Green Schools Network

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ACTIVITY SHEET

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Why talk about Insecticides & Pesticides?

How do you digest the fact that some processed food could store worms? Wash it down with a cola drink... they come fortified with pesticides! That was how the joke went about a decade ago when the Centre for Science and Environment made the startling discovery that a popular, oh-so-chic cola drink carried traces of pesticide residue. And if you were wondering how it got there, then there is another can of worms to make you sit up... we are talking about the huge threat to our food shelves from increasing domestic use of pesticides and genetically modified (GM) foods. Are we getting by fine without the conventional, organic variants? Let us find out more...

Name.....

School Name .....

Class..... **Date** .....

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Pesticide is actually a generic term and is usually applied or understood in the context of agricultural usage. But did you know that a pesticide can be any chemical or biological agent which kills or controls pests? It could be a disinfectant, an anti-microbial agent, even a virus or a bacterium itself. In the specific context of agricultural use, it could be an insecticide, an organic fungicide or an organic herbicide. Say what? Arre, the first kills insects, while the second restricts fungus and the third controls weeds.

ACTIVITY 1

There are actually varying levels of residual pesticides in most food grains. But there are also permissible limits known as Maximum Residue Limit (MRL), defined separately for various pesticide-crop combinations. Compare the MRL for the combinations given in table, both Indian and American (EPA) standards. And if you wondering where to look it up, you might be able to dig out information from http://www.cseindia.org/ under the head **Food Safety and Toxins** in the **Pesticides Regulation** section. What do you see?

Hi! I am Pandit Gobar Ganesh. You will find me in Gobar Times—a magazine that tells you how your everyday life is linked to the world around you. Hooked, huh? If you want to know more about me and GobarTimes visit us at:

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SNo	Pesticide	Crops	Indian MRL	US (EPA) MRL
1	Phorate	Mustard, Apple, Citrus Fruits		
2	Maleic Hydrazide	Potato, Garlic, Onion		
3	Carbendazim	Jute, Groundnut		
4	Oxamyl	Cucumber, Citrus fruits, Spices		
5	Zineb	Paddy, Wheat, Tobacco		

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India is the biggest producer of pesticides in Asia, spewing about 1,00,000 MT per annum! That is not all. We are also the 12th largest users of pesticides in the world. Yet the usage per unit area (gms/Hectare) is 600 for India as against 3000 gms/Ha in developed nations. But is that cause to celebrate? Perhaps not. Before increasing our pesticide consumption, let us not forget the lessons of the classical 'Green Revolution'. Even as the newly independent India maximised the application of fertilisers and pesticides to green her fields, her soils steadily upped their thirst for irrigation. So, today, with the crunch in water resources and more mouths to feed, what is the way ahead? Biotechnology? That would ensure, say many scientists, higher yield at lower cost. But what about the cost to the Earth? A question with no simple answers!

ACTIVITY 2

Which country in the world produces maximum pesticides? And which is the biggest user? The answers will reveal that we are not alone in our complacency. Many countries just produce pesticides for export. Multinational companies like Union Carbide operate foreign production units. So the hazardous work involved does not affect the home country! You may not remember the Bhopal Gas tragedy but ask someone who was likely to have read newspaper reports in 1984. The case is still cited as one of the world's biggest examples of human rights violation. What came of the long-drawn litigation?

Production Rank	Country	Consumption Rank	Country
1		1	
2		2	
3		3	
4		4	
5		5	

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Under the aegis of UNEP, there is an international body that works under the Stockholm Convention on Persistent Organic Pollutants. Formed at about the same time when pesticide residue was detected in soft drinks in India, this body identifies chemical substances that persist in the environment posing threats to human health. It has identified 12 worst offenders – referred to as the 'Dirty Dozen'. Nine out of the 12 POPs are pesticides!

But hold on. Why do we hate pesticides? To an agriculturist, at least, it would seem as if they do the most

useful work. They increase crop yields by saving crops from pests. In the US, it is assessed that the money spent on pesticides is returned four times over in terms of higher yield, particularly by reducing pest led wastage. Hmm, but here is the googly. It is the residue pesticide which is a cause of concern. It is still not uncommon in India to hear about deaths caused because fruits, vegetables or grains – well sprayed with pesticides – are not washed before cooking. And farm animals are no less at risk, another indirect route for pesticides to reach the human stomach.

ACTIVITY 3

How can we reduce exposure to pesticides? Try marking the following suggestions in order of ease i.e. the easiest should be marked number 1 and so on.

Suggestion	Rank
Grow Your Own Vegetables	
Thoroughly Wash All Food & Vegetables	
Buy Organic Food	
Trim Visible Fat from Meat	
Peel or Remove the Outer Layer	
Cook Meat & Chicken Thoroughly	
Consume a variety of Foods	

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Can we use organic pesticides to curb the adverse effects of regular pesticide use? A popular organic growth promoter, *panchkavya* is prepared by mixing cow dung, cow urine and cow milk with curd and ghee in a proper ratio and then fermenting the mixture using yeast, banana, groundnut cake and water of tender coconut. Other tested solutions to reduce pesticide dependence include polyculture, trap cropping, crop rotation and composting yard waste.

ACTIVITY 4

Note: This activity might get a bit cumbersome to arrange at home. You might want to ask your chemistry lab teacher at school to guide you with the process. But the choice is yours.

AIM: To test the presence of Pesticides & Insecticides in Fruits & Vegetables

MATERIALS REQUIRED Mortar and pestle, beakers, funnel, glass rod, filter paper, china dish, water bath, tripod stand, fusion tube, knife, test tube. Samples of various fruits and vegetables, alcohol, sodium metal, ferric chloride, ferrous sulphate crystals, distilled water, sulphuric acid and dil.

PROCEDURE:

- Take different types of fruits and vegetables and cut them into small pieces, then crush them.
- Take different kinds for each kind of fruits and vegetables and place the crushed fruits and vegetables in these beakers and add 100 ml of alcohol to each of these. Stir well and filter.
- Collect the filtrate in separate china dishes, Evaporate the alcohol by heating the china dishes one by one over a water bath and let the residue dry in the oven.
- Heat a small piece of sodium in a fusion tube, till it melts.
- Then add one of the above residues from the china dish to this fusion tube and heat it till red hot.
- Drop the hot fusion tube in a china dish containing about 10 ml of distilled water.
- Break the tube and boil the contents of the china dish for about 5 minutes. Cool and filter the solution. Collect the filtrate.
- To the filtrate add 1 ml of freshly prepared ferrous sulphate solution and warm the contents. Then add 2-3 drops of ferric chloride solution and acidify with diluted HCl.
- If a blue or green ppt. or colouration is obtained it indicates the presence of nitrogen containing insecticides.
- Repeat the test of nitrogen for residues obtained from other fruits and vegetables and record the observation.

Read more at: http://projects.icbse.com/chemistry-306

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