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# Report of the Scientific Committee of the Spanish Agency for Food Safety and Nutrition (AESAN) in relation to the risk associated with the consumption of certain potentially allergenic foods

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## Abstract

Food allergies are an important public health problem with an increasing prevalence in the population and have a significant impact on the lives of allergic patients and their families.

The Scientific Committee of the Spanish Agency for Food Safety and Nutrition (AESAN) has reviewed and compiled the available information on those food allergens that are not declarable but that could be relevant in Spain, in particular, fruits of the *Rosaceae* family, legumes, kiwi and pine nuts, in order to support, in the event that the review of declarable allergens in the European Union is addressed, their inclusion in said list, if relevant.

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The Scientific Committee of the AESAN concludes that *Rosaceae* allergy is one of the most frequent among patients suffering from food allergy, representing, in Spain, approximately 23.6 % of the diagnosed food allergy reactions. Of particular importance is peach allergy, followed by apple allergy; and, in terms of symptom severity, allergic reactions to *Rosaceae* are related to a high frequency of anaphylaxis. With regard to legume allergy (without taking into account peanuts or soybeans), it has been noted that it affects approximately 7 % of the Spanish population with food allergies, with lentils being the most implicated legume, and that they can produce serious symptoms, such as anaphylaxis. Furthermore, kiwi allergy is a major paediatric allergy and is associated with severe gastrointestinal symptoms and anaphylaxis. And finally, pine nut allergy is not a very common food allergy, although it has been found to be related to a high probability of developing anaphylaxis at low food concentrations.



**Key words**

Allergen, food allergy, fruit, *Rosaceae*, legume, kiwi, pine nut.

**Suggested citation**

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## 1. Introduction

The prevalence of food allergies in Spain can be to 7.4 % of the population, with substantial geographical variations in prevalence and the food that causes an allergy (Fernandez-Rivas, 2009). Food allergies are a significant public health problem, being increasingly prevalent in the population. They can also have a major impact on the lives of allergic patients and their families (Peters et al., 2021). Similarly, they are more prevalent in childhood and, in some cases, such as with egg or cow's milk allergies, they often clear up as a person ages (Peters et al., 2017). However, food allergies that last throughout life, even those that de *novo*, can be considerably detrimental to the patient's quality of life.

In the study carried out by Lyons et al. (2019), the aim of which was to determine the prevalence of a probable food allergy in the European adult population using a standardised methodology in different centres of the EuroPrevall project, significant geographical differences were observed, both in the global frequency of food allergies, and in the foods involved. Overall, the prevalence of a probable food allergy to at least one priority food, was much lower than the prevalence of self-reported food allergies and ranged from 0.3 % (Confidence Interval (95 % CI): 0.0-1.7) to 5.6 % (95 % CI: 3.9-7.7), being more frequent in regions with greater sensitivity to pollens, and, although the foods involved differed between territories, those of vegetable origin predominated, especially in Mediterranean countries. In the Spanish population, specifically in Madrid, one of the highest figures was observed among the analysed centres, with 3.28 % of adults with a probable food allergy to at least one of the priority foods studied. This figure came in behind Zurich (5.64 %). Of these foods, peach was the most frequently associated with a probable allergy (prevalence: 1.61 %; 95 % CI: 0.63-3.18), melon (prevalence: 0.95 %; 95 % CI: 0.25-2.24) and shrimp (prevalence: 0.82 %; 95 % CI: 95 %: 0.19-2.04).

Annex II to Regulation (EU) No. 1169/2011 on the provision of food information to consumers (EU, 2011) includes substances or products that cause allergies or intolerances and that have special considerations when informing consumers about their presence. This annex includes, among other things, various nuts, such as: almonds, hazelnuts, walnuts, cashews, pecans, Brazil nuts, pistachios, macadamia nuts or Australian walnuts and products derived therefrom; for example, pine nuts are not included, but neither are other foods such as fruits of the rosaceae family (which includes common foods such as peach, apricot, plum, cherry, apple, pear, blackberry and strawberry, among others), kiwi or legumes.

The FAO/WHO (Food and Agriculture Organization of the United Nations/World Health Organization) expert group, in its risk assessment of food allergens (FAO/WHO, 2022), carried out a review with the aim of updating the list of priority allergens that must be indicated on food labels. To do this, they relied on data on the prevalence, potency, and severity of the symptoms caused. However, due to the lack of data on these factors, or their low scores, some foods were not candidates to be included in the list of priority allergens. For those allergens not included in this list, following the evaluation carried out by the FAO/WHO expert group, it was established, by consensus, that they could be considered at the regional level. So, on the recommendation of this group, it would be up to risk managers to decide to include allergens other than those included in the lists of allergens that must be mandatorily declared at a regional level.

To manage this risk, the Spanish Agency for Food Safety and Nutrition (AESAN) requires data on the prevalence, severity and potency of food allergens that are not required to be declared but may be relevant in Spain, based on the risk assessment model for food allergens proposed by the FAO/WHO (2022) in order to be able to support, if it becomes relevant, the proposal to include them in the list of mandatory notifiable allergens, if there is a review of those allergens in the European Union.

To this end, the Scientific Committee of the AESAN was asked to assess the risk to the health of consumers, from the point of view of food allergies and for labelling purposes, of the intake of fruits of the family of rosacea, legumes, kiwi and pine nuts, based on the data on the prevalence, potency and severity of the allergic reactions they cause in people sensitive to these foods, found in the scientific literature. As well as the review of the scientific literature, the information obtained through a survey on the prevalence, potency and severity of allergies to these foods was also analysed. The survey was prepared in collaboration with the Spanish Society of Allergology and Clinical Immunology (SEAIC, *Sociedad Española de Alergología e Inmunología Clínica*), and medical specialists in allergology participated.



## 2. Mandatory regulations on reporting allergens

The development of lists of notifiable allergens in food labelling has evolved over the years within the regulatory framework, both in the European Union and globally.

### 2.1 European framework

Regulation (EU) No. 1169/2011 on the provision of food information to consumers (EU, 2011) sets out requirements on the labelling of allergens and, among other measures, makes it mandatory to indicate any ingredient or processing aid listed in Annex II to that regulation, or derived from a substance or product listed in that Annex, that causes allergies or intolerances and is used in the manufacture or preparation of a food and is still present in the finished product, even if in a modified form. It is further provided that the ingredients listed in Annex II must be highlighted typographically, so that they are clearly distinguishable from the rest of the ingredients, for example, by using a different typeface, style or background colour. And, if there is no list of ingredients, the word "contains" must be included followed by the name of the substance or product as listed in Annex II to Regulation (EU) No. 1169/2011.

The substances or products that cause allergies or intolerances and that are listed in Annex II of the aforementioned regulation are the following:

1. Cereals containing gluten, namely: wheat (such as spelt and khorasan wheat), rye, barley, oats or their hybrid varieties and products thereof, exceptions: wheat-based glucose syrups, including dextrose; wheat-based maltodextrins; barley-based glucose syrups; cereals used to make alcoholic distillates, including ethyl alcohol of agricultural origin.
2. Crustaceans and crustacean-based products.
3. Eggs and egg products.
4. Fish and fish-based products, exceptions: fish gelatine used as a carrier for vitamins or carotenoid preparations; fish gelatine or ichthyocola used as a clarifier in beer and wine.
5. Peanuts and peanut-based products.

