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Prevalence of oral allergy syndrome among school-age children in Mexico: a first nationwide study in Mexico and Latin America

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Abstract
Background: Epidemiological knowledge about oral allergy syndrome (OAS) in Latin America is limited. The aims of this study are to estimate the prevalence of OAS in Mexican children, identify the most associated foods, describe its main clinical manifestations, and determine the associated factors.
Material and methods: Multicenter cross-sectional study (October 2023–April 2024) with stratified sampling in 8 regions of Mexico. A structured questionnaire was applied and multivariate analyses were performed to identify factors associated with OAS.
Results: A total of 4269 children were included (51.7% boys; mean age: 8.7 years). The national prevalence of OAS was 2.8% (95% confidence interval (CI): 2.3%-3.3%), with higher frequency in the northwest (6.4%), southeast (3.9%), and southwest (3.6%) regions. In addition to oral

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manifestations, the most frequently reported manifestations were reddish skin (40.8%), hives (39.2%), skin itching (38.3%), and sneezing (26.7%). The foods most frequently associated with OAS were milk (21.7%), shrimp (10.8%), egg (7.5%), avocado (6.7%), cashew, wheat, and peanut (5.8% each), tomato, and pork (4.2% each). Age 9–12 years (adjusted odds ratio [OR]: 1.63; P = 0.013). Asthma (adjusted OR: 1.88; P < 0.001), atopic dermatitis (adjusted OR: 3.09; P < 0.001), and pollen allergy (adjusted OR: 4.25; P < 0.001) were significantly associated with OAS.
Conclusions: The prevalence of OAS in school-age children is nearly 3%. Multiple foods capable of causing oral manifestations were identified, with dairy, shrimp, and fish among the most important ones.

Introduction

Currently, food allergy represents a global challenge because of the vast number of affected people. Global estimates indicate a self-reported prevalence of food allergy in children ranging from 2.5% to 24.6%.[1] Immunologically mediated adverse food reactions are classified into three categories: immunoglobulin E (IgE)-mediated, non-IgE-mediated, and mixed-pattern reactions;[2] within the first category, oral allergy syndrome (OAS) is particularly remarkable.

Oral allergy syndrome refers to a group of patients with food allergy who primarily experience manifestations in the oral cavity after ingesting certain foods;[3,4] however, in some cases, these clinical manifestations are accompanied by systemic manifestations, such as hives, skin itching, localized swelling, and, in more acute cases, an anaphylactic reaction.[5–8]

The prevalence of OAS in children varies widely, ranging from 0.5% to 16.9%, depending on factors, such as geographic area, diagnostic methods used, and characteristics of the studied population.[7–16] Varieties of foods are associated with OAS, which differ considerably according to regional dietary habits. In general, fruits and vegetables[6,7,14,16,17] are the main triggers, although in some areas, animal-derived products, such as dairy and seafood, are the most important triggers.[3,10,18] Additionally, gender, age, presence of atopic comorbidities, a family history of allergic disease, and allergic sensitization to pollens are the factors that influence the clinical expression of OAS.[6,10,11,13,14,16,17,19]

Available information on the prevalence of OAS in school-age children at the national level is limited and mostly accessible from the studies conducted in highly urbanized cities, which introduce heterogeneity in dietary habits and the availability of certain foods, as these vary significantly between regions. These differences can influence both the occurrence of OAS and the foods commonly implicated in reactions, potentially creating statistical confounding when identifying factors associated with OAS. Therefore, it is essential to generate national evidence that considers regional diversity to improve diagnosis, clinical care, and prevention strategies for OAS in the pediatric population. In this context, the present study aims to: determine the national and regional prevalence of OAS in Mexican children; identify the food groups and specific foods most frequently implicated; characterize the most common clinical manifestations associated with OAS; and analyze the factors significantly associated with its presence.

Material and methods

Design and setting

A multicenter, population-based cross-sectional study was conducted nationwide, including school-age children aged 6–12 years attending both public and private schools. Mexico is territorially divided into eight regions: northwest, northeast, west, central-north, central-south, east, southwest, and southeast.[20] These regional divisions were used as criteria to select a representative sample of children from each of the eight regions to ensure broad and diverse geographic coverage. Data collection was carried out through structured questionnaires directed to the parents or guardians of the selected children, with fieldwork conducted from October 2023 to July 2024.

