

INFORMATION SHEET - PYRROLIZIDINE ALKALOIDS (PAS)

Background

Pyrrrolizidine alkaloids are a group of naturally occurring toxins that are found in a number of plant species around the world, including *Symphytum* (comfrey), *Heliotrope*, *Echium* (Paterson's Curse/Salvation Jane) and *Crotalaria* species. Pyrrrolizidine alkaloids enter the human food supply through the use of comfrey leaves in salad, through the contamination of grain crops by weed species (*Heliotrope* and *Crotalaria*), eggs and dairy products or through the contamination of honey as a result of foraging by bees on the flowers of Paterson's Curse/Salvation Jane.

There have been no reported health problems from eating Paterson's Curse/Salvation Jane honey in Australia.

FSANZ previously examined the PAs issue and proposed a provisional tolerable daily intake (PTDI) of 1 microgram of PAs/kilogram bodyweight/day. Using this PTDI, a 70kg person or a 17kg child can ingest 70 micrograms or 17 micrograms PAs/day respectively. How this relates to tolerable levels of PAs in honey is shown in the following table.

PA concentration (micrograms/kg honey)	Amount of honey/day	
	70 kg adult	17 kg child
500	140 g	34 g
1000	70 g	17 g
2000	35 g	8.5 g

For Australian honey, levels of about 2000 micrograms/kg have been recorded but some blending of bulk honey substantially reduces this level. All commercial packers in Australia blend honey derived from PA-potential plant sources. Industry estimates that only 8-10% of honey produced is from floral sources which potentially contain PAs.

Industry research indicates that Australian consumers on average eat 1kg of honey per annum per capita. This would equate to around 2.74g of honey per day. This would mean that the 70 kg adult or the 17 kg child could safely eat honey containing 25,000 micrograms/kg or 6,200 micrograms/kg respectively and remain below the FSANZ However, food safety considerations must take into account the MOST vulnerable sub-section of the population. Australian nutritional data has shown that a child of about 17 kg BW is the most vulnerable in terms of honey intake. That they are also more vulnerable to the effects of PTDI. These levels are ten or three times the highest levels detected in Salvation Jane honey so far.

However, food safety considerations must take into account the MOST vulnerable sub-section of the population. Australian nutritional data has shown that a child of about 17 kg BW is the most vulnerable in terms of honey intake. That they are also more vulnerable to the effects of PAs is an additional factor to consider. Using the Australian Nutritional data and the PTDI suggested by FSANZ the following implications can be made:

Data from 1995 National Nutrition Survey			Data Deduced using the ANZFA PTDI of 1 microgram PAs/kg BW/day	
Age Group (years)	Average Body Weight (kg)	95 th %tile Honey Consumption (grams/day)	Allowed Daily Intake of Pas (micrograms)	Implied Maximum Levels of Pas in honey (micrograms/kg)
2-4	17	28.6	17	594
5-12	32	43.0	32	744
13-19	63	64.2	63	984
20-45	74	57.3	74	1291

It is important to note that because honey is not the only dietary source of PAs then these estimated concentrations will in fact be lower because the total PA intake from all food sources needs to be considered.

The UK Ministry of Agriculture, Fisheries and Forests (MAFF), in their internet-accessible information sheet on PAs in honey, also uses the maximum honey consumption for population groups rather than the average. The UK MAFF has concluded, based upon the apparent lack of effect of the PAs in one cup of comfrey tea per day, that there is no cause for concern for an adult consumer of honey containing 60 micrograms of PAs/kg (MAFF Food Surveillance Information Sheet 52 – Surveillance for pyrrolizidine alkaloids in honey <http://www.foodstandards.gov.uk/maff/archive/food/infosheet/1995no52/52honey.htm>). Note that it is recognised that young children are more susceptible to PA intoxication than adults and therefore this figure of 60 micrograms of PAs/kg would in fact be lower in order to protect this more vulnerable section of the population. Note also that this is 20 times and 10 times less than the levels deduced for adults and children respectively using FSANZ's PTDI.