6. Soybean and soy-based products, exceptions: fully refined soybean oil and fat; mixed natural tocopherols (E 306), natural d-alpha tocopherol, natural d-alpha tocopherol acetate, and natural d-alpha tocopherol succinate derived from soybean; phytosterols and phytosterol esters derived from soybean vegetable oils; phytostanol esters derived from soybean oil phytosterols.
7. Milk and its derivatives (including lactose), exceptions: whey used to make alcoholic distillates, including ethyl alcohol of agricultural origin; lactitol.
8. Nuts, i.e. almonds (*Amygdalus communis* L.), hazelnuts (*Corylus avellana*), walnuts (*Juglans regia*), cashews (*Anacardium occidentale*), pecans (*Carya illinoensis* (Wangenh.) K. Koch), Brazil nuts (*Bertholletia excelsa*), pistachios (*Pistacia vera*), macadamia nuts or Australian walnuts (*Macadamia ternifolia*) and products thereof, except nuts used to make alcoholic distillates, including ethyl alcohol of agricultural origin.
9. Celery and products thereof.
10. Mustard and products thereof except:
    behenic acid with a minimum of 85 % purity and obtained after two distillation stages used in the manufacture of emulsifiers E 470a, E 471 and E 477 (EU, 2024).
11. Sesame seeds and products based on sesame seeds.
12. Sulphur dioxide and sulphites in concentrations higher than 10 mg/kg or 10 mg/l in terms of total $SO_2$, for products ready for consumption or reconstituted according to the manufacturer's instructions.
13. Lupin beans and products thereof.
14. Molluscs and products thereof.

The list in Annex II to Regulation (EU) No. 1169/2011 (EU, 2011) was drawn up on the basis of scientific advice from the European Food Safety Authority (EFSA). Article 21 (2) of that regulation also states: "In order to ensure better information for consumers and to take into account the latest scientific developments and technical knowledge, the Commission shall systematically re-examine and, where appropriate, update the list in Annex II by means of delegated acts in accordance with Article 51 […]." Updating the list in Annex II may entail adding or deleting a substance from that list.

## 2.2 Global framework

Beyond the European framework, there are also global standards and guidelines on food allergens.

The *Codex Alimentarius* Commission emerged in 1962 to develop global food standards, with basic objectives of protecting consumer health and facilitating international food trade (FAO/WHO, 2024).

In 1985, the *Codex* Commission elaborated the GSLPF (General Standard for the Labelling of Prepackaged Foods) (FAO, 1985), to harmonise the labelling of all prepackaged foods offered as such to consumers or for hospitality purposes, and some aspects related to the presentation of these.

The first time the *Codex Alimentarius* addressed food allergen labelling was in 1993. Subsequently, the first groups of food causing these allergies were established, which were incorporated into the GSLPF in 1999. This list has been informally known as the "Big 8" food allergens as they are the most common and are responsible for the majority of allergic reactions.

Since the original drafting of the GSLPF there have been numerous scientific advances in the knowledge of food allergens and their management. The *Codex* Commission therefore requested scientific advice, including current evidence of consumer understanding of allergens, from FAO and the WHO, which convened a series of expert meetings to provide scientific advice on this issue.

The first work consisted of a review and validation of the list of priority allergens of *Codex* through a risk assessment process. It was established that only those foods or ingredients that caused hypersensitivity as measured by immunoglobulin E (IgE) and coeliac disease should be included in the list. For these reasons, sulphites and lactose were not taken into account as they were not IgE-mediated reactions.



For the review of the list of priority allergens, criteria based on three factors were used:

- Prevalence: proportion of a defined known population that has experienced a food-related immune-mediated adverse reaction.
- Potency: evidence of a plausible cause-and-effect relationship establishing that the food causes food allergies and supported by Double-Blind Placebo-Controlled Food Challenge (DBPCFC) studies designed to evaluate the potency of an ingredient (regardless of the severity of the reaction and reported symptoms).
- Severity: frequency and proportion of serious objective reactions. The data collected to calculate the severity produced by each allergen have been used to establish different categories. The groups formed depend on whether they cause at least 5-10 % of anaphylactic reactions and in how many different *Codex* regions this proportion of reactions occurs.

The substances analysed are those that cause IgE-mediated hypersensitivity and that are currently listed in section 4.2.1.4 of the GSLPF (these being: gluten-containing cereals and products thereof; crustaceans and products thereof; eggs and egg products; fish and fish products; peanuts, soya and products thereof; milk and dairy products; and nuts and products thereof), as well as other foods that are on the priority allergen lists established in specific countries or regions (for example, molluscs, mustard, celery, sesame, buckwheat, lupin beans and others), in addition to gluten.

Due to the lack of data on prevalence, severity, and/or potency globally, or because some foods are consumed regionally, the *Codex* Commission recommended that some of the allergens, such as buckwheat, celery, lupins, mustard, and some nuts (Brazil nuts, macadamia nuts, and pine nuts) should not be listed as world priority allergens, but could be considered for inclusion on priority allergen lists in individual countries.

In this regard, countries may request the inclusion of certain allergens that are not currently included in Annex II, but may be relevant at the regional level, based on data on their prevalence, severity and potency.

## 3. Allergy to rosaceae plants

*Rosaceae* are a family of plants that include most of the frequently consumed fruit species, such as peach, apple, pear, quince, plum, cherry, strawberry, apricot and raspberry, among others.

The main allergens responsible for allergies to these fruits are proteins belonging to the Lipid Transfer Proteins (LTP) family, which are mainly found in the skin or peel of most plant foods. These proteins resist treatments such as cooking and roasting, and remain in juiced, canned, dried, fermented or crystallised vegetables. This prevents patients from consuming them in any of these forms, if they have been previously sensitised (Missaoui et al., 2022).

In the above-mentioned study carried out by Lyons et al. (2019), the pattern of food allergies observed in Spain, more specifically in Madrid, conforms to the so-called Mediterranean phenotype. This pattern is characterised by an increased frequency (44.4 %) of LTP protein-mediated peach allergy (Pru p 3).

In another study carried out in eight European centres (Athens, Lodz, Madrid, Reykjavik, Sofia, Utrecht, Vilnius and Zurich), in the general population aged between 20 and 54 years, it was observed that the most frequent IgE sensitisations were to hazelnuts (9.3 %), peaches (7.9 %) and apples (6.5 %). The order of prevalence of IgE sensitisation against different foods was similar in each centre and correlated with the prevalence of allergens associated with birch pollen, Bet v 1 and Bet v 2, very common in central Europe (Burney et al., 2014). Other authors also agree that the foods most frequently associated with food allergies in Europe are peaches and apples (Lyons et al., 2020) (D 'Aiuto et al., 2024).

In a Spanish multi-centre, cross-sectional study *(*Allergologica-2005), in which 4991 volunteers (children and adults) were signed up, a food allergy was diagnosed in 7.4 % of cases (95 % CI: 6.7-8.1). The foods that triggered the most frequent allergic reactions were fruits (33.3 % of cases), nuts (26 %), seafood (22 %), eggs (16 %), milk (13.9 %) and fish (9.8 %). Within fruits, those of the *Rosaceae* family (mainly peaches and apples), accounted for 70.7 % of the allergic reactions per fruit and 23.6 % of all food allergic reactions. Milk and eggs were the most common foods in patients under 5 years old, while fruits and nuts were the most prevalent in patients older than 5 years (Fernández-Rivas, 2009).

Similarly, of the 1831 participants in the study recently carried out by Scala et al. (2025), in Italy, and examined with the molecular allergy diagnostic test Allergy Explorer-ALEX-2, 426 had reactions to at least on rosacea allergen, basically to LTPs. Most patients (77 %) had IgE antibodies specific to the major peach allergen (Pru p 3).

According to the results of the survey carried out to prepare this report, 58.2 % of allergists responded that, in their daily clinical practice, they diagnosed peach allergy "very frequently" (more than 1 case per week), and 24 % responded that stating an allergy to apples. And, according to the perception of 45.1 % of the specialists who participated in the survey, the prevalence of this allergy in Spain has increased significantly in the last 5 years.

