the label about the products containing hydrogenated vegetable fats or bakery shortening as they contain Trans fats". FSSAI also states that food label can depict a health claim of "trans fat free" when the Trans fat is less than 0.2 g per serving of food. According to Indian Food Laws (FSSAI), ingredients that cause hypersensitivity must be listed on the food product even if the quantity is less than 5%. FSSAI has identified an additional allergenic ingredient, namely, black gram, as the cause of hypersensitivity/allergy and thus included in the list of allergens.<sup>[5]</sup> It is mandatory to indicate whether the product contains a vegetarian ingredient or non-vegetarian ingredient through symbols. Green coloured filled circle in a square indicates vegetarian, and brown coloured filled circle in a

brown colour square indicate non-vegetarian food. The purpose of these symbols is to give a quick guide or information about the vegetarian/non-vegetarian ingredients in the food product.

A study conducted in Coimbatore City to find awareness about the food labelling among school-going children (n = 1409). About 50% of children knew about the food labels and examine them while purchasing.<sup>[6]</sup> Another study in Coimbatore on consumers (n = 200) aged 20-60 years claimed that they (46%) read all the information such as serving size, nutrient content, price, expiry date and ingredients. About 27% of the consumers read only the expiry date and about 16% of the participants read only the price before buying the food products.<sup>[7]</sup> Reading food labels were reported to be a common habit among most of the adolescents of Kolkata. However, many of them appeared to be concerned only about the shelf life or safety of the product.<sup>[8]</sup> A survey on the consumers (n = 838) of Indore City revealed that more than half of them (61.8%) indicated that their choice of specific foods was not based on nutrition information. Only 9.3% claimed that they utilise that knowledge when shopping. About 57.7% of consumers "Don't understand" the food labels, whereas 39.7% "Partially understand" the food labels information.<sup>[9]</sup> The gap between research and policy priorities has always presented an enormous challenge both for academics and policymakers. In India, there is a scarcity of rigorous evidence on food label compliance with the regulatory authority. With this background, the present study was planned to study bakery products in a local market in India.

## MATERIALS AND METHODS

The present study was undertaken in 2018, which examined and evaluated the labels of selected bakery products for compliance with the FSSAI Guidelines. Market Survey of bakery products was carried out at National and Local outlets in Vadodara to fulfil the criteria required for selecting appropriate bakery products. One local brand and one national brand of bakery products with food labels were purposively selected. Fifteen products from all the batches available in the market from each brand were collected, and the labels were examined and evaluated for compliance with FSSAI guidelines for food labelling (Table 1). Products with counterparts available in both brands were selected for the study. Using the above criteria, 30 products qualified from the two brands. Analysis of the food labels for various components of nutrition labelling, namely, symbols and logos, nutrient claims, health claims, Serving size, ingredients list, allergen declaration, Nutrition Facts Panel (NFP), Front of pack (FOP), information on colours, flavours and preservatives and other miscellaneous information. Examination of packaged bakery products having claims of multiple sources of "nutrients of

**Table 1: List of Bakery Products Selected for the Compliance**

| S. No | National Brand                              | Local Brand   |
|-------|---|---|
| 1     | Cream roll (Strawberry, vanilla, chocolate) | Cream roll (Pineapple, strawberry, mango, chocolate, vanilla) |
| 2     | Slice cake (Vanilla, chocolate)             | Slice cake (Chocolate)  |
| 3     | Premium quality rusk                        | Premium rusk  |
| 4     | Maska Khari                                 | Butter khari  |
| 5     | Veg chocolate cake                          | Eggless chocochip cake  |
| 6     | Chocolate bar cake                          | Chocolate walnut cake   |
| 7     | Potato shells                               | Cheese straw  |
| 8     | Veg muffins                                 | Premium muffins   |
| 9     | Bread stick                                 | Shrewsbury cookies  |
| 10    | Swiss roll                                  | Kajunankhatai   |
| 11    | Plum cake                                   | Almond and raisin cake  |
| 12    | Veg fruit cake                              | Fruit biscuit   |
| 13    | Whole wheat bread                           | Fresh brown bread   |
| 14    | Rich sandwich bread                         | Premium bread   |
| 15    | Bun pav                                     | Bhajipav  |

concern". The Percentages were calculated for compliance with FSSAI guidelines.