Summary

- There have been no known health problems reported from eating honeys containing PAs
- Industry blends honey that is from known PA producing plants such as Salvation Jane (Paterson's Curse) to dilute the PA content
- Industry and CSIRO have supported work on the development of analytical methods for detecting PAs in honey and initial investigations into the feasibility of removing PAs from honey during processing.
- PAs have been reported in honeys from around the world, including the USA, UK, Switzerland
- FSANZ is the appropriate Australian agency to comment on the safety of the PAs found in some honeys. To date no formal recommendations on a Maximum Permissible Concentration of PAs in honey have been made by the organisation.

For industry comment, contact Australian Honey Bee Industry Council, Email: ahbic@honeybee.org.au

Attached is a fact sheet issued by FSANZ.



FACT SHEET

9 February 2004

CONSUMERS ADVISED TO LIMIT CONSUMPTION OF PATERSON'S CURSE/SALVATION JANE HONEY

Food Standards Australia New Zealand (FSANZ) today issued advice to consumers who eat more than 2 tablespoons of honey every day not to eat honey made exclusively from Paterson's Curse or Salvation

Jane. This is because of the presence of high levels of naturally occurring toxins known as pyrrolizidine alkaloids. There have been no reported health problems from eating Paterson's Curse/Salvation Jane honey in Australia,

According to the National Nutrition Survey, nine percent of Australians eat honey on any given day. The average honey eater consumes about 3 teaspoons a day while 5% eat more than 2 tablespoons a day. It would be unusual for anyone to consume large amounts of honey every day. Paterson's Curse/Salvation Jane honey is also a relatively rare product usually found in specialty markets.

FSANZ also advised honey processors to continue their practice of blending Paterson's Curse/Salvation Jane honey with other honeys as this will reduce the pyrrolizidine alkaloids to a safe level. Most commercially available honeys are blended.

Pyrrolizidine alkaloids are a group of naturally occurring toxins that are found in a number of plant species around the world, including *Symphytum* (comfrey), *Heliotrope*, *Echium* (Paterson's Curse/Salvation Jane) and *Crotalaria* species. Pyrrolizidine alkaloids enter the human food supply through the use of comfrey leaves in salad, through the contamination of grain crops by weed species (*Heliotrope* and *Crotalaria*), eggs and dairy products or through the contamination of honey as a result of foraging by bees on the flowers of Paterson's Curse/Salvation Jane.

Pyrrolizidine alkaloids can cause liver damage in both animals and in humans when exposure is high over an extended period. FSANZ has provisionally established a safe level of intake (referred to as a tolerable daily intake) of one microgram per kilogram bodyweight per day based on the known toxicity in humans.

Preliminary results of a survey of pyrrolizidine alkaloids levels in commercially available honey conducted by the CSIRO Animal Health Plant Toxins Unit have been made available to FSANZ. This survey examined the pyrrolizidine alkaloids content of 60 samples of honey specifically chosen to represent honey derived from sources likely to contribute to contamination by pyrrolizidine alkaloids. The highest levels of pyrrolizidine alkaloids were found in honey samples derived mainly from Paterson's Curse/Salvation Jane.

The preliminary results from the CSIRO honey survey have been examined by FSANZ together with information on the expected dietary intake of pyrrolizidine alkaloids from honey using food consumption data from the 1995 National Nutrition Survey. For the average consumer of about 3 teaspoons a day of honey, the levels of pyrrolizidine alkaloids in these honey samples would be well below the tolerable daily intake and not a cause for concern. However, for the high consumer of about 2 tablespoons a day of honey sourced exclusively from Paterson's Curse/Salvation Jane, there is potential to exceed the tolerable daily intake.

For more information:

FSANZ has previously examined the available toxicity data on pyrrolizidine alkaloids and prepared a Technical Report (Technical Report No. 2 '*Pyrrolizidine Alkaloids: A Toxicological Review and Risk Assessment*' November 2001) which is available on the FSANZ website (www.foodstandards.gov.au/mediareleasespublications/technicalreportserie1338.cfm).

There is also more information on pyrrolizidine alkaloids on the Australian Honey Bee Industry Council website www.honeybee.org.au