

Are Apricot Kernels Toxic?

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Abstract

If future research shows that Laetrile has value, we can expect the consumption of apricot kernels to increase. Critics of Laetrile have asserted that apricot kernels are highly toxic. Case histories confirm that negative reactions to eating apricot kernels can take place, but such reports are rare, and we have only suggestive evidence concerning what doses cause adverse effects.

INTRODUCTION

Apricot kernels contain Laetrile, considered by some to have anti-cancer effects. Critics of Laetrile warn the public that eating apricot kernels is dangerous: They can make you sick and can even be fatal. The professional literature provides some evidence that negative effects can occur if you eat a lot of kernels at once, but unfortunately it tells us very little else.

A single apricot kernel contains about ½ milligram of cyanide (Committee on Toxicity, 2006; there is variation, however; see Holzbecker, Moss and Ellenberger, 1984). Laetrile proponents claim that about ten kernels per day (5 mg of cyanide) is considered to be sufficient to prevent cancer and as many as 50 kernels is recommended to combat an existing cancer (25 mg of cyanide) (apricotseeds.com). Are these doses dangerous?

RESULTS

Table 1 is an attempt to describe the current state of knowledge on the toxicity of apricot kernels. The data comes from three sources:

A report from the Committee on Toxicity (2006), a discussion of cyanide toxicity in general, based on reports from a number of regulatory agencies. The reports state what levels of cyanide are dangerous and thus predict the toxicity level of apricot kernels.

Admonitions, statements from Laetrile supporters on how many apricot kernels one can consume without negative reactions. These statements are not backed up by research, but have a basis in personal experience.

Case histories, from the published research as well as comments posted by apricot kernel users on the internet.

Figure 1

Table 1: Number of Kernels and Toxicity

| | predictions | admonitions | case studies |
|--------------------------|-------------------------------|--|--|
| lethal | 65 to 560/day (1) | | |
| | | | |
| toxic/requires treatment | more than: 1 to 3 /day (1) | more than: 15 in 4 hours (2) 5 to 6 in 2 hrs (3) 8-10 at once (4) 5 per hour (5) | 20-40, one sitting (5) 30, one sitting (6) 9, one sitting (7) 30, one day (8) |

- (1) Committee on Toxicity, 2006
- (2) Bradford et al, 1983
- (3) Richardson and Griffin, 2005
- (4) Sayre and Kaymakcalavu, 1964
- (5) Apricotpits.com, one sitting
- (6) Rubino and Davidoff, 1979, one sitting
- (7) Suhard et al, 1998, one sitting
- (8) cgeorge, 2007 (internet)
- (9) Ray, 2008 (internet)

LETHAL DOSES

According to the report of the Committee on Toxicity (2006), a lethal dose of cyanide is considered to be between .5 to 3.5 mg/kg of body weight. For a 175 pound man, this means 40 mg (80 kernels) to 280 mg (560 kernels) per day, and for a 140 pound woman, 32.5 mg (65 kernels) to 227.5 mg per day (455 kernels).

Deaths from consuming apricot kernels appear to be rare. I could find only two publications describing lethal consequences (these two reports, however, are widely cited in anti-Laetrile publications).

Sayre and Kaymakcalavu (1964) report that between 1957 and 1962, two children died of cyanide poisoning in a hospital in Central Turkey after eating apricot kernels. No information was provided on how many kernels were consumed.

Lasch and Shawa (1981) report two more deaths of children in Gaza. One had been part of a group that had been

“feasting on apricot kernels,” according to their parents, and another, again along with other children, had consumed a sweet prepared from apricot kernels. Once again, there was no information on how much was consumed.

We are left with little idea of how many apricots there are in a “lethal dose.” It is, however, remarkable that only these cases are reported in the professional literature.

NON-FATAL TOXIC REACTIONS REQUIRING TREATMENT

A TDI or tolerable daily intake of cyanide, according to the Council of Europe and the World Health Organization, is between 12-20 micrograms per kg (Committee on Toxicity, 2005). Assuming the lowest figure, for a 175 pound man, this is little less than one mg (960 micrograms) or two apricot kernels. For a 140 pound woman, it is about $\frac{3}{4}$ of a mg (780 micrograms), or one and a half kernels. Assuming the higher figure, for a 175 pound man, this is 1.6 mg per day (three kernels), and for a 140 pound woman, 1.3 mg (two and half kernels).

The two studies cited above describing cases of children who died from cyanide poisoning after eating apricot kernels also included other children who ate the same kernels and had very negative reactions, but survived with treatment. This was the case with seven children in Sayre and Kaymakcalavu (1964), in seven children in the group that “feasted” on apricot kernels and 14 in the group that ate a sweet made with apricot kernels in Lasch and Shawa (1981). Once again, however, we do not know how many kernels were consumed.

Rubino and Davidoff (1979) described the case of a woman diagnosed with nodular lymphoma who ate “20 to 40” apricot kernels as a substitute for lunch. Within a half hour she had a “headache, weakness, disorientation and nausea” and vomited up “substantial quantities of chewed kernels” – her blood cyanide level was high, 3.2 mg/dl. She was treated and recovered, and was released from the hospital after three days.