Rosaceae allergy is a persistent allergy, with the increase in the number of foods that induce symptoms having been described over time. A study by Betancor et al. (2021) describes the follow-up of 151 patients with specific IgE sensitization to at least one LTP, with special attention to allergies to fruits of the *Rosaceae* family, during a 10-year monitoring period. At baseline, 113 patients (74.8 %) were clinically allergic to LTP-associated plant foods and 38 (25.1 %) were only sensitised, showing no symptoms after exposure to LTP-related foods. Once allergy to a plant food was diagnosed, patients were advised

to avoid that food and continue consuming those they tolerated. It was observed that, over time, 31 % of patients developed an allergy to new plant foods that had been tolerated at the time of diagnosis. 13 % of patients only sensitised to LTP developed an allergy to other plant foods, the most frequent being fruits of the *Rosaceae* family, especially of the *Prunoideae* subgroup (peach, apricot), followed by nuts. The data obtained provide relevant information on the appearance of new food allergies.

Regarding the severity of symptoms, the majority of patients suffer (at some point in their lives): urticaria (58 %), anaphylaxis (46 %) and oral allergy syndrome (OAS; mild symptoms; 42 %) (Costa and Mafra, 2022). In fact, according to the results of the survey carried out for the preparation of this report, the majority of specialists (73.2 %) were of the opinion that allergy to *Rosaceae* is associated with skin reactions (urticaria, angioedema) and 25.4 % associated it with anaphylaxis and, regarding the latter, according to the opinion of 60.3 %, the most frequent type of reaction produced by peach, nectarine and Paraguayan peach is anaphylaxis, and the same is true of apples (according to 40.3 % of respondents). Higher levels of specific IgE and simultaneous sensitisation to more than five rosacea are significantly associated with an increased risk of severe reactions (Fernández-Rivas, 2009) (González-Mancebo et al., 2011) (Scheurer et al., 2021) (Cañas et al., 2022). Approximately 26.8 % of the allergists consulted through the survey indicated that, in the last year, they had treated more than 20 patients with symptoms of anaphylaxis due to the consumption of rosacea, of which almost half was due to accidental ingestion. For this reason, 67.6 % of the professionals surveyed considered that the Oral Food Challenge (OFC) should only be performed with confirmation of the diagnosis in very specific cases, due to the risk of suffering anaphylaxis.

The presence of cofactors, such as exercise, fasting, and non-steroidal anti-inflammatory drugs (e.g., ibuprofen), can amplify the clinical relevance of rosacea allergy (Asero and Pravettoni, 2013). Several cofactors, either alone or in combination, increase the risk of severe reactions or anaphylaxis (Asero et al., 2022).

On the other hand, reactivity to other allergens (e.g., pollens) appears to have a mitigating effect on symptom severity, reducing the frequency of anaphylactic reactions (Costa and Mafra, 2022) (Rossi et al., 2023) (Scala et al., 2023).

In relation to the minimum amount necessary to induce symptoms, according to the opinion of 35.2 % of the allergists participating in the survey, between 10 and 100 mg of fruit are required to induce some kind of symptom in the patient.

Asked about the five most frequent food allergies in their health centres, including the foods listed in Annex II of Regulation (EU) No. 1169/2011 (EU, 2011) on substances or products that cause allergies or intolerances (cereals containing gluten, nuts or milk, among others), in general, the allergists indicated that the five most frequent allergies are those produced by the following foods: nuts; rosaceae; eggs; crustaceans and milk, with rosaceae being the only food group, of those indicated, not currently included in Annex II.

Taking the above into account, according to the published data, in Spain, fruits are the group most involved in allergic reactions (33.3 %) and, among them, fruits of the *Rosaceae* family (mainly peaches and apples), with 70.7 % of reactions due to fruit and 23.6 % of all food allergic reactions, which shows the high relative prevalence and clinical relevance of rosaceae in our environment,

especially in patients more than 5 years old. These allergies are also associated with a high frequency of anaphylaxis, affecting approximately 45 % of people who suffer from it at some point in their lives (serious). The perception, moreover, is that mono-sensitised people may also react very severely (danger of anaphylaxis) to contact with the skin of the peach or apple, where, as has been said, LTP allergen is mainly found.

Lastly, it is worth noting that almost all of the specialists surveyed for this report (95.3 %) believed that rosaceae should be included in the list of substances or products that cause allergies or intolerances, which must be declared on food labels.



## 4. Allergy to legumes

The legume family (*Leguminosae*) is made up of plants that produce a pod containing seeds (Vergeer et al., 2020), which include beans, chickpeas, lentils, lupin beans, peas, soybeans and peanuts. The WHO considers this food group essential, due to its high protein content, micro-nutrients and low cost (Tricco et al., 2018). Foods in this group can also be used as a substitute for wheat in gluten-free products and as a technological aid in meat or dairy products intended for vegan diets (Mastrorilli et al., 2024). This report will focus on the consumption of legumes, excluding peanuts and soy, because both foods are already included in the Regulation (EU) No. 1169/2011 (EU, 2011) list of substances or products that cause allergies or intolerances.

Legumes are usually part of the Mediterranean diet and the most commonly consumed in Spain are lentils, chickpeas, beans and peas (Martínez San Ireneo et al., 2008).

The pattern of sensitisation to pulses varies geographically according to consumption and exposure to pollen (Verma et al., 2013). In Spain, an allergic reaction to legumes amounts to 7 % of patients with a food allergy (Fernández-Rivas, 2009). The high rate of cross-reaction between different legumes makes accurate diagnosis essential to avoid extensive dietary restrictions, with consequent nutritional loss (Arksey and O'Malley, 2005) (Ouzzani et al., 2016).

In the study carried out by Mastrorilli et al. (2024) the global epidemiology of legume allergy in children was reviewed and it was observed that its prevalence is very heterogeneous according to the region. In the Mediterranean basin and Asia, lentils, chickpeas and peas stand out as the most prevalent legumes that cause allergies and main causes of childhood allergies within the legume group. In population studies, the prevalence of an allergy to legumes is usually low (≤0.5 %), but in European paediatric clinical cohorts they constitute a relevant group: 5.3 % of all food allergies diagnosed are due to these legumes, with a notable contribution in Mediterranean countries, where lentils are the predominant allergen (approximately 80 % of cases). In addition, cross-reaction is very high: up to 60 % of children react to more than one legume, which complicates clinical management. Overall, despite being less frequent than other food allergies, legumes constitute an emerging and clinically relevant group, particularly in Mediterranean regions such as Spain (Mastrorilli et al., 2024). These same authors point out that, in recent years, the concern about allergies to legumes has increased considerably, given that more relevant cases of clinical manifestations have been reported after their ingestion, but despite the widespread consumption of legumes and the growing allergy to them, little data is available on the characteristics of children with an allergy to legumes.

In the study by Martínez San Ireneo et al. (2008), with a cohort of 54 children allergic to legumes, they observed that allergic reactions appeared at approximately 2 years of age. Of these, 80 % had an allergy to lentils and 59 % to chickpeas, although more than 70 % had a positive response to more than three types of legumes. Clinical allergy to more than one legume is common and boiled legume extracts are best suited to distinguish between sensitised allergic and tolerant children, because the former cannot tolerate cooked legumes (Martínez San Ireneo et al., 2008). It is known that the main allergens of lentils, chickpeas, green beans and peas maintain great stability, even after cooking, even with the appearance of new allergens (neoallergens) (Armentia et al., 2006).



In adults, the incidence of legume allergies seems to be increasing in Spain (Somoza et al., 2015) due to the increase in the consumption of legumes, by the population in general and the vegetarian population in particular (13.6 % of adults stated that they follow vegetarian dietary practices) (Reese et al., 2023). In a study with 455 adults with a suspected food allergy, carried out in Madrid, 6.9 % presented with an allergy to legumes, predominantly in women and atopic patients; lentils being the most implicated and mainly responsible for systemic reactions (Somoza et al., 2015). The symptomatology associated with it was atopic dermatitis (13 %) and 71 % suffered from rhinoconjunctivitis and/or asthma. 25 % of patients with a lentil allergy reported having some event of anaphylaxis, this number being lower in the case of chickpeas and beans (17 %) (Somoza et al., 2015).