Instrument

A specific questionnaire, already used in previous reports by our group, was used in this study. This questionnaire was created by allergists, incorporating questions commonly asked during allergy consultations, particularly about a personal history of allergic diseases such as asthma, allergic rhinitis, and atopic dermatitis; sociodemographic data, such as children's age and gender, were also collected (Supplementary Material).

Definitions

Initially, to identify possible adverse food reactions, parents were asked whether their children had experienced allergic manifestations after consuming any food or drink.[10] To identify possible cases of OAS, an affirmative response to this initial question was considered; in these cases, further information was collected regarding the presence of manifestations localized in the oral cavity (OAS) as well as in other organs or systems. Additionally, detailed information was requested about the foods the parents associated with the appearance of these clinical manifestations.

Statistical analysis

Frequencies and proportions were estimated for qualitative variables; 95% confidence intervals (95% CI) for proportions

were calculated using the Modified Wald (Agresti–Coull) method. To estimate the prevalence of OAS, the total number of children presenting oral manifestations after consuming food was divided by the total sample analyzed; this procedure was also applied to each geographic region of the country. Multivariate analyses were performed using binary logistic regression to identify factors associated with OAS, expressed as adjusted odds ratios (aOR) with corresponding 95% confidence intervals (CI). Adjustment variables included gender (male), age (9–12 years), history of allergic diseases, and maternal and personal atopy. $P \leq 0.05$ was considered statistically significant. Analyses were conducted using IBM® SPSS® Statistics version 29.0 (IBM Corp., Armonk, NY).

Ethics

This study was approved by the Research Ethics Committee of the Hospital Civil de Guadalajara "Dr. Juan I. Menchaca." Parents or guardians of the selected children provided written informed consent for inclusion of their children and to participate as informants. None of the children responded directly to the survey.

Results

Subject characteristics

A total of 4269 children were included, with 51.7% males and 48.3% females; the mean age was 8.7 ± 1.8 years, and 59.7% attended public schools. The prevalence of asthma was 13.9%, allergic rhinitis 18.0%, and atopic dermatitis 15.9%; pollen allergy was reported in 12.8% patients (Table 1).

Table 1 Population characteristics.

	Total *N* = 4269	
	n	%
Gender		
Male	2208	51.7
Female	2061	48.3
Age (years)		
6–8	2061	48.3
9–12	2208	51.7
School type		
Public	2250	59.7
Private	1719	40.3
Comorbidity		
Asthma	595	13.9
Allergic rhinitis	769	18.0
Atopic dermatitis	678	15.9
Maternal atopy	788	18.5
Paternal atopy	797	18.7
Pollen allergy	546	12.8

Prevalence of OAS

In all, 120 patients of OAS were recorded, representing a national prevalence of 2.8% (95% CI: 2.4–3.4%). According to geographic region, the northwest region had the highest prevalence of OAS at 6.4% (95% CI: 4.3–9.3%), followed by the southeast at 3.9% (95% CI: 2.4–6.3%) and the southwest at 3.6% (95% CI: 1.3–4.5%). Both central-south and east regions showed similar prevalence at 2.7% (95% CI: 1.6–4.5% [central-south], and 1.4–4.8% [east]), while the west region had a prevalence of 2.3% (95% CI: 1.5–3.4%). Finally, the central-north and northeast regions reported the lowest prevalence at 1.7% (95% CI: 0.9–3.3% [central-north]) and 1.0% (95% CI: 0.4–2.4% [northeast]) (results not shown in tables).

Manifestations of OAS

Table 2 presents the most frequent manifestations in the 120 children with OAS. In addition to oral discomfort, the most common manifestations were reddish skin (40.8%), hives (39.2%), and skin itching (38.3%). The less frequent manifestations were respiratory difficulty (19.2%) and hypotension (5.8%); interestingly, four patients (3.3%) of anaphylaxis associated with OAS were recorded.

Foods associated with OAS

In all, 69 individual foods were identified as associated with OAS in children. By category, the most frequent food groups were fruits (35.8%), followed by dairy (24.2%) and seafood (18.3%). The least frequent category was red meat (7.5%) (Table 3).