## RESULTS AND DISCUSSION

The labels were examined and evaluated for compliance with FSSAI guidelines for food labelling. Care was taken to select similar products from the two brands of bakery products.

### Nutrition Facts Panel

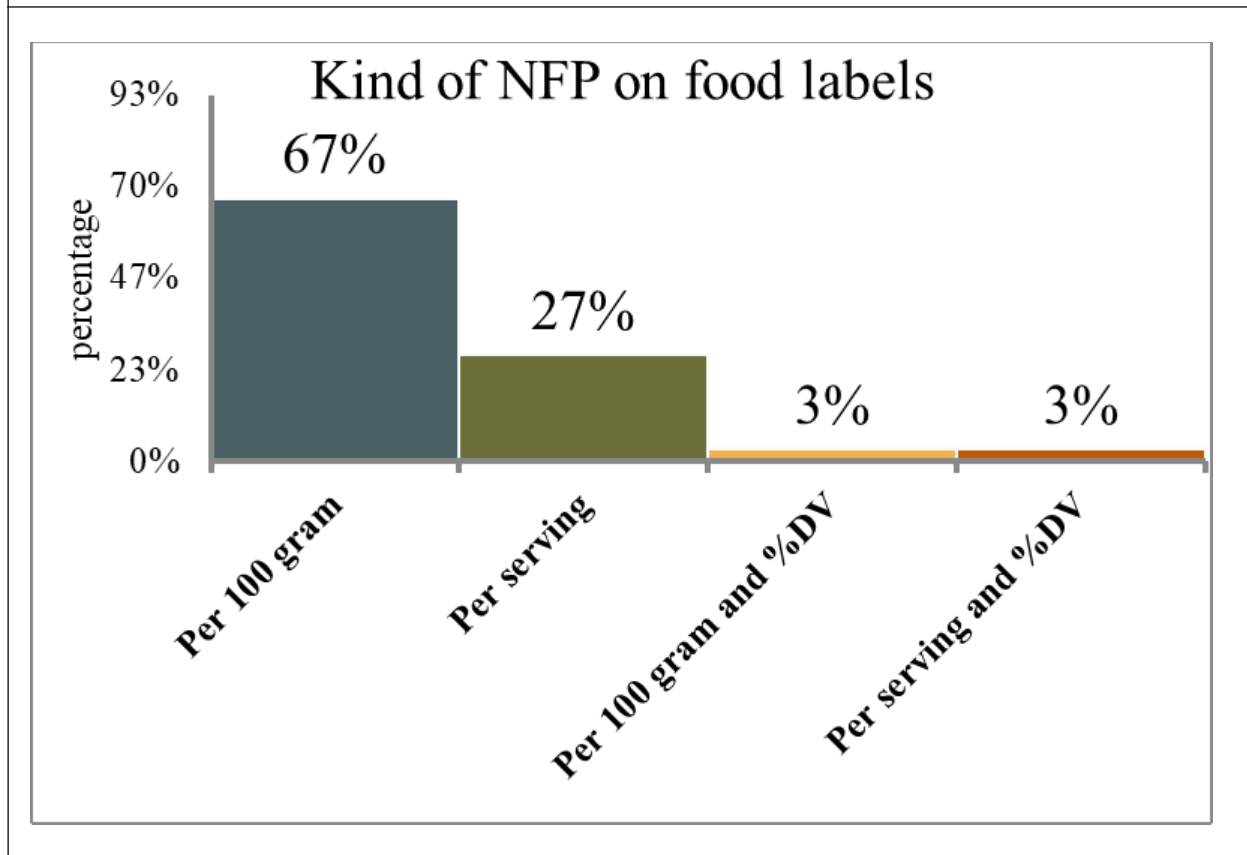
According to FSSAI of India (2011), nutrition information on NFP should be given as "per 100 gm" or "100 ml" or "per serving" of the product on the label.<sup>[5]</sup>