An allergy to legumes is an allergy that is diagnosed occasionally, according to data obtained from allergists through the AESAN/SEAIC survey, with lentil allergies being the most frequent (according to the opinion of 15.2 % of respondents), followed by an allergy to chickpeas (13 %) and peas (9 %). In all cases, it is a moderate allergy (to lentils [according to 51.3 % of respondents]; to chickpeas [49.4 %] and to dried beans [40.3 %]), although it can induce severe symptoms, such as anaphylaxis, after the ingesting lentils (according to the opinion of 36 % of the allergists surveyed) and chickpeas (21 %). More than half of the professionals surveyed report that, in the last year, a very low percentage of their patients (≤5 %) have suffered an anaphylactic reaction after eating legumes, but the majority were due to accidental ingestion. And in the case of legumes, almost half of the professionals surveyed do not consider it necessary to perform OFC to confirm the diagnosis of an allergy to these foods, except in very specific cases.

The amount needed to induce symptoms, according to most of the professionals who participated in the survey (approximately 70 %), is minimal, merely 100 mg or less being needed to induce symptoms.

In summary, and based on the published data, allergies to legumes affects approximately 7 % of the Spanish population that is allergic to food, affecting 6.9 % of the adult population and 5.3 % of the child population, with lentils being the most to blame in both population groups. The frequency of severe symptoms (anaphylaxis) is estimated at approximately 25 % for adults (severe). In terms of potency, based on survey data, an amount less than or equal to 100 mg of allergen was estimated to be sufficient to induce symptoms.

Finally, it should be noted that the majority of the specialists surveyed (94 %) believed that the inclusion of these foods should be considered in the list of foods mandatorily notifiable, at least, in Spain.

## 5. Kiwi allergy

The kiwi (*Actinidia* spp.) belongs to the family *Actinidiaceae*. At the beginning of the 19th century, the plant was first described in China, growing wild along the Yangtze River valley. In 1904, the seeds were brought to New Zealand and their fruits became known as the "Chinese gooseberry". When New Zealand began exporting kiwis, around the 1960s, the name was changed to the current one (Fine, 1981).

Kiwi allergies were first described in 1981 (Fine, 1981) and most research work on kiwi allergies has been done in the European population and is often described in relation to cross-reactions with other sources such as pollen, rye, hazelnut, chestnut, banana and avocado (Gall et al., 1994) (Rancé et al., 2005).

In a study of the population by Lyons et al. (2020), carried out on 2110 children aged 7-11 years, in seven cities in different European countries, a clinical allergy to kiwi affected 2.9 % of the population studied, according to the data of the self-declared food allergy study (symptoms reported at some point with any food and any priority food). Kiwi was among the most frequently mentioned priority foods, after cow's milk, eggs, tomatoes and fish. Nonetheless, when analysing the actual prevalence of food allergies (medical history compatible with a positive skin test), the figures ranged from 0 to 1.06 %, depending on the country. Spain (Madrid) was the country with the highest prevalence (1.06 %; 95 % CI: 0.19-2.74, of the general child population), above the Netherlands, Poland and Switzerland.

These results on kiwi allergy in children are consistent with those reported by other authors, such as Grabenhenrich et al. (2020), who carried out a study on a population cohort of children aged 6-10 years from eight European countries, in which kiwi allergies were assessed as a parent-referred food allergy (symptoms) and medical diagnosis, but not by provocation tests. The prevalence of children with symptoms at some point, after consuming kiwi, was very low in the whole of Europe, about 0.5 %, and the prevalence of an allergy to kiwi diagnosed by a doctor was about 0.2 %. As for Spain (Madrid), the study shows the highest figures within the participating countries: around 1 % of children ever presented symptoms after ingesting kiwi and around 0.6 % had a doctor-diagnosed kiwi allergy, always within a general child population, not selected due to a suspected allergy. These data confirm that school-age kiwi allergies are rare in Europe, although Spain is at the higher end of the observed prevalence range.

In a population study carried out by Lyons et al. (2019), kiwi allergies were analysed in a representative sample of people aged 20 to 54 years, from six European cities. Overall, self-declared food allergy to kiwi (symptoms sometimes reported after ingesting this fruit) was around 3.8 % of adults, but when a likely food allergy to kiwi was analysed (compatible symptoms + specific IgE ≥0.35 kUA/L), prevalences in the general adult population were lower, ranging from 0 to 1.34 %, depending on the country, with 0.64 % in Madrid (95 % CI: (0.11-1.77), second most prevalent city behind Zurich (1.34 %; 95 % CI: 0.60-2.42).

In Spain, according to data obtained from the AESAN/SEAIC survey of allergists, a kiwi allergy is an allergy that is only occasionally diagnosed (41.6 % of the specialists surveyed), accounting, in the opinion of 46.3 % of respondents, for 1-5 % of patients who go to the clinic.

Analysing patterns of kiwi sensitisation and clinical manifestations in Europe in 12 European countries, in the study conducted by Le et al. (2013), revealed marked differences when the climatic conditions of each region were taken into account. Patients from Iceland (the only representative from Northern Europe) mainly experienced severe symptoms (respiratory and cardiovascular), while the majority of patients from Central/Western and Southern Europe showed predominantly oral allergic syndrome (OAS). A kiwi allergy associated with a birch pollen allergy was more represented in Central/Western Europe, while in Southern Europe the association was higher with grass pollen allergens. Mono-allergy to kiwi was most frequently found in Iceland and southern Europe (Le et al., 2013).



The study by Jorge et al. (2017), carried out in Portugal, showed kiwi, peach and strawberry were, in this order, the fruits that most frequently yielded positive results in sensitisation tests, and kiwi was associated with oral and intestinal symptoms. Le et al. (2017) quantified the frequency of kiwi allergy symptoms, respectively in adults and children (6-18 years) from different European countries, indicating that it manifests itself with oral symptoms in most cases (35.3-100 %); cutaneous (33.3-58.8 %); gastrointestinal (16.7-35.3 %); and respiratory (16.7-23.5 %). Anaphylaxis (and even collapse) has been described in some cases since 1981, after accidental ingestion of kiwi, or even after performing a skin test with fresh material (Gawrońska-Ukleja et al., 2013) (Strinnholm et al., 2014) (Haktanir et al., 2017).

When the surveyed specialists were asked about the symptoms that are associated with this food allergy, approximately 70.2 % said that they are usually skin symptoms (urticaria, angioedema), and 23.9 % indicated that it can induce anaphylaxis. For this reason, 69.7 % of respondents rule out performing OFC to confirm their diagnosis routinely, leaving it only for very specific cases. In fact, in this same survey, 53.7 % of specialists report that, of the 1-5 % of their patients who have suffered anaphylaxis in the last year, in most cases it occurred by accidental ingestion.

Regarding the minimum amount of food needed to induce symptoms, according to the opinion of 85.2 % of the specialists who participated in the survey and in the questions related to kiwi allergy, an amount less than 100 mg is sufficient to induce symptoms in a person with allergies.

For all the above, according to the published information, in the child population in European countries, the prevalence of kiwi allergies ranges between 0 and 1.06 %, with Spain being the country with the highest prevalence (up to 1.06 %); in the European adult population, the global prevalence is between 0 and 1.34 %, with a prevalence of 0.64 % in Spain. A kiwi allergy is associated with severe gastrointestinal symptoms (15-35 % of the patients with kiwi allergy) and anaphylaxis (1-55 % of the patients with this type of allergy, according to the estimates of the specialists participating in the survey). People who are sensitised say they cannot consume a whole piece of fruit before feeling any symptoms, and cases of anaphylaxis have even been described after performing the diagnostic skin test.

86 % of the specialists surveyed said that kiwi should be included in the list of substances or products that cause allergies or intolerances, which must be declared on food labels.