Table 2 Main clinical manifestations in school children with oral allergy syndrome (*N* = 120).

	n	%
Lip itchiness	64	53.3
Lip edema	57	47.5
Skin redness	49	40.8
Hives	47	39.2
Skin itchiness	46	38.3
Palate itchiness	38	31.7
Sneezing	32	26.7
Rhinorrhea	31	25.8
Cough	30	25.0
Nasal congestion	28	23.3
Pharyngeal oppression	27	22.5
Abdominal pain	25	20.8
Wheezing	24	20.0
Flatulence	24	20.0
Vomiting	24	20.0
Tearing	20	16.7
Respiratory difficulty	23	19.2
Hypotension	7	5.8
Anaphylaxis	4	3.3

Table 3 Food categories related to oral allergy syndrome in school children (*N* = 120).

	n	%
Fruits	43	35.8
Dairy	29	24.2
Seafood	22	18.3
Dried fruit	17	14.2
Vegetables	12	10.0
Cereals	12	10.0
Legumes	12	10.0
Red meats	9	7.5

Among the 120 children with OAS, individual foods most commonly implicated within each category were: fruits (avocado [6.7%] apple [6.7%], and peach [5.8%]); dairy, milk (21.7%); seafood (shrimp [10.8%] and fish [5.0%]); nuts (cashew [5.8%], pecan [5.8%], and almond [5.8%]); vegetables (tomatoes [4.2%]); cereals (wheat [5.8%]); red meat (pork [4.2%]); legumes (peanut [5.8%]); and finally, egg (7.5%) (Table 4).

Factors associated with OAS

Table 5 shows the results of multivariate analysis. An inverse association was discovered between male children (protective factor) and OAS (adjusted odds ratio [OR]: 0.63, P = 0.016). In contrast, the following factors were positively associated with OAS: age 9–12 years (adjusted OR: 1.63, P = 0.013), personal history of asthma (adjusted OR: 1.88, P < 0.001), atopic dermatitis (adjusted OR: 3.09, P < 0.001), and pollen allergy (adjusted OR: 4.25, P < 0.001).

Discussion

This study excels for several key findings. First, to date, it is the only national-level study, and in Latin America, that has determined the prevalence of OAS in school-age children. Second, in addition to oral discomfort, the study identifies the extra oral clinical manifestations most frequently associated with OAS, as well as the food groups and specific foods related to the appearance of oral manifestations. Finally, the study identified gender, age, asthma, atopic dermatitis, and pollen allergy as factors associated with the clinical manifestations of OAS.

Global efforts to determine the prevalence of OAS are limited. In this context, the current study represents a novel contribution, showing that 2.8% of school-age children experience oral manifestations after consuming certain foods. The current results contrast with those observed in South Korea, where the prevalence of OAS was 4.4%.[14] In recent years, Japan has been one of the countries with the maximum number of studies aimed at determining the prevalence of OAS. In one such study, using a questionnaire, 0.99% of school-age children and 2.75% of adolescents with secondary education were reported to have OAS. Although that study included populations from all prefectures of the country, unlike the current approach, the

Table 4 Foods most frequently associated with oral allergy syndrome in school children (*N* = 120).

Fruits		Dairy		Seafood		Dried fruits		Vegetables		Cereals		Meats		Legumes		Egg	
Avocado	8 (6.7%)	Milk	26 (21.7%)	Shrimp	13 (10.8%)	Indian walnut	7 (5.8%)	Tomato	5 (4.2%)	Wheat	7 (5.8%)	Pork	5 (4.2%)	Peanut	7 (5.8%)	Egg	9 (7.5%)
Apple	8 (6.7%)	Cheese	14 (11.7%)	Fish	6 (5.0%)	Pecan nut	7 (5.8%)	Mushroom	2 (1.7%)	Rice	2 (1.7%)	Chicken	5 (4.2%)	Lentils	2 (1.7%)		
Peach	7 (5.8%)	Yogurt	14 (11.7%)	Clam	6 (5.0%)	Almond	7 (5.8%)	Celery	2 (1.7%)	Oatmeal	1 (0.8%)	Turkey	1 (0.8%)	Beans	1 (0.8%)		
Pineapple	6 (5.0%)	Cream	13 (10.8%)	Lobster	6 (5.0%)	Brazil nut	5 (4.2%)	Broccoli	2 (1.7%)	Maize	1 (0.8%)	Beef	1 (0.8%)				
Mango	6 (5.0%)			Crab	5 (4.2%)	Hazelnut	3 (2.5%)	Chard	1 (0.8%)								
Lime	5 (4.2%)			Oyster	5 (4.2%)	Sesame	2 (1.7%)	Chile	1 (0.8%)								
Kiwi	4 (3.3%)			Octopus	3 (2.5%)	Chestnut	2 (1.7%)	Cauliflower	1 (0.8%)								
Papaya	4 (3.3%)			Blue crab	2 (1.7%)	Sunflower	1 (0.8%)	Spinach	1 (0.8%)								
Banana	4 (3.3%)					Pistachio	1 (0.8%)	Pepper	1 (0.8%)								
Strawberry	3 (2.5%)							Carrot	1 (0.8%)								
Orange	3 (2.5%)																