Figure 1 depicts the kind of NFPs displayed on examined food labels. About 67% per cent of the bakery products had NFP as "per 100 g," 27% of the products indicated NFP as "per serving," 3% showed NFP as "per 100 g" and "% DV" and 3% displayed NFP as "Per serving" and "% DV". The percent Daily Value (%DV) is the percentage of the Daily Value for each nutrient in a serving of the food. The Daily Values are reference amounts (expressed in grams, milligrams, or micrograms) of nutrients to consume or not to exceed each day.<sup>[10]</sup> The serving size mentioned on the food labels should be realistic and standard across the brands. In the present study, the serving size was mentioned in 37% (n = 9) of the products from Local brand. The serving size varied

among various products, namely, premium rusk, fruit biscuit, Shrewsbury cookies and cheese straw (10 g  $\approx$  1 unit of each product), kajunankhatai and butter Khari (11 g  $\approx$  1 unit of each product), premium muffins (14 g  $\approx$  1 unit of each product), cream roll (48 g  $\approx$  1 unit of each product), chocolate slice cake (150 g  $\approx$  entire pack). The serving sizes were unrealistic, either too small as in the case of fruit biscuit and Shrewsbury cookies or too large as in chocolate slice cake. Variation in serving size can alter the nutritional values reported on food labels and compromise the food choices made by the population. Results from a similar study stated that the majority (64%) of food products had NFP as "per 100 g," 19% of the products declared NFP as "per serving". Only 8% of the products reported NFP as "per 100 g, per serving and % DV". Nineteen per cent of the products displayed NFP as "per 100 g and per serving", and 2% of the products displayed NFP as "per serving."<sup>[11]</sup> There is a need of defining a simple, easy to understand format for reporting serving size on food labels to come up with clear and easily comprehensible nutrition information to the buyers.<sup>[12]</sup>

Figure 2 shows the percentage reporting of mandatory nutrients on NFP of the food products. Under FSSAI, it is mandatory to report energy value (kcal), protein (g), carbohydrates (g) and sugar (of the total carbohydrates) (g) and fat (g or ml) on NFP. It is mandatory to substantiate the

**Figure 1: Reporting of Nutrients on Nutrition Facts Panel (NFP) in Bakery Products Selected for the Study**

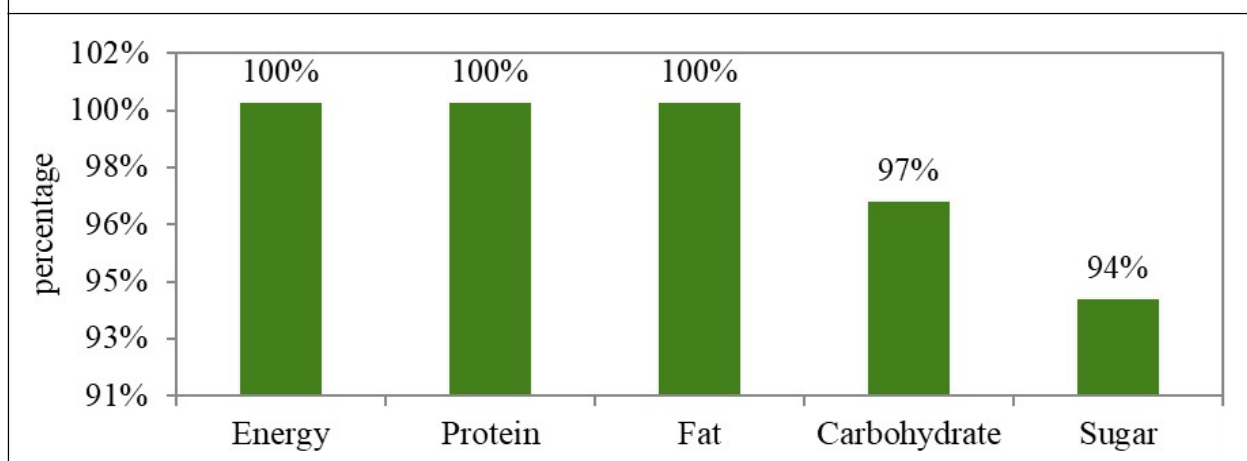


nutrition and/or health claims made on FOP. It was found that 76% of the bakery products adhered to reporting five mandatory nutrients. Energy, protein and fat were reported in all the products, followed by carbohydrates (97%) and sugar (94%). Eighty per cent of the products (n = 24) reported SFA and TFA. In the present study, the reporting of fibre, SFA and TFA were 100% and 83%, respectively. A study done on processed foods stated that energy was reported in 100% of the products, followed by carbohydrates and protein (99%), fat (98%) and sugar (87%).<sup>[11]</sup>