## 6. Pine nut allergy

The pine nut is the fruit of *Pinus pinea* L., a tree belonging to the *Pinaceae* family, of the gymnosperms class. It is also called *P. sativa* Quer. and *P. domestica* Mathiol. It blooms from March to May,

and in Europe it is found in the Mediterranean basin, currently occupying 2.84 % of forests there. In Spain, the areas with the greatest presence are Huelva, Seville and Cadiz, followed by the northern plateau, in Valladolid, in Zamora, Avila and Segovia, as well as other areas (Añó et al., 2002).

Currently, they are frequently consumed raw or roasted and as ingredients in foods such as bread, cakes, cookies, sauces (for example, pesto), sweets and vegetable and meat dishes. Although the protein composition of pine nuts can vary between species, the scientific literature confirms that this dried fruit is a valuable source of nutrients (Nergiz and Dönmez, 2004).

The prevalence of pine nut allergies is very low, with only sporadic cases described in the scientific literature. Most published data indicate that pine nut allergy is uncommon compared to other nut allergies, and population studies do not provide an accurate estimate of specific prevalence for this nut. A bibliographic review on pine nut allergy carried out in 2015 identified only 45 cases of pine nut allergy described worldwide (Cabanillas and Novak, 2015). Along the same lines, in the survey carried out by AESAN and SEAIC, the majority of specialists (51.9 %) indicated that they diagnose this allergy "rarely" and 67.7 % of the respondents reported that less than 1 % of patients who come to the clinic have a pine nut allergy.



34 % of the specialists participating in the survey indicated that patients suffer from anaphylaxis as the most frequent symptom. In fact, it is known that consuming a large amount of pine nuts is not necessary to induce anaphylaxis. The most common clinical manifestations of pine nut allergies are immediate reactions mediated by IgE, with anaphylaxis being the predominant presentation (García-Menaya et al., 2000) (Ibañez et al, 2003) (Cabanillas et al., 2012) (Cabanillas and Novak, 2015). Van de Scheur and Bruynzeel (2004) described the first case of acute anaphylaxis following the ingestion of a salad containing pine nuts. Reactions have also been described after consumption of pine nuts as part of pesto sauce (Beyer et al., 1998) (Roux et al., 1998); salads (Roux et al., 1998) (Van de Scheur and Bruynzeel, 2004); meatballs and meat (De las Marinas et al., 1998) and in cakes, candies or biscuits (Koepke et al., 1990) (Morenet-Vautrin et al., 1998) (Añó et al., 2002) (Ibañez et al., 2003). Reactions have also been described after the consumption of pine nuts on their own (Ibañez et al., 2003) (Cabanillas et al., 2012) (Barbarroja-Escudero et al., 2014) (Cabanillas and Kovak, 2015). In the review carried out by Cabanillas and Novak (2015), although only 45 cases published worldwide were identified, their potential severity was highlighted, since approximately 75 % of the reactions described were anaphylactic. These findings are consistent with the Spanish clinical series by Cabanillas et al. (2012), in which 10 patients with an IgE-mediated pine nut allergy treated in a hospital in Madrid were studied, with the observation that 80 % of the reactions were systemic and severe.

In the survey conducted by the AESAN, through the SEAIC, 28 % of the specialists indicated that, in their opinion, only between 1-10 mg were needed for the patient to suffer some kind of symptom; 13.2 % indicated that with an intake of less than 1 mg and another 13.2 % with an intake of 10-100 mg, although 38 % of the specialists surveyed said that they did not have enough data. One third of the specialists surveyed stated that the most frequent symptoms related to a pine nut allergy were anaphylactic reactions, while another third indicated that the most frequent were skin symptoms (urticaria, angioedema).

In conclusion, pine nut allergies do not seem to be a very frequent food allergy in Spain (according to the survey data, less than 1 % of the population with a food allergy), although it is related to a high probability of developing anaphylaxis (75-80 % of patients), in low concentrations (<10 mg, according to most of the specialists surveyed, and even <1 mg, according to 13 % of them).

Approximately 61 % of the allergist clinicians who answered the AESAN/SEAIC survey said that pine nuts should be included in the list of substances or products that cause allergies or intolerances, that are mandatorily notifiable in the European Union.



## 7. Questionnaire on food allergies in Spain

Taking into account the work being carried out by the *Codex Alimentarius* Commission, and in anticipation of a possible revision to the list in Annex II of Regulation (EU) No. 1169/2011 (EU, 2011), in order to support the inclusion of certain allergens that are not currently included in that Annex, but that may be relevant in Spain, it is necessary to have up-to-date information on the prevalence, severity and potency of allergies caused by foods such as fruits of the rosacea family, legumes, kiwis and pine nuts.

In addition to the data published in scientific journals on allergies caused by these foods in Spain, a questionnaire was prepared in collaboration with SEAIC with questions related to the prevalence, potency and severity of some food allergies, especially those caused after the ingestion of pine nuts, rosaceae, kiwis and legumes. This questionnaire was disseminated, through SEAIC, to doctors specialising in Clinical Allergology, with the aim of getting their opinions on these allergies and thus being able to base the approach to the review of the list of mandatorily notifiable allergens in the European Union.

The specialists surveyed were asked about the frequency of diagnosis of such allergies, based on their clinical experience, as well as the number of patients allergic to the aforementioned foods. They were also asked about the level of severity (mild, moderate, severe [anaphylaxis]) or the symptoms that patients present after suffering allergic reactions to these foods and they were asked to indicate those foods, within a list, that they considered to produce the most serious allergic reactions in their health centre. There were also questions about the correlation between the specific IgE tests and the severity of the clinical reactions after ingestion and about the number of patients who have required hospitalisation or treatment by the emergency services due to an allergy to rosaceae, legumes, kiwi or pine nuts, in the last year. In addition, they were asked if they performed OFC on patients to confirm the diagnosis of food allergy. Regarding the issues related to the potency of these food groups for causing allergic reactions, questions were asked about the minimum amount necessary to induce symptoms in patients; whether they considered that repeated exposure to traces could increase sensitisation in allergic patients; about the number of patients who, over a year, report having suffered an anaphylactic reaction and about the accidental consumption of such foods and their consequences.

### 7.1 Responses to the general aspects of the questionnaire

The survey involved 120 doctors specializing in Clinical Allergology from all the Spanish autonomous

communities, but, of them, 80 answered both the general questions (years of experience; health centre; autonomous community) and the specific questions about the registration of food allergies in their workplaces and about their perception of the prevalence, potency and severity of allergies to pine nuts, rosaceae, kiwi and legumes. Therefore, the results shown refer to these 80 doctors specialising in Clinical Allergology.

Regarding general questions, 45 % of specialists said they had more than 20 years of experience in Clinical Allergology; 87.5 % indicated that they work in a hospital centre and the rest in private medical practice (7.5 %), in speciality centres (2.5 %) and in mutual and health insurance medical centres (7.5 %). Regarding the type of health centre, 87.5 % of respondents indicated that they work in public centres and 12.5 % in private clinics.

Of the 80 participants who answered the specific questions, 62.5 % indicated that their care work covers patients of all ages; 30 % only the adult population and 7.5 % the child population. When asked if food allergies are recorded in a structured manner in the electronic medical record of the health centre where they work, 21.4 % answered yes and with standardised codes; 37.9 % indicated yes, although without standardised coding; 29.1 %, which are recorded only as clinical notes and 10.7 %, which are not systematically recorded (the remaining 1 % answered that they did not have enough data). 38.8 % of specialists indicated that information on food allergies for scientific studies or statistical purposes is extracted through manual review of patients' medical records; 26 % indicated that it is done through structured databases; 20.4 % responded that information is not extracted for that purpose and 14.6 % that they did not have enough data. When asked how respondents would extract information about food allergies to complete the questionnaire, only 31 % indicated that they would do so through a structured database or by reviewing medical records. Approximately 60 % of specialists consider that the current food allergy records in electronic medical records are not detailed enough for scientific studies and that key details on allergic reactions and diagnostic tests are missing.