Table 5 Factors associated with oral allergy syndrome in school children.

	OR	95% CI	P	OR	95% CI	P
Male	0.62	0.42–0.90	0.013	0.63	0.43–0.92	0.016
Private school	1.09	0.75–1.61	0.642	-	-	0.371
Age 9–12 years	1.71	1.16–2.52	0.007	1.63	1.11–2.40	0.013
Asthma	1.75	1.13–2.70	0.012	1.88	1.22–2.90	<0.001
Allergic rhinitis	1.38	0.87–2.19	0.167	-	-	0.065
Atopic dermatitis	2.82	1.90–4.18	< 0.001	3.09	2.10–4.54	<0.001
Maternal atopy	1.31	0.85–2.00	0.218	-	-	0.09
Paternal atopy	1.26	0.82–1.93	0.286	-	-	0.11
Pollen allergy	3.35	2.14–5.26	< 0.001	4.25	2.83–6.39	<0.001

Notes: OR: odds ratio; 95% CI: 95% confidence interval.
*Covariates were entered using the Enter method. **Covariates were entered using the Forward–Conditional method.

authors focused only on OAS associated with the consumption of fruits from the *Rosaceae* family and soy.[11] These results contrast sharply with those obtained in another study conducted in the central region of the same country, where 15.6% of children experienced clinical manifestations after consuming fruits or vegetables.[8] Similarly, a study conducted in Gifu Prefecture reported that approximately 2.1% of participants had food-related problems (3457/163,174), of which 1314 patients (0.8%) matched to OAS.[15] In Saitama, Japan, 6.9% of children experienced oral manifestations after consuming fruits and vegetables[7] that aligned more with pollen-food syndrome.

In Eastern Europe, a study in Ukraine reported an OAS prevalence of 16.9% in the pediatric population.[16] In Western Europe, among a sample of 2474 children, 38 (1.5%) experienced oral manifestations after food consumption.[9] In East Asia, a study in Taiwan found that 0.9% of children experienced pharyngeal itching after consuming fruits, and 0.5% after consuming vegetables.[13] Finally, two studies comprising adolescents, one in Japan and another in Mexico, reported prevalence of OAS in 16.0% and 4.9% of patients, respectively.[10,12]

Factors that may contribute to regional differences in the prevalence of OAS, in both children and adults, include diversity in dietary habits and food availability, which affects exposure to different allergens. Additionally, exposure to different types of vegetation and the effects of climate change may also contribute to the clinical manifestation of OAS. Finally, a wide variety of methods used to detect OAS affects comparability between studies, making estimation of uniform prevalence difficult. In summary, the current study is the first to address this phenomenon in both Mexico and throughout Latin America.

For years, there has been a debate as to whether OAS is limited exclusively to the presence of oral manifestations after consuming certain foods, or whether it is accompanied by systemic manifestations. In the present study, a considerable proportion of children with OAS, in addition to oral discomfort, presented systemic manifestations, such as hives, skin itching, sneezing, rhinorrhea, wheezing, and even anaphylaxis. In studies conducted in Japan, between 1.7% and 20.0% of children who experienced oral discomfort after consuming fruits or vegetables also developed additional cutaneous, gastrointestinal, or respiratory manifestations.[7,8] Similarly, a study conducted in Turkey reported that children with OAS predominantly exhibited oral manifestations; however, 9.0% of patients also documented episodes of anaphylaxis.[6] In Mexican children with allergic diseases, manifestations such as dysphonia, nasal itching, and rashes were associated with the presence of OAS.[5] Collectively, these findings suggest that although OAS is primarily characterized by oral manifestations, systemic manifestations should not be excluded in a significant proportion of patients.

