

Irradiated commodities infected with fresh mould spores

Moulds

Moulds grow from tiny spores floating in the air everywhere around us. And when they land on a surface they germinate if the circumstances of moisture, nutrients and temperature are right.

What if?

An Indian research team wondered what would happen if irradiated commodities were infected with fresh spores which could germinate.

They took Indian circumstances as point of departure: you have irradiated your commodity, during transport it was infected with the spores of toxin producing moulds, the storage is poor, your commodity gets moist and moulds get a chance to grow. What will happen? They set out to find out.

They tested a number of commodities: wheat, maize, sorghum and pearl millet were irradiated with 0.75 kGy against insects. Potatoes and onions were irradiated with 0.10 kGy to prevent sprouting.

After irradiation the commodities were heat sterilised and then inoculated with spores from a toxin producing mould. The same was done with unirradiated commodities to compare. This was followed by incubation at 27 °C for 7 days.

Much more toxin formation

In the irradiated commodities they found much more toxin formation than in the controls without irradiation. This was for wheat 45.7 % more toxin, for maize 31.4% more toxin, for sorghum 80.8% more toxin, in pearl millet 66% more toxin, in potatoes 74.4 % more toxin and in onions 84% more toxin (1). This was clearly a general trend and in a follow up research they tried to find out what the cause could be.

Irradiated wheat

They took wheat and irradiated it with a range of different doses and did further exactly as with the first research. And now they found that with an increasing dose there was increased toxin

formation. They put their findings in a table which is quite revealing. Here is that table:

Irrad-iation dose	Afla-toxin B1	Free fatty acids	Fungal weight
0	358	354	18.5
0.50	512	493	20.2
0.75	544	532	17.9
1	556	540	18.6
2	571	570	16.3
2.5	633	599	16.3

The important thing is to realise that all these numbers are quantities. No matter how they are expressed. So let us see what the table tells us.

The tale of the Table

The first and second column together show that with increasing radiation dose the amount of aflatoxin also increases. The fourth column tells us that the dry weight of the mould remained more or less the same. So, the increased toxin production is not caused by increased growth of the mould. The third column is the amount of free fatty acids in the wheat. Column 1 and 3 together show that increased irradiation caused an increase in free fatty acids. So, to put things together: more irradiation gave higher levels of free fatty acids and this resulted in more aflatoxin production (2).

This research is in line with French research that found that irradiation causes the breakdown of fats in free fatty acids, which stimulate aflatoxin production (3).

In other words **toxin production by toxin producing moulds is greatly stimulated by the chemical changes in commodities caused by irradiation.**

Fake research

What was the reaction from the promoters of

food irradiation? The usual one: fake research and attempts to discredit this genuine research. Heat sterilisation had destroyed 'anti-fungal properties' in the wheat, they pretended. Most farmers know that this is nonsense. When wheat or other commodities get moist then they get mouldy.

Then there were allegations on the followed procedures. Not too many people are familiar with laboratory procedures, so it easy to suggest all kinds of sinister things. And then last but not least they misrepresented this research in their reviews.

Misrepresentation

The crux of the research was, that there was not only an upsurge in toxin production, but a clear dose relationship: more irradiation gave more toxin.

The review conceded that there was this upsurge in toxin production, but stated this was 'without any clear relationship to the irradiation

dose.'⁽⁴⁾ So, now in combination with their own fake research they could pass this genuine research off as a fluke.

What if?

Experience shows that under normal circumstances there is fierce competition among microorganisms. So, it cannot be claimed that under moist conditions you always will find higher toxin levels. On the other hand it is well documented that in many cases the toxin producers got the upper hand with often fatal consequences. So many factors are involved that nobody can predict anything for a given situation.

But what must be understood is that if things go wrong, then this irradiation disinfection method aggravates matters. And a disinfection method that makes things worse is a **bad** disinfection method.

Uncontrolled chemical engineering

In addition should be understood that irradiating commodities on a regular basis tends to change their chemical composition in such a way that toxin producers can get easier the upper hand. Because although we don't know why moulds produce toxins it is a fair assumption that somewhere it gives them a biological advantage.

References

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H. Julius
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