Similar research was conducted in Costa Rica revealed that total fat (78%), saturated fat (74%), and sodium (77%) were less commonly reported on pastries, cakes, and sweet biscuits. Total added sugars were the least often reported on packages of savoury snacks (67%). Sugar (79%) was the least reported critical nutrient in all the food groups whereas energy (90%) and total fat (90%) were the nutrients most reported in all food groups.<sup>[13]</sup>

According to the FSSAI guidelines, the list of ingredients should have an appropriate title, such as the term “Ingredients”. The ingredients used in the product should

**Figure 2: Reporting of Mandatory Nutrients on NFP in Selected Bakery Products Ingredients List**



be listed in descending order of their composition.<sup>[5]</sup>; Ingredients listed in descending order of their weights help the consumers select a healthy food product. In the present study, 92% (n = 22) of the products listed the ingredients in descending order of percentage weights. The majority of the bakery products (92%) from the National and Local brands complied with FSSAI guidelines. Commonly listed alternative sources/names for sugar were refined sugar, sucrose, dextrose, malt extract, maltodextrin, invert syrup/sugar, liquid glucose, caramelised sugar. For fat, alternative names used were hydrogenated oils, partially hydrogenated oils/fats, shortening, margarine, butter, cocoa butter, sunflower oil, and cream. Salt was listed as edible salt, common salt, iodised salt. Manufacturers often list the “ingredients of concern” with different names in the ingredients list to mask their visibility, especially when a particular product contains a high amount of one or more ingredients of concern. Similar research stated that of the total 1,020 processed food products selected for the study, only 337 (33%) of the products listed ingredients in descending order of percentage weights. Out of 10 food groups, only four namely, bakery products (26%), ready-to-cook/eat products (20%), wheat and oats based products (18%) and snacks (14%) had more than 10% of the products that complied with the FSSA guidelines.<sup>[11]</sup>

During the Canadian food supply label review, 76 products (0.5%) had discrepancies in their nutrition claim classifications. This study showed that 49% of products displayed some claim on food labels.<sup>[14]</sup> CSE (2019) study showed that many of these packaged foods have fat and salt content many times the threshold.<sup>[15]</sup>

In the case of bread and bakery products, out of 600 products, only 378 products met the FSSAI guidelines (63%), and

sodium was labeled in a total of 162 products out of 600 products (27%).<sup>[16]</sup>

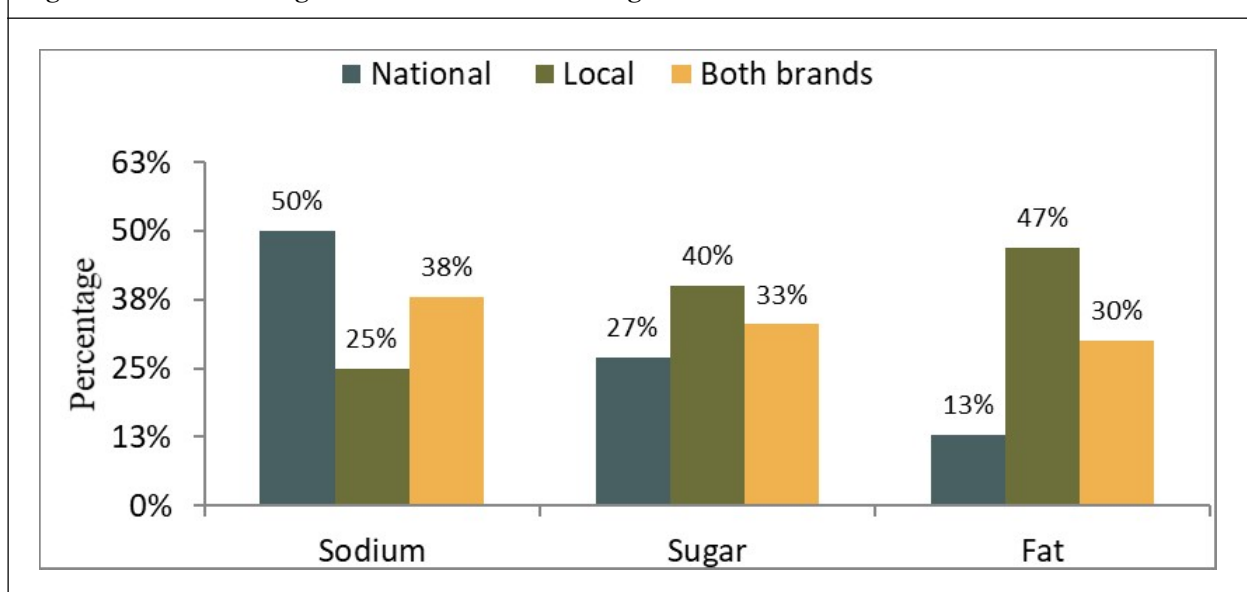
### Listing of More than One Source of “Ingredients of Concern” in Ingredients List in Selected Bakery Products