The type of foods associated with OAS may help explain the presence or absence of systemic manifestations. Some years ago, a new classification of OAS was proposed based on the category of foods triggering clinical manifestations: if manifestations were caused solely by plant-derived foods, it was defined as phenotype I; if both plant- and animal-derived foods (milk, meat, and eggs) were involved, it was classified as phenotype II. This latter phenotype may better explain the occurrence of systemic manifestations in OAS patients.[21] As shown in the results, there are cases where oral manifestations are triggered by animal-derived foods. This phenomenon was documented by Amlot et al., who reported patients of OAS associated with consumption of seafood or cow's milk.[3] More recently, in Singapore, seafood was observed to cause exclusively oral manifestations.[18] It is possible that patients with OAS related to animal-derived foods may maintain manifestations confined to the oral cavity if they regularly avoid consumption of such foods; otherwise, there is a risk of progressive worsening of symptoms.

The current study identified approximately 70 different foods associated with OAS. In the order of frequency, the most important were dairy, particularly cow's milk, followed by shrimp, chicken egg, avocado, and apple. Studies in South Korea have shown that foods primarily related to OAS are apple, kiwi, and peach.[14,17] Similarly, children in Turkey presented clinical manifestations mainly associated with peach, kiwi, and tomato.[6] Ukrainian children experienced clinical manifestations after consuming peanut, apple, and hazelnut.[16] Japanese children developed clinical manifestations related to kiwi, pineapple, and melon.[7] Finally, in Mexico, adolescents with OAS reported clinical manifestations after consuming shrimp, cow's milk, and pecan,[10] consistent with the present findings.

Among other relevant findings, the current study discovered several factors associated with OAS. A lower frequency of cases in males was notable, In contrast, age of 9–12 years, personal history of asthma or atopic dermatitis, and pollen allergy were associated with a higher probability of developing OAS. Various studies have reported similar findings, suggesting that certain risk factors may behave consistently globally.[6,10,11,13,14,16,17,19]

The current study has certain limitations that must be considered when interpreting the results. First, much of the information was collected through questionnaires applied to the children's parents or caregivers, which could introduce recall bias or errors in interpreting and reporting clinical manifestations. Additionally, the diagnosis of OAS was based on self-reported clinical manifestations, without confirming cases through direct interviews or objective diagnostic tests, such as specific immunoglobulin E (IgE) quantification, skin tests, or oral food challenges. Hence, misclassification errors could have influenced the underestimation or overestimation of OAS cases. In addition, It is also acknowledged that regional differences in access to healthcare services, the level of medical knowledge, and cultural perceptions of allergy could have influenced the identification and reporting of cases across different areas of the country. We did not include potential clinical or environmental cofactors, such as recent infections, use of medications, exposure to pollutants, or variations in regional dietary patterns, which could have affected the occurrence of OAS. Finally, owing to the cross-sectional design of the study, causal relationships between the identified factors and the presence of OAS could not be established. Despite these limitations, surveys like the current one provide valuable insights into the prevalence and characteristics of OAS in the national pediatric population. Furthermore, as a pioneering and currently unique national survey, it offers the opportunity to improve future data collection tools, include new variables, and expand the age groups studied.

Conclusions

The results of the current study reveal that OAS affects 2.8% of Mexican school-age children, with an uneven distribution peaking in the northwest region of the country (6.4%). This frequently underestimated condition extends beyond oral discomfort, presenting with significant cutaneous manifestations, such as skin redness, hives, and itching, as well as respiratory manifestations, such as sneezing. The foods most frequently implicated include milk, shrimp, egg, avocado, and common dietary allergens in case of children such as nuts, wheat, and peanuts. Notably, the risk of OAS is significantly increased in children aged 9–12 years and in those with a history of asthma, atopic dermatitis, or pollen allergy, highlighting the need for early clinical surveillance in vulnerable populations and a more comprehensive preventive approach in pediatric health.

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Mandatory Disclosure on Use of Artificial Intelligence

The authors declare that no AI-assisted tools were used in the preparation of this manuscript. All references have been manually verified for accuracy and relevance.

