



Macadamia Oil Safety Profile

Bactol® Alcohol Gel

Bactol® Alcohol Gel has been formulated with a macadamia oil emollient. The macadamia oil used in Bactol® Alcohol Gel is a highly refined cosmetic grade oil, and therefore can be expected to be low in allergenic protein.

Background

Peanut and tree nut allergy is most common in infants but may appear for the first time in adults. Peanut allergy causes more problems than other food allergies because it is common (1 in 50 infants), exposure is hard to avoid and in some cases even trace amounts can trigger symptoms.

Peanut allergy can be characterised by more severe symptoms, such as gastrointestinal, skin and respiratory symptoms, than other food allergies and by a high rate of symptoms on minimal contact^{1,2}.

Severe sufferers also may experience potentially life-threatening anaphylactic shock in response to ingestion of peanuts. Anaphylactic shock is an allergic reaction in which the release of histamine causes swelling, difficulty in breathing, heart failure, circulatory collapse and sometimes death. As many as one-third of peanut sensitive patients may have severe reactions, such as fatal, and near-fatal, anaphylaxis³.

Probably due to the fact peanut induced anaphylaxis typically will occur to children and its onset may be rapid and life-threatening, peanut (and tree nut) allergy tends to attract a disproportionate level of interest, often resulting in responses that represent a gross over-reaction to the magnitude of the threat⁴. This may be exemplified by the fact that in the United States, there are approximately 3.3 million Americans who are allergic to nuts. However, serious allergic reactions to any food cause just 2000 hospitalisations a year (out of more than 30 million hospitalisations nationwide), while 150 people (children and adults) die each year from all food allergies combined.

The causative agent (allergen) for nearly all food related allergic reactions are proteins⁵. Typically, most whole nuts will contain between 7-22 % protein⁶. In order for an allergic reaction to be elicited, the allergen has to enter the body and typically this will be via ingestion.

Direct skin contact with the allergen, even with highly sensitive patients, may also elicit a mild, highly localised reaction (typically weals and erythema), particularly if the epidermis is compromised (this is the basis of the diagnostic skin prick test)⁷.

1 J. O'B Hourihane, S. A. Kilburn, P. Dean, J. O. Warner; "Clinical characteristics of peanut allergy"; Clin. Exp. Allergy 27, 634-639, (1997)

2 J. O'B Hourihane, S. A. Kilburn, J. A. Nordlee, S. L. Hefle, S. L. Taylor, J. O. Warner "An evaluation of the sensitivity of subjects with peanut allergy to very low doses of peanut protein"; J Allergy Clin. Res, 100, 596-600 (1997)

3 G.A. Settipane, "Anaphylactic deaths in asthmatic patients"; Allergy Proc., 10, 271-274 (1989)

4 N. A. Christakis, "This allergies hysteria is just nuts"; BMJ;337:a2880 (2008)

5 <https://www.nhs.uk/conditions/food-allergy/causes/> retrieved 28th May 2019

6 M. Venkatachalam, S. K. Sathe, "Chemical composition of selected edible nut seeds"; J Agric Food Chem. 54, 4705-4714 (2006)

7 S. J. Simonte, S. Ma, S. Mofidi, S. H. Sicherer, "Relevance of casual contact with peanut butter in children with peanut allergy"; J.Allergy Clin Immunol, 112,180 – 182 (2003)

Nut oils

Oils expressed from nuts have been shown to contain significantly lower levels of protein than the parent nut and as a consequence will tend to be less allergenic than the parent nut.

Refining of the oil (degumming, winterisation and decolourisation) will also lower the level of protein further (with each refining step contributing to the lowering of the protein level) and hence a highly refined oil will be significantly less allergenic than a virgin (unrefined) oil. The typical protein content of several common nut oils, along with their allergenicity rating is shown in table 1.

Table 1:

Comparison of protein levels for various gourmet oils and their immunoassay relative reactivity (data ex Teuber *et al*⁸).

Oil type (and manufacturer)	Protein content (ppm)	Immunoassay relative reactivity
Peanut		
Flora	62.2 ± 2.2	+/-
Hain	2.2 ± 0.7	-/+
Spectrum	16.7 ± 0.8	-/+
Gourmet Int.	12.7 ± 2.8	++
Nut extract	5300	++++
Macadamia		
Oil of Aloha	21.3 ± 0.9	-/+
Loriva	81.1 ± 0.8	+
Nut extract	3000	++

Key:

Relative reactivity was based on a subjective visual scale with ++++ assigned to the most reactive oil tested (peanut oil)

-/+ indicates a band in the immunoassay was barely visible

+/- indicates a very light band in the immunoassay was visible



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Macadamia nut allergy

As can be seen in table 1, macadamia oil can potentially give rise to allergic reactions, as evidenced by the mild responses shown in the immunoassay relative reactivity scores. It is also notable that crude extracts of macadamia nut are significantly less reactive than crude peanut extracts.

Whilst much less common, there have been several reports of allergy to macadamia nuts with reactions typically being triggered by consumption of the nut kernels⁹. There are also reports of contact dermatitis amongst macadamia pickers, although it has been shown that the outer husk is significantly more allergenic than the edible kernel¹⁰.

Even rarer are reports of anaphylaxis due to macadamia and again these are limited to patients who have consumed the nut¹¹. These patients were also found to be allergic to several other nut types.

In one case, a patient who had suffered anaphylaxis after consuming an orange flourless cake slice made from macadamia meal also demonstrated a marked skin reaction after being rubbed with a cut macadamia nut kernel. The same patient showed no reaction when pure macadamia oil was rubbed onto her skin⁹.

Macadamia oil

According to the UN Globally Harmonised System of Classification and Labelling of Chemicals (GHS), any substance for which there is evidence that the individual substance can cause sensitisation by skin contact in a substantial number of humans, or where there are positive results from an appropriate animal model, will be classified as a skin sensitizer.

Given the slight reactivity in the immunoassay reported in table 1, a cosmetic grade macadamia oil (winterised to minimise any protein content) was sourced from a reputable supplier. The classification of this oil by the supplier confirmed that this oil was not a sensitizer. Because of this, as the raw material is not classified as a sensitizer, Bactol® Alcohol Gel is also not classified as a sensitizer.

9 M. Lerch, C. Egger, A. J. Bircher, "Allergic reactions to macadamia nut", *Allergy*, 60,130-131(2005)

10 T. E. Knight, B. M. Hausen, "Dermatitis in a nutshell: Occupational exposure to *Macadamia integrifolia*", *J. Am. Acad. Derm* 35, 482-484 (1996)

11 M. F. Sutherland, R. E. O'Hehir, C. Suphioglu, "Macadamia nut anaphylaxis: Demonstration of specific IgE reactivity and partial cross-reactivity with hazelnut" *J. Allergy Clin Immunol*, 104, 889-890 (1999)



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Conclusion

The risk of allergic reaction from the use of Bactol® Alcohol Gel is extremely low. In the rare event that a highly sensitive individual does experience an adverse reaction, it is highly likely that any reaction will be localised and present as an irritation, or in severe cases wheals and/or erythema).

Whiteley Corporation makes every effort to ensure that its products are always safe to use, however products can affect individuals differently and the company cannot predict individual responses. Therefore, if irritation does occur when using this product or any other cleaning/disinfecting solution then the individual should be removed from direct contact with the solution until a satisfactory safe working environment for that individual is determined. Medical advice should then be sought and the product use not recommence by that individual until after suitable medical clearance is independently provided.