Lastly, it should be noted that, when asked whether they considered that rosaceae, legumes, kiwi and pine nuts should be included in the list of substances or products that cause allergies or intolerances, which are mandatorily notifiable in the European Union, a high percentage of specialists answered yes (95.3 %, 93.8 %, 85.9 % and 60.9 %, respectively).

The rest of the answers to the specific questions on the prevalence, potency and severity of pine nuts, rosaceae, kiwi and legume allergies are contained in the previous sections, as well as in the tables in Annex I of this document.

## Conclusions of the Scientific Committee

The prevalence of food allergies in Spain can reach up to 7.4 %, with an allergy to rosaceae being one of the most frequent among patients suffering a food allergy, mostly peach and apple. Allergies to fruits of the *Rosaceae* family account for approximately 23.6 % of diagnosed food allergic reactions, especially in patients over 5 years old. As for the severity of allergic reactions after the ingestion of rosaceae, these are related to a high frequency of anaphylaxis, affecting approximately 45 % of people who suffer from it. Due to the frequency of severe symptoms, insufficient data is

available on the minimum amount needed to be consumed to induce symptoms, and it has been found to be highly dependent on the characteristics of each person. However, the perception is that mono-sensitised people are capable of suffering very serious allergic reactions after contact with the skin of the peach or apple, where the allergen is mainly found.

Allergies to legumes (not including peanuts and soybeans) affects approximately 7 % of the Spanish population allergic to food, and specifically, 6.9 % of the adult population and 5.3 % of the child population, with lentils being the most implicated in both population groups. As for the frequency of onset of severe symptoms (anaphylaxis), it is estimated to be approximately 25 % for adults. And on potency, no data is available to be able to determine the minimum amount of allergen that induces symptoms.



Regarding kiwi allergies, in the child population, in European countries the prevalence of a kiwi allergy ranges from 0 to 1.06 %, with Spain being the country with the highest prevalence (1.06 %). In the European adult population, the global prevalence is between 0 and 1.34 %, with a prevalence of 0.64 % in Spain. A kiwi allergy is associated with severe gastrointestinal symptoms (15-35 % of the patients with kiwi allergy) and anaphylaxis (1-5 % of the patients with this type of allergy, according to estimates from the specialists participating in the survey). However, there are no data indicating the minimum amount needing to be ingested to suffer symptoms (potency), although people who are sensitised report that they cannot consume a whole piece of fruit before feeling any symptoms.

On the other hand, with regard to pine nut allergy, the Scientific Committee concludes that it is not a very common food allergy in Spain (according to the survey data, less than 1 % of the population with a food allergy), although it is related to a high probability of developing anaphylaxis (severity: 75-80 % of patients), at low concentrations of the food (potency: <10 mg, according to most of the specialists surveyed, and even <1 mg, according to 13 % of them).

In conclusion, based on the published prevalence and severity data and the views of the medical specialists surveyed, the Scientific Committee, shares their opinion that there is sufficient evidence to propose the inclusion, in this order, of rosaceae, legumes, kiwi and pine nuts, in the list of substances or products that cause allergies or intolerances, which are mandatorily notifiable in the European Union.

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# Annex I. Questions and answers on the prevalence, potency and severity of allergies to rosaceae, legumes, kiwi and pine nuts

## 1. Allergy to rosaceae plants

**Table 1.** Questions and answers on prevalence, severity and potency of rosaceae allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| What proportion of patients are allergic to ROSACEAE plants? | Less than 1 % (less than 1 case per 100 patients) | 0.0 |
| | 1-5 % (1 to 5 cases per 100 patients) | 7.0 |
| | 5-10 % (5 to 10 cases per 100 patients) | 25.4 |
| | 10-20 % (10 to 20 cases per 100 patients) | 32.4 |
| | More than 20 % (more than 20 cases per 100 patients) | 28.2 |
| | I don't have enough data | 7.0 |
| In your autonomous community, do you consider that the prevalence of an allergy to ROSACEAE plants is higher than that reported in national or international studies? | Yes, it is significantly higher | 22.5 |
| | Yes, it's slightly higher | 11.3 |
| | It is similar | 39.4 |
| | It is less | 5.6 |
| | I don't have enough data to assess this | 21.1 |
| Have you observed an increase in the prevalence of ROSACEAE plant allergies in the last 5 years? | Yes, notably | 45.1 |
| | Yes, slightly | 29.6 |
| | No, it remains stable | 25.4 |
| | No, it has decreased | 0.0 |
| Do you usually carry out the Oral Food Challenge (OFC) to confirm the diagnosis of a ROSACEAE food allergy? | Yes, always | 2.8 |
| | Yes, in most cases | 21.1 |
| | Only in specific cases | 67.6 |
| | No, never | 8.5 |
| In your experience, what minimum amount of ROSACEAE is needed to induce symptoms in the patient? | Direct contact with traces | 4.2 |
| | Intake <1 mg (e.g. a small particle) | 7.0 |
| | Intake of 1-10 mg (e.g. a bread crumb or tiny piece of food) | 21.1 |
| | Intake of 10-100 mg (e.g. a small bite) | 35.2 |
| | Intake of more than 100 mg (e.g. a partial serving) | 14.1 |
| | Intake of a full serving or more | 5.6 |
| | I don't have enough data | 12.7 |
| Do you consider that repeated exposure to trace amounts of ROSACEAE may increase sensitization in allergic patients? | Yes, in most cases | 7.0 |
| | Yes, but it depends on the patient | 26.8 |
| | No, it doesn't seem to affect sensitisation | 23.9 |
| | I don't have enough data | 42.3 |

**Table 1.** Questions and answers on prevalence, severity and potency of rosaceae allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| How many patients report having suffered anaphylaxis in the last 12 months after ingesting ROSACEAE? | None | 1.4 |
| | 1-5 patients | 19.7 |
| | 6-10 patients | 25.4 |
| | 11-20 patients | 19.7 |
| | More than 20 patients | 26.8 |
| | I don't have enough data | 7.0 |
| What are the most common symptoms related to a ROSACEAE allergy? | Skin symptoms (hives, angioedema) | 73.2 |
| | Respiratory symptoms (rhinitis, asthma) | 0.0 |
| | Digestive symptoms (nausea, vomiting, diarrhoea) | 1.4 |
| | Anaphylaxis | 25.4 |
| | I don't have enough data | 0.0 |
| In the last 12 months, how many patients report having accidentally consumed ROSACEAE plants and suffered symptoms? | None | 9.9 |
| | 1-5 | 40.9 |
| | 6-10 | 9.9 |
| | More than 10 | 26.8 |
| | I don't have enough data | 12.7 |
| Have specific IgE tests shown correlation with the severity of the clinical reaction after ROSACEAE ingestion, in your experience? | Yes, the higher the specific IgE, the greater the severity | 4.2 |
| | Yes, but with a few exceptions | 39.4 |
| | No, the correlation is not clear | 49.3 |
| | I don't have enough data | 7.0 |
| What is the rate of anaphylactic reactions to ROSACEAE in your clinical experience? | Less than 1 % (less than 1 case per 100 patients) | 2.8 |
| | 1-5 % (1 to 5 cases per 100 patients) | 31.0 |
| | 5-10 % (5 to 10 cases per 100 patients) | 23.9 |
| | 10-20 % (10 to 20 cases per 100 patients) | 19.7 |
| | More than 20 % (more than 20 cases per 100 patients) | 14.1 |
| | I don't have enough data | 8.5 |
| How many patients with a ROSACEAE allergy have been hospitalised at your facility in the last 12 months? | None | 53.5 |
| | 1-5 patients | 9.9 |
| | 6-10 patients | 0.0 |
| | 11-20 patients | 4.2 |
| | More than 20 patients | 1.4 |
| | I don't have enough data | 31.0 |

