

Honey and Infant Botulism

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At the Council Meeting last year* I informed the membership of a case of **Infant Botulism** in Fife. *'Honey on a Dummy could have killed tot'* was the headline in one Scottish newspaper but subsequent reports in other papers were more measured. At the time I did write to the Food standards Agency for guidance but was referred to their current advice that honey should carry a label that it should not be given to infants of 1 year or under. This advice was repeated to the Council Meeting and in a later short article in the **Scottish Beekeeper**. This has been reiterated by the Food Standards Agency and remains voluntary.

The **Health Protection Report** (28 May 2010 – Vol 4 No 21) reported the third case of Infant Botulism associated with honey consumption since August 2009. They were concerned that health warnings advising against feeding honey to infants less than one year of age were not being followed. This is a rare disease in the UK with only 8 cases reported up until the end of 2008. It is considered that in these infants there is an immaturity of the gut flora so that ingested spores of *Clostridium botulinum* are able to germinate and produce toxin in the intestinal tract. The Botulinum neurotoxin is then absorbed into the circulation and affects the neuromuscular junctions leading to a flaccid paralysis in the affected infants. The initial clinical signs of the illness are of a general nature so that diagnosis can be difficult. Treatment will require intensive nutritional and respiratory supportive care in a specialist unit but fortunately there is a special immunoglobulin treatment available from a centre in California, USA which usually enables a speedier recovery.

C. botulinum spores are everywhere in the environment but are commoner in some geographical areas than others. There are many parts of the world where it exists but is not recognised and so goes under-reported. It is possible that the recent rise in UK reports is due to improved recognition by clinicians. It is rarely possible to clearly link consumption of honey to the clinical manifestations of illness but in the recent UK cases there is a history of the infants being fed honey. In one case the same type of *C. botulinum* was isolated from the honey as from stool specimens. Processed infant foods would not normally contain those spores as the heating and storage requirements destroy them.

The same processes cannot of course be applied to honey without significant damage to the product.

There is no doubt that samples of unprocessed honey can contain Botulinum spores. Whereas bacteria cannot grow in honey which is ripe and with a moisture content of 18% or less the spores of Botulinum do survive. But the environment abounds with the spores so that some would argue that environmental contamination and not honey is the source of this illness in infants. (See article by Ross Conrad; September 2009 issue , **Bee Culture**). So though there may be a correlation between honey and Infant Botulism this does not necessarily imply causation. There is an informative reply to this in the March 2010 issue of **Bee Culture** by Bruce Tompkin a microbiologist with 45 years experience in the food industry and a researcher into C. botulinum. He estimates that in the USA in the late 1970s about 35% of cases of infant botulism had honey implicated as a cause. Of the two types of C. botulinum Type B predominated in the Eastern coastal states and type A in the Western states of the USA. This pattern was found to match the types found in the soils of those states. There is evidence accumulating that soil, nearby construction sites and dusty and windy localities may be factors. Surveys of foods published in the USA have shown that C. botulinum spores rarely occur but in honey the results are somewhat different. Here *the prevalence rate for all the surveys from around the world was reported to be 5.1% of 2,033 samples. (Snowdon and Cliver 1996).*

Public Health policy in the West has relied on education informing the public of the risks of feeding honey to infants of less than a year old and the use of appropriate labelling has been a key part of this campaign. Data from California would suggest this policy has been successful. California was the state with the highest number of annual cases. The proportion of cases with a history of honey consumption in affected infants was 39.7% in the 1970s, 14.7% in the 1980s, 5.3% in the 1990s and 4.7% in the 2000s (reported by Bruce Tompkin in his article). In other countries the link between honey and Infant Botulism is not so well known and there remains a higher incidence where honey is implicated in new cases.

So how is it that honey has a risk of carrying C. botulinum spores? C. Botulinum is known to be a soil-borne microorganism that can be brought to the hive by the honey bee. It is postulated that the levels in the hive would remain very low and that somehow multiplication would have to occur for the levels found in honey to be reached. There are

other opinions that it is most likely that contamination could occur in the processing environment eg. during harvesting, extracting and bottling processes. However research has demonstrated that growth within the hive is more likely. *C. botulinum* is an anaerobe and it is possible that it can multiply in dead bees and pupae or can be enhanced where other bacteria are present. The internal temperature of the hive would enhance such growth. Is it possible that careful attention to hive hygiene with frequent comb changes and use of 'hive cleansers' that stimulate honey bee cleaning behaviour may lead to a corresponding reduction in the spores within a hive?

As beekeepers we must take a sensible view on the evidence before us. Infant botulism is a serious disease and in the early stages difficult to diagnose unless there is a high index of suspicion. The risk associated with honey is there and can be reduced by public education. **The Scottish Beekeepers' Association advises members to follow the advice of the Food Standards Agency that honey should be clearly labelled stating that it should not be given to infants under one year of age.** While this condition will not be eradicated as there are so many other sources of environmental contamination, at least a steady and welcome reduction in incidence could be achieved.

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References

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