As per the food laws, mandatory listing of ingredients in descending order of their weight percentage infers that the first few ingredients are the significant contributors to the food. Any product reporting more than one source of “ingredients of concern” with alternative names in the first two places of the ingredient list may be high in that particular ingredient. It was found that 38% of the total products had more than one source of sodium in the ingredients list, 33% of the total products had more than one source of sugar in the ingredients list, which was followed by 30% of the products with multiple sources of fat among both National and Local brand (Figure 3).

More than one source of sodium was reported as INS 500(II): (Sodium bicarbonate), INS 466 (Sodium carboxymethyl cellulose) and INS 325 (Sodium lactate). More than one source of sugar appeared as invert syrup, maltodextrin, sucrose, refined sugar. The multiple sources of fat were hydrogenated vegetable oil, butter, margarine.

FSSAI mandates labelling the products containing hydrogenated vegetable fats or bakery shortening containing Trans fats on the food labels. It also states that a food label can depict a health claim of “trans-fat-free” when the Trans fat is less than 0.2 g per serving of food.<sup>[5]</sup> Of the total products containing fat sources (n = 24), 63% (n = 15) had trans-fat sources in the ingredients list with various alternative

**Figure 3: Products having More than One Source of Ingredients of Concern**



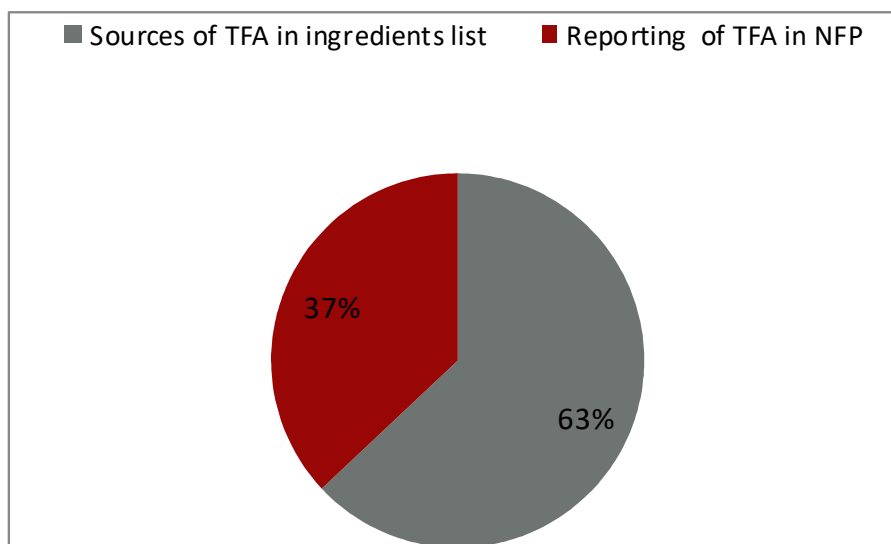
names like Hydrogenated Oils, Partially Hydrogenated oils/ Fats, Shortening, Margarine, Butter, cream (Figure 4). Out of the total products from National and Local brands (n = 30), 37% (n = 11) of the products showed TFA related claims, of which 54% (n = 6) products reported the claim as “Total trans fat content not more than 1% by weight” and 45% (n = 5) products reported the claim as “Total trans fat content not more than 2% by weight”. The labelling of Trans fat claims was not accurate as there was no clarity regarding the reference weight mentioned on these claims. Local brands reported no trans fat even though they contained hydrogenated fats in their ingredients list (n = 8). As per the FSSAI, every food product in which fats, oils and fat emulsions are used as an ingredient must report the quantity of TFA content and

saturated fat content on the label. The content of saturated fat and trans fat may be declared as “not more than”. The saturated fat and trans fat content are to be given only if the fat content is more than 0.5%. Non-compliance was seen in declaration of trans fat content on food label.