**Table 1.** Questions and answers on prevalence, severity and potency of rosaceae allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| In your experience, what percentage of patients with a ROSACEAE allergy have required emergency care due to a severe reaction in the past 12 months? | Under 1 % | 9.9 |
| | 1-5 % | 35.2 |
| | 5-10 % | 16.9 |
| | More than 10 % | 18.3 |
| | I don't have enough data | 19.7 |
| In your opinion, should ROSACEAE be included in the European Union mandatorily notifiable list of substances or products causing allergies or intolerances? | Yes | 95.3 |
| | No | 3.1 |
| | I have no opinion | 1.6 |

## 2. Allergy to legumes

**Table 2.** Questions and answers on the prevalence, severity and potency of legume allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| What proportion of patients have a LEGUME allergy? | Less than 1 % (less than 1 case per 100 patients) | 31.3 |
| | 1-5 % (1 to 5 cases per 100 patients) | 29.9 |
| | 5-10 % (5 to 10 cases per 100 patients) | 20.9 |
| | 10-20 % (10 to 20 cases per 100 patients) | 10.5 |
| | More than 20 % (more than 20 cases per 100 patients) | 0.0 |
| | I don't have enough data | 7.5 |
| In your autonomous community, do you consider that the prevalence of allergy to LEGUMES is higher than that reported in national or international studies? | Yes, it is significantly higher | 4.5 |
| | Yes, it's slightly higher | 7.5 |
| | It is similar | 50.8 |
| | It is less | 7.5 |
| | I don't have enough data to assess this | 29.9 |
| Have you observed an increase in the prevalence of LEGUME allergies in the last 5 years? | Yes, notably | 6.0 |
| | Yes, slightly | 22.4 |
| | No, it remains stable | 70.2 |
| | No, it has decreased | 1.5 |
| Do you usually carry out the Oral Food Challenge (OFC) to confirm the diagnosis of a LEGUME food allergy? | Yes, always | 1.5 |
| | Yes, in most cases | 40.3 |
| | Only in specific cases | 47.8 |
| | No, never | 10.5 |

**Table 2.** Questions and answers on the prevalence, severity and potency of legume allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| In your experience, what minimum amount of LEGUMES is necessary to induce symptoms in the patient? | Direct contact with traces | 4.5 |
| | Intake <1 mg (e.g. a small particle) | 10.5 |
| | Intake of 1-10 mg (e.g. a bread crumb or tiny piece of food) | 25.4 |
| | Intake of 10-100 mg (e.g. a small bite) | 29.9 |
| | Intake of more than 100 mg (e.g. a partial serving) | 14.9 |
| | Intake of a full serving or more | 1.5 |
| | I don't have enough data | 13.4 |
| Do you think repeated exposure to trace amounts of LEGUMES may increase sensitisation in allergic patients? | Yes, in most cases | 7.5 |
| | Yes, but it depends on the patient | 26.9 |
| | No, it doesn't seem to affect sensitisation | 23.9 |
| | I don't have enough data | 41.8 |
| How many patients report having suffered anaphylaxis after eating LEGUMES in the last 12 months? | None | 16.4 |
| | 1-5 patients | 50.8 |
| | 6-10 patients | 10.5 |
| | 11-20 patients | 3.0 |
| | More than 20 patients | 1.5 |
| | I don't have enough data | 17.9 |
| What are the most common symptoms related to a LEGUME allergy? | Skin symptoms (hives, angioedema) | 49.3 |
| | Respiratory symptoms (rhinitis, asthma) | 4.5 |
| | Digestive symptoms (nausea, vomiting, diarrhoea) | 25.4 |
| | Anaphylaxis | 14.9 |
| | I don't have enough data | 6.0 |
| In the last 12 months, how many patients report having accidentally consumed LEGUMES and suffered symptoms? | None | 22.4 |
| | 1-5 | 41.8 |
| | 6-10 | 10.5 |
| | More than 10 | 3.0 |
| | I don't have enough data | 22.4 |
| Have specific IgE tests shown correlation with the severity of the clinical reaction after LEGUME ingestion, in your experience? | Yes, the higher the specific IgE, the greater the severity | 17.9 |
| | Yes, but with a few exceptions | 32.8 |
| | No, the correlation is not clear | 34.3 |
| | I don't have enough data | 14.9 |

**Table 2.** Questions and answers on the prevalence, severity and potency of legume allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| What is the rate of anaphylactic reactions to LEGUMES in your clinical experience? | Less than 1 % (less than 1 case per 100 patients) | 29.9 |
| | 1-5 % (1 to 5 cases per 100 patients) | 28.4 |
| | 5-10 % (5 to 10 cases per 100 patients) | 11.9 |
| | 10-20 % (10 to 20 cases per 100 patients) | 6.0 |
| | More than 20 % (more than 20 cases per 100 patients) | 1.5 |
| | I don't have enough data | 22.4 |
| How many patients with a LEGUME allergy have been hospitalised at your facility in the last 12 months? | None | 61.2 |
| | 1-5 patients | 9.0 |
| | 6-10 patients | 1.5 |
| | 11-20 patients | 1.5 |
| | More than 20 patients | 0.0 |
| | I don't have enough data | 26.9 |
| In your experience, what percentage of patients with a LEGUME allergy have required emergency care due to a severe reaction in the past 12 months? | Under 1 % | 29.9 |
| | 1-5 % | 26.9 |
| | 5-10 % | 7.5 |
| | More than 10 % | 0.0 |
| | I don't have enough data | 35.8 |
| In your opinion, should LEGUMES be included in the European Union mandatorily notifiable list of substances or products that cause allergies or intolerances? | Yes | 93.8 |
| | No | 1.6 |
| | I have no opinion | 4.7 |

## 3. Kiwi allergy

**Table 3.** Questions and answers on the prevalence, severity and potency of kiwi allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| What proportion of patients have a KIWI allergy? | Less than 1 % (less than 1 case per 100 patients) | 16.4 |
| | 1-5 % (1 to 5 cases per 100 patients) | 46.3 |
| | 5-10 % (5 to 10 cases per 100 patients) | 20.9 |
| | 10-20 % (10 to 20 cases per 100 patients) | 9.0 |
| | More than 20 % (more than 20 cases per 100 patients) | 3.0 |
| | I don't have enough data | 4.5 |

**Table 3.** Questions and answers on the prevalence, severity and potency of kiwi allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| In your autonomous community, do you consider that the prevalence of KIWI allergies is higher than that reported in national or international studies? | Yes, it is significantly higher | 6.0 |
| | Yes, it's slightly higher | 13.4 |
| | It is similar | 55.2 |
| | It is less | 1.5 |
| | I don't have enough data to assess this | 23.9 |
| Have you observed an increase in the prevalence of KIWI allergy in the last 5 years? | Yes, notably | 13.4 |
| | Yes, slightly | 31.3 |
| | No, it remains stable | 52.2 |
| | No, it has decreased | 3.0 |
| Do you usually carry out the Oral Food Challenge (OFC) to confirm the diagnosis of KIWI food allergy? | Yes, always | 3.0 |
| | Yes, in most cases | 22.4 |
| | Only in specific cases | 59.7 |
| | No, never | 14.9 |
| In your experience, what minimum amount of KIWI is needed to induce symptoms in the patient? | Direct contact with traces | 7.5 |
| | Intake <1 mg (e.g. a small particle) | 17.9 |
| | Intake of 1-10 mg (e.g. a bread crumb or tiny piece of food) | 34.3 |
| | Intake of 10-100 mg (e.g. a small bite) | 25.4 |
| | Intake of more than 100 mg (e.g. a partial serving) | 9.0 |
| | Intake of a full serving or more | 1.5 |
| | I don't have enough data | 4.5 |
| Do you think repeated exposure to trace amounts of KIWI may increase sensitisation in allergic patients? | Yes, in most cases | 11.9 |
| | Yes, but it depends on the patient | 25.4 |
| | No, it doesn't seem to affect sensitisation | 17.9 |
| | I don't have enough data | 44.8 |
| How many patients report having suffered anaphylaxis in the last 12 months after eating KIWI? | None | 11.9 |
| | 1-5 patients | 53.7 |
| | 6-10 patients | 14.9 |
| | 11-20 patients | 7.5 |
| | More than 20 patients | 1.5 |
| | I don't have enough data | 10.5 |
| What are the most common symptoms related to a KIWI allergy? | Skin symptoms (hives, angioedema) | 70.2 |
| | Respiratory symptoms (rhinitis, asthma) | 3.0 |
| | Digestive symptoms (nausea, vomiting, diarrhoea) | 0.0 |
| | Anaphylaxis | 23.9 |
| | I don't have enough data | 3.0 |