Author Contributions

Conceptualization: MBB, JMR; Methodology: MBB, JMR; Validation: MBB, MGBGN, JMR, BMMM, JDM, GARS, DRY, AGA, EASV, IMMB, MRS, SCG; Formal analysis: MBB, JMR; Investigation: MBB, MGBGN, JMR, BMMM, JDM, GARS, DRY, AGA, EASV, IMMB, MRS, SCG; Resources: MBB, MGBGN, JMR, BMMM, JDM, GARS, DRY, AGA, EASV, IMMB, MRS, SCG; Data curation: MBB, JMR; Writing – original draft: MBB; Writing – review & editing: MBB, MGBGN, JMR, BMMM, JDM, GARS, DRY, AGA, EASV, IMMB, MRS, SCG.

Conflicts of Interest

The authors declared no potential conflict of interest with respect to research, authorship, and/or publication of this article.

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Supplementary

Adverse Food Reaction Survey

School Name: _____

Age: _____ Child's gender: ( ) Female ( ) Male

School type: Public ( ) Private ( )

In the past 12 months, has your child experienced wheezing or whistling in the chest?
( ) No ( ) Yes

Has your child ever been diagnosed with asthma?
( ) No ( ) Yes
In the past 12 months, has your child experienced sneezing, runny nose, or nasal congestion when NOT having a cold or flu?
( ) No ( ) Yes

Has your child ever been diagnosed with allergic rhinitis?
( ) No ( ) Yes
In the past 12 months, has your child experienced itchy hives that appear and disappear?
( ) No ( ) Yes

Has your child ever been diagnosed with atopic dermatitis?
( ) Yes ( ) No

Do any of your child's first-degree relatives have allergic diseases?
( ) No ( ) Yes

Please select from the list the relatives of your child who have an allergic disease:
( ) Father with asthma
( ) Mother with asthma
( ) Father with allergic rhinitis
( ) Mother with allergic rhinitis
( ) Father with atopic dermatitis
( ) Mother with atopic dermatitis
( ) Father with drug allergy
( ) Mother with drug allergy
( ) Father with food allergy
( ) Mother with food allergy

Does your child experience allergic reactions after consuming any food or drink?
( ) No ( ) Yes

What types of reactions does your child experience after consuming this food or drink?
(Mark with an X all that apply, and if necessary, write those not included in the list)

Oral reactions	Gastrointestinal reactions	Skin reactions	Respiratory reactions	Other
Itching of the lips	Abdominal bloating	Hives	Throat tightness	Chest tightness
Swelling of the lips	Vomiting	Redness of the skin	Sneezing	Headache
Itching of the palate	Flatulence (gas)	Itching of the skin	Cough	Tearing (watery eyes)
Swelling in the mouth	Diarrhea	Itching in skin folds	Wheezing (chest whistling)	Sweating
-	Constipation	-	Shortness of breath	Low blood pressure
-	Abdominal pain	-	Runny nose	Anaphylaxis
-	-	-	Nasal congestion	-

Other – Which one? _____

Please select from the following list the foods that cause the symptoms described above after consumption (mark with an X that applies):

Fruits & vegetables	Cereals & legumes	Meats & dairy products	Seafood	Nuts & seeds	Others
Avocado	Rice	Chicken	Clam	Sesame	Chocolate
Apricot	Oats	Pork	Shrimp	Almond	Seasoning
Cherry	Rye	Beef	Crab	Hazelnut	Food coloring
Plum	Corn	Rabbit	Blue crab	Peanut	Artificial sweetener
Coconut	Wheat	Lamb	Lobster	Chestnut	Phenylalanine
Peach	Gluten	Goat	Oyster	Date	Egg
Raspberry	Cornonthe Cob	Turkey	Fish	Walnut	Honey
Strawberry	Bean	Cow's milk	Octopus	Brazil nut	Mustard
Currant	Lentil	Cheese	-	Cashew	-
Guava	Soy	Yogurt	-	Nutmeg	-
Kiwi	Pea	Cream	-	Raisins	-
Lime	Broad bean	-	-	Pistachio	-
Lemon	Chickpea	-	-	Sunflower seed	-
Mango	Green bean	-	-	-	-
Mandarin	-	-	-	-	-
Apple	-	-	-	-	-
Melon	-	-	-	-	-
Blackberry	-	-	-	-	-
Orange	-	-	-	-	-
Nectarine	-	-	-	-	-
Papaya	-				