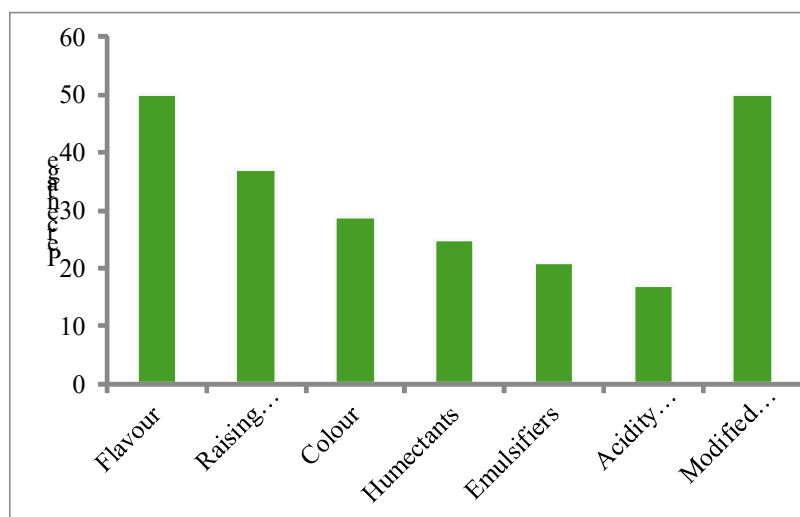
### Reporting of Additives on Back of Pack of Nutrient Labels of Selected Bakery Products

The commonly reported additives on the labels of bakery products were flavouring agents, colouring agents, raising agents, acidity regulators, humectants, emulsifiers and modified starch. About 50% of the products displayed information on the added flavour of which 33% of the

**Figure 4: Sources of Trans Fatty Acids (TFAs) in Food Products**



**Figure 5: Reporting of Additives on Back of Pack Nutrient Labels of Selected Bakery Products**



| S. No. | Additives Class   | Most Commonly Used Additives   |
|--------|-------------------|--|
| 1      | Raising agent     | INS 500 (II): Sodium bicarbonate   |
| 2      | Colouring agents  | Caramel (E 150 (Plain caramel); E 150 (Caustic sulphite caramel); E 150 (Ammonia caramel); E 150 (Sulphite ammonia caramel))   |
| 3      | Humectants        | INS 325 (Sodium lactate); INS 422 (Glycerol); INS 1520 (Propylene glycol)  |
| 4      | Emulsifiers       | INS 435 (Polyoxyethylenesorbitanmonostearate); INS 491 (Sorbitan monostearate); INS 471 (Mono- and diglycerides of fatty acids (glyceryl monostearate, glyceryl distearate)) |
| 5      | Acidity regulator | INS 260 (Glacial acetic acid)  |
| 6      | Modified starch   | INS 1442 (Hydroxypropyldistarchphosphate)  |

products displayed the same as “contains added flavour” (Figure 5), 25% of the products displayed it as “contains added artificial flavouring substances”, 42% displayed it as “contains permitted added flavour”. Twenty-nine per cent of the products reported added colour on the labels, out of which 28% of the products displayed the information as “contains permitted natural colour,” 43% as “may contain artificial colours,” and 28% as “may contain permitted synthetic food colours”. About 25% of the products displayed humectant related labels. Humectants are used in products such as sponge cakes and Swiss rolls. They can absorb moisture and helps to retain the moisture content and extend shelf-life, controlling the rate of crystallisation in sweets, lowering the freezing point of soft ice creams. About 21% of the products displayed emulsifier related labels. Seventeen per cent of the products displayed acidity regulator related labels.

Only 4% of the products reported added modified starch on labels, generally used as a thickener and vegetable gum and derived from potatoes, wheat, maize, rice and barley, or roots like cassava. The results showed compliance regarding additives declaration on food labels.