**Table 3.** Questions and answers on the prevalence, severity and potency of kiwi allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| In the last 12 months, how many patients report having accidentally consumed KIWI and suffered symptoms? | None | 26.9 |
| | 1-5 | 32.8 |
| | 6-10 | 7.5 |
| | More than 10 | 7.5 |
| | I don't have enough data | 25.4 |
| Have specific IgE tests shown correlation with the severity of the clinical reaction after KIWI ingestion, in your experience? | Yes, the higher the specific IgE, the greater the severity | 11.9 |
| | Yes, but with a few exceptions | 35.8 |
| | No, the correlation is not clear | 35.8 |
| | I don't have enough data | 16.4 |
| What is the rate of anaphylactic reactions to KIWI in your clinical experience? | Less than 1 % (less than 1 case per 100 patients) | 25.4 |
| | 1-5 % (1 to 5 cases per 100 patients) | 32.8 |
| | 5-10 % (5 to 10 cases per 100 patients) | 13.4 |
| | 10-20 % (10 to 20 cases per 100 patients) | 9.0 |
| | More than 20 % (more than 20 cases per 100 patients) | 4.5 |
| | I don't have enough data | 14.9 |
| How many KIWI allergy patients have been hospitalised at your facility in the last 12 months? | None | 62.7 |
| | 1-5 patients | 4.5 |
| | 6-10 patients | 3.0 |
| | 11-20 patients | 0.0 |
| | More than 20 patients | 0.0 |
| | I don't have enough data | 29.9 |
| In your experience, what percentage of KIWI allergy patients have required emergency care due to a severe reaction in the past 12 months? | Under 1 % | 37.3 |
| | 1-5 % | 22.4 |
| | 5-10 % | 6.0 |
| | More than 10 % | 1.5 |
| | I don't have enough data | 32.8 |
| In your opinion, should KIWI be included in the European Union mandatorily notifiable list of substances or products that cause allergies or intolerances? | Yes | 85.9 |
| | No | 7.8 |
| | I have no opinion | 6.3 |

## 4. Pine nut allergy

**Table 4.** Questions and answers on the prevalence, severity and potency of pine nut allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| What proportion of patients have a PINE NUT allergy? | Less than 1 % (less than 1 case per 100 patients) | 67.7 |
| | 1-5 % (1 to 5 cases per 100 patients) | 11.8 |
| | 5-10 % (5 to 10 cases per 100 patients) | 1.5 |
| | 10-20 % (10 to 20 cases per 100 patients) | 1.5 |
| | More than 20 % (more than 20 cases per 100 patients) | 0.0 |
| | I don't have enough data | 17.7 |
| In your autonomous community, do you consider that the prevalence of PINE NUT allergies is higher than that reported in national or international studies? | Yes, it is significantly higher | 1.5 |
| | Yes, it's slightly higher | 2.9 |
| | It is similar | 20.6 |
| | It is less | 17.7 |
| | I don't have enough data to assess this | 57.4 |
| Have you observed an increase in the prevalence of PINE NUT allergies in the last 5 years? | Yes, notably | 2.9 |
| | Yes, slightly | 17.7 |
| | No, it remains stable | 69.1 |
| | No, it has decreased | 10.3 |
| Do you usually carry out the Oral Food Challenge (OFC) to confirm the diagnosis of a PINE NUT food allergy? | Yes, always | 1.5 |
| | Yes, in most cases | 26.5 |
| | Only in specific cases | 47.1 |
| | No, never | 25.0 |
| In your experience, what minimum number of PINE NUTS is needed to induce symptoms in the patient? | Direct contact with traces | 4.4 |
| | Intake <1 mg (e.g. a small particle) | 13.2 |
| | Intake of 1-10 mg (e.g. a bread crumb or tiny piece of food) | 27.9 |
| | Intake of 10-100 mg (e.g. a small bite) | 13.2 |
| | Intake of more than 100 mg (e.g. a partial serving) | 1.5 |
| | Intake of a full serving or more | 1.5 |
| | I don't have enough data | 38.2 |
| Do you think repeated exposure to trace amounts of PINE NUTS may increase sensitisation in allergic patients? | Yes, in most cases | 5.9 |
| | Yes, but it depends on the patient | 20.6 |
| | No, it doesn't seem to affect sensitisation | 16.2 |
| | I don't have enough data | 57.4 |

**Table 4.** Questions and answers on the prevalence, severity and potency of pine nut allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| How many patients report having suffered anaphylaxis in the last 12 months after eating PINE NUTS? | None | 45.6 |
| | 1-5 patients | 32.4 |
| | 6-10 patients | 1.5 |
| | 11-20 patients | 0.0 |
| | More than 20 patients | 0.0 |
| | I don't have enough data | 20.6 |
| What are the most common symptoms related to PINE NUT allergies? | Skin symptoms (hives, angioedema) | 33.8 |
| | Respiratory symptoms (rhinitis, asthma) | 1.5 |
| | Digestive symptoms (nausea, vomiting, diarrhoea) | 2.9 |
| | Anaphylaxis | 33.8 |
| | I don't have enough data | 27.9 |
| In the last 12 months, how many patients report having accidentally consumed PINE NUTS and suffered symptoms? | None | 36.8 |
| | 1-5 | 22.1 |
| | 6-10 | 4.4 |
| | More than 10 | 0.0 |
| | I don't have enough data | 36.8 |
| Have specific IgE tests shown correlation with clinical reaction severity after PINE NUT ingestion, in your experience? | Yes, the higher the specific IgE, the greater the severity | 13.2 |
| | Yes, but with a few exceptions | 20.6 |
| | No, the correlation is not clear | 30.9 |
| | I don't have enough data | 35.3 |
| What is the rate of anaphylactic reactions to PINE NUTS in your clinical experience? | Less than 1 % (less than 1 case per 100 patients) | 42.7 |
| | 1-5 % (1 to 5 cases per 100 patients) | 10.3 |
| | 5-10 % (5 to 10 cases per 100 patients) | 4.4 |
| | 10-20 % (10 to 20 cases per 100 patients) | 0.0 |
| | More than 20 % (more than 20 cases per 100 patients) | 4.4 |
| | I don't have enough data | 38.2 |
| How many patients with a PINE NUT allergy have been hospitalised at your facility in the last 12 months? | None | 61.8 |
| | 1-5 patients | 5.9 |
| | 6-10 patients | 0.0 |
| | 11-20 patients | 0.0 |
| | More than 20 patients | 0.0 |
| | I don't have enough data | 32.4 |

**Table 4.** Questions and answers on the prevalence, severity and potency of pine nut allergies

| Question | Response options | Response rate (%) |
|---|---|---|
| In your experience, what percentage of patients with a PINE NUT allergy have required emergency care due to a severe reaction in the past 12 months? | Under 1 % | 48.5 |
| | 1-5 % | 7.4 |
| | 5-10 % | 1.5 |
| | More than 10 % | 0.0 |
| | I don't have enough data | 42.7 |
| In your opinion, should PINE NUTS be included in the European Union mandatorily notifiable list of substances or products that cause allergies or intolerances? | Yes | 60.9 |
| | No | 20.3 |
| | I have no opinion | 18.8 |