Suchard, Wallace and Gerkin (1998), reported a case of a 41 year-old woman who ate 30 apricot kernels at one sitting. Within 20 minutes she suffered from “generalized weakness and numbness” (p. 742). Paramedics found her “lying on the bathroom floor, moaning, and unresponsive to stimuli” (pp. 742-3). Her blood cyanide level five hours after admission was high, .431 mg/dl. She was treated, and was discharged from the hospital after two days.

Suchard et. al. point out that their publication was the first published case of cyanide toxicity from eating apricot kernels reported since 1979 (Rubino and Davidoff, described above), about ten years before their article was submitted.

A few informal surveys have been carried out on the internet, with respondents answering questions such as this one: “Can you eat too many seeds per day, and if so, how many is too many?” (11/09/2007; cancervictors.net). The responses are of course volunteered and were not checked for accuracy, and there were only two responses that provided useful information. (I restrict the cases to respondents who were not taking other forms of Laetrile at the same time):

“When I ate too many, I got dizzy (the room spinning around) for about 10 minutes. I started out with 9 per day, then started increasing by 1 or 2 each time (3 x's a day). The day I got dizzy, I had eaten 9 at one time -- decided I had better be patient and build up slowly. Now, I eat around 45 a day”. ([cancervictors](http://cancervictors.net), 12/01/2007, [cgeorge](http://cgeorge.org))

“... when I first got them I took all 30 at once next day I (got) so sick so now I'm slowly building up to taking the 30 a day ... 10 in the morning and 10 in the after noon and 10 at night ([cancercompass](http://cancercompass.com), 12/17/08, Ray)

ADMONITIONS

Bradford et .al. (1983) recommend that “... the maximum number of apricot kernels to be consumed in any four-hour period should be about 15 in a 150-lb adult. (p. 57).

Richardson and Griffen (2005) advise that “It is important not to consume more than five or six kernels within a two-hour period” (p. 216).

Sayre and Kaymakcalavu (1964), in their report on negative reactions to apricot kernels among children note that: “In Anatolia (Turkey) there is a rather general awareness of the potential danger of such seed consumption, for many adults, while admitting their general fondness for the seeds, warn against eating more than 8 or 10 at one time” (p. 1114)

Apricotpits.com states that kernels “should be taken in doses of 5 per waking hour ... along with a lot of water at each dose.” This website also notes that not everybody gets a bad reaction from taking a lot of apricot pits at once – only a small percentage “get nauseous from the apricot seeds” and will need to divide their seeds into many small doses throughout the day.

There is thus fairly good agreement that consuming more than five to ten kernels in a short time can produce negative reactions.

CONCLUSIONS AND LACUNAE

Death by apricot kernels appears to be rare, consuming more than 20 kernels at once can lead to serious negative reactions, but again, there are few recorded cases, and milder negative reactions can occur with eating about five to ten kernels at once.

The data triangulate well, but, as is obvious from table 1, the empirical basis of these summary statements is weak. We would eventually like to say with confidence what the lowest observed adverse effect level (LOAEL) is as well as what the no observed adverse effect level (NOAEL) is.

In addition, major mysteries remain.

Thousands of people have purchased and presumably have eaten apricot kernels. Young (1992), in fact, states that in the 1970's, apricot kernels were "in vogue," and even today they are widely advertised on the internet. Why do reports of apricot pit toxicity appear so rarely in the professional literature or even anecdotally, especially when the anti-laetrile establishment is so eager to cite the few that do exist? Is apricotpit.com correct in stating that negative reactions appear in only a few cases?

Of course, such reactions could be common but simply not reported. More likely, serious negative reactions are in fact unusual.

A second mystery is how people are apparently able to accommodate to apricot kernels, having negative reactions at first but gradually building up to higher doses (see e.g. cgeorge's report, cited above).

One website gives the following advice: "If you do not have cancer and you want to prevent it, eat 7 to 10 apricots seeds daily (start out at a low dosage, such as 1 or 2 at a time and work up to 7 to 10) "
(http://www.1cure4cancer.com/continue_pp2.htm).

How does accommodation occur, and what are the best schedules to follow in "getting used to" apricot kernels?

The third mystery is why there is so little research on the relationship between consuming apricot kernels and negative reactions.

I suspect that a major part of the problem is the widespread

belief that Laetrile is useless against cancer. Anti-Laetrile writers have seized on the few studies of apricot pit toxicity and have cited them again and again, giving the false impression that apricot pits are dangerous and no further research is necessary.

But the case against Laetrile as an anti-cancer agent has not been made. It has been argued that studies "proving" that Laetrile is useless are deeply flawed (Griffin, 1997; Moss, 1966; Krashen, 2008, 2009). In addition, the professional literature contains a number of reports of patients who did well with Laetrile, reports written by professional physicians who reported the cases carefully, and are not in the business of selling apricot kernels (e.g. Morrone, 1962, Navarro, 1955, 1970, 1975; Navarro and Lagman, 1956; Navarro et al, 1957, 1958). These cases cannot be ignored, and there are too many of them to attribute all to fraud, misdiagnoses or spontaneous remission.

Despite the pessimism of the medical establishment, people continue to consume apricot kernels, and if future studies on the efficacy of laetrile are positive, consumption will increase. It is essential that we improve the state of knowledge on the possible toxicity of apricot kernels.

FOOTNOTE

1. According to Taylor et. al. (2006), cyanide blood levels of higher than .05 mg/dl produce toxic effects, with fatalities occurring at levels of .3 and higher (pp. 6-7). A level of 3.2 mg/dl is very high.

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