### Allergen Information

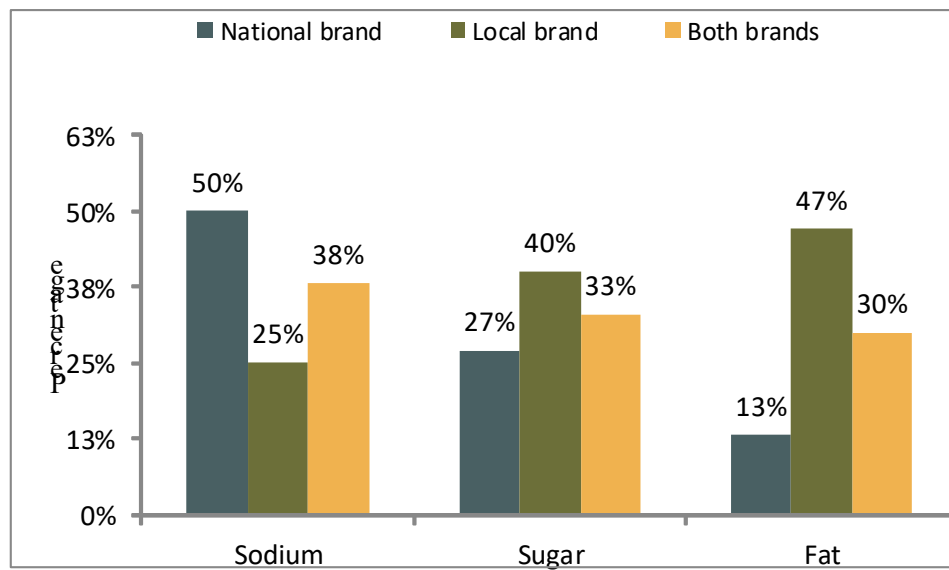
Various types of allergen information as advisory/precautionary declarations commonly found on bakery products surveyed in the study were as follows:

1. “Contains eggs, wheat and manufactured under facility that also handles milk products and nuts”.
2. “Contains wheat ,milk solids and processed under facility that also handles soya products, sesame seeds and nuts”.
3. “Polyols may have laxative effects”.

One of the critical concerns for consumers with food hypersensitivity is the presence of food allergen in a “hidden” form in processed food. This can happen when the ingredients derived from the allergy-causing foods are reported using a broad, uninformative term (such as textured vegetable protein

instead of soy), technical or scientific term (such as “ovalbumin” instead of egg, “casein” instead of milk ) or by using a broad, uninformative term (such as textured vegetable protein instead of soy). Thus, the primary aim of all food allergen regulatory frameworks is to make sure the use of the easy-to-understand terms in the ingredient list. <sup>[17]</sup> According to Indian Food Laws (FSSAI), ingredients that cause hypersensitivity must be listed on the food product even if the quantity is less than 5%. It was observed that of the total 30 products, thirty-seven percent (n = 9) of the products carried allergen advisory/precautionary declaration on food products. The remaining 15 products did not carry any allergen declaration. None of the products from local brand having allergen sources in the ingredient list (n = 15) displayed allergen declaration. From the national brand, 13 products displayed allergen sources in the ingredients list, out of which only 60% of products carried allergen declaration.

Data presented in Figure 6 reveals that all the bakery products from the National and Local brand were wheat-based, but only 33% (n = 10) of the products carried wheat-related allergen declaration. The majority of the products had allergen advisory/precautionary declaration related to “tree nuts and nuts” (n = 9), followed by “cereals containing gluten” (n = 9), “milk and milk products” (n = 6), “soya products” (n = 6), “sesame seeds” (n = 6), “eggs and products” (n = 3). Results from a similar study revealed that out of 1,020 processed food products selected, 218 (21%) products carried allergen advisory/precautionary declaration on food labels. Of the products (n = 802) that did not carry advisory/precautionary declaration, 492 had one or more allergenic ingredients in the ingredients list.<sup>[11]</sup> The results from both studies show poor compliance regarding allergen declaration on food labels. According to FSSAI, it is mandatory to indicate whether the product contains vegetarian ingredients or non-vegetarian ingredients through symbols.<sup>[5]</sup> Most of the products (87%) studied had either vegetarian or non-vegetarian logos, followed by ISO (30%).

**Figure 6: Brand-wise Reporting of Allergen Source on Ingredients List and It's Substantiation**

## CONCLUSION

The majority of the bakery products studied complied with the FSSAI guidelines, but poor compliance was seen in the declaration regarding allergen information and Trans-fat declaration on food labels. Lack of critical nutrient declaration on the most purchased products is a matter of concern, as an excess of critical nutrient consumption including sodium, fat, energy and added sugars are strongly associated with the onset of obesity and non-communicable diseases such as hypertension, diabetes, cardiovascular diseases, and food allergy. Attempts to critically examine the labels for compliance with the FSSAI guidelines have been few and far in India. More rigorous research studies can add value and help policymakers in better implementation of food labelling guidelines.

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