

THE 7TH OMAN INTERNATIONAL CONFERENCE ON FOOD SAFETY AND CONFERENCE ON Towards Resilient & Dynamic Food Systems

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IMPORTANCE OF DATA QUALITY in RISK ASSESSMENT UNDERPINNING FOOD REGULATORY DECISIONS

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We use FOOD ADDITIVES

To ensure processed food <u>remains</u> <u>safe</u> and <u>in good condition</u>

Many discussions, especially sweeteners.

When we think of sugar, sweet flavor immediately comes to our mind. But SUGARs are NOT ONLY used as SWEETENERS, they also HAVE important TECHNOLOGICAL FUNCTIONS.

WHAT is TECHNOLOGICAL FUNCTIONS?



BALANCE Balance acidic and bitter flavours



COLOUR Sugars develop the brown color



Make highfiber foods *taste* better.

FUNCTIONS of SUGAR

TEXTURE-MOUTHFEEL help *provide soft structure* and *smoothness*.



PRESERVATIVEPreventsmicrobialgrowth and spoilage



Non-nutritive sweeteners Artificial sweeteners Non-caloric sweeteners High intensity sweeteners

Low and No Caloric Sweetners (LNCS)

LNCSs are food additives used to give the foods a taste

Like all food additives, LNCSs are regulated substances that undergo a global COMPREHENSIVE SAFETY ASSESSMENT by food safety authorities before the market.

COMPREHENSIVE SAFETY ASSESSMENT provided by THE <u>RISK ANALYSIS</u> is <u>SAME</u> for <u>EACH FOOD ADDITIVE</u>.



To protect our health by providing access to safe food.

Foods are continuously monitored throughout life for sustainable food safety.

It is a PRIORITY ISSUE for all international and national health authorities.

INTERNATIONAL COLLABORATION IN FOOD SAFETY IS ESSENTIAL

Since food is in unlimited mobility and food produced in one country can be consumed in many countries, food safety is a global issue that crosses borders and needs international cooperation.

The "Codex Alimentarius Commission" established by WHO and FAO in 1961 was born out of this need.



provide CREDIBLE INFORMATION

INTERNATIONAL STRUCTURING IN FOOD SAFETY ORGANISATIONS





- There is no zero risk. Every activity has risk.
- All regulations are risk based.
- The safety assessment should make for every activity, <u>not only for food</u>.
- «Safety assessment» is based on risk analysis

RISK ANALYSIS



FOR RISK ASSESSMENT WE NEED EVIDENCE-BASED DATA







FOR RISK ASSESSMENT,

IT IS ESSENTIAL TO GET THE ACCURATE DATA FROM EVIDENCE-BASED SCIENTIFIC STUDIES



CRITICAL READING is IMPORTANT to choose the accurate data

NOT ALL SCIENTIFIC RESEARCH IS RELIABLE AND VALUABLE

Every article published in a peer-reviewed scientific journal may NOT be worth considering.

Is study credible? No Do NOT waste time

- ✓ To understand scientific evidence correctly.
- ✓ When experimental evidence is either <u>absent</u> or <u>limited</u>, regulators can turn to <u>observational</u> evidence.
- To interpret correctly this evidence, it is essential to understand methodologies, results and limitations.

cannot prove causation.

- Confounding factors
- Selection bias
- Information bias
- Publication bias

How to read and evaluate a scientific paper by Non-Scientists

ABSTRACT

- Study type-worth to read
- N=?
- How selcted, collected and stored?
- Result -Risk -/+/same
- in comparable groups
- RR/HR>1 (+) ; <1 (-)
- CI (if smaller more certain results
- Replication
- Bias minimum confounding to be controlled





HOW DO POLICYMAKERS DECIDE?

1. <u>Risk thresholds</u>- comparisons

2. <u>Risk matrix</u>-identify serious/less harmful

3. <u>Risk prioriti</u>zation –pot. impact / probability of occurrence

For EFFECTIVE POLICIES, policy makers need to KNOW CAUSES for A PARTICULAR OUTCOME

PM considering «how to decrease the risk of injury from shark attacks» might be presented with evidence that «eating ice cream is associated with increased shark attacks».



Ice cream does NOT cause shark attacks



Swimming in shark-infested waters can occur in warm weather when people eat ice cream.



It would NOT WORK to TAKE POLICIES that affect ice cream consumption without addressing the CAUSE (swimming in shark-infested waters).

1. RISK ASSESSMENT

1. <u>HAZARD IDENTIFICATION</u>

Substance can be harmful? If it is harmful, what does it do?

2. <u>HAZARD CHARACTERISATION</u>

What kind of effects cause hazard? Estimate the severity and duration of hazard.

<u>3. EXPOSURE ASSESSMENT</u>

How amount, how long, how often exposure, who can be harmed?

4. <u>RISK CHARACTERISATION</u>

Information from all the steps and to report results to RMs, thus helping them to make decisions.



A shark in the seas is a hazard.

WHAT IS THE DIFFERENCE?

smt that has the potential to harm you.

HAZARD in food = A factor that lead to advers effects

RISK



Swimming with a shark is a risk.

the probability that a hazard will cause harm

RISK = A function of the probability of an adverse effect and the magnitude of that from hazard (s) in food.

DATA IS OBTAINED FROM TOXICITY TESTS





TOXICITY TESTS

APPLIED TO all FAs including SWEETENERS, BEFORE AUTHORISATION



INTERNATIONAL ORGANISATIONS SET THE LIMIT VALUES

NUMERICAL VALUES ARE CALCULATED FROM TOXICITY TEST RESULTS

AS A RESULT OF TOXICITY TESTS; NOAEL is determined, and ADI is calculated.

SAFE LIMITS are DETERMINED

NUMERICAL VALUES -SAFE USE OF FOOD ADDITIVES

NOAEL

A highest dose that shows 'no observable adverse effects' in exp. animals.

For FA, we consume over a lifetime, the exposure period should be long enough to cover 85% of the life span of the exp. animals.



The most sensitive critical health outcome in the most sensitive animal species.

«an estimate of the amount that can be taken daily for a lifetime without appreciable risk».

EXTRAPOLATION

No harm even after a lifetime of exposure.



THERE ARE STILL CONSUMER FEARS



- not natural, chemical
- no technological function
- cause severe health risks (alergies to cancer)
- Manufacturers deceive consumers by changing the nature, content, and quality of food

HOW to MANAGE CONSUMER FEARS?



- TEACHING that RISK ANALYSIS is a scientific powerful tool.
- RISK and evidence-based analysis should be used SYSTEMATICALLY.
- ENSURE effective and reliable RISK COMMUNICATION among all stakeholders.
- RESISTANCE against MISINFORMATION
- LISTEN consumer CONCERNS and QUESTIONS.

LET'S EVALUATE this ARTICLE with CRITICAL READING

McCullough et al. (2022) Sugar- and Artificially-Sweetened Beverages and Cancer Mortality in a Large U.S. Prospective Cohort. CEBP. 31:1907.

- Prospective cohort study
- n~900,000 (>50 yrs-old)
- Duration of study: 1982–2016; 34 years
- AIM: The effect of SSB and ASB Consump. on Mortality and Mortality due to cancer (20 cancer types)

Sample size GOOD

The type of study an observational study

• 26% of participants had died from cancer.



How many cups
How many years
Drinking period /day

✓ Wrong self-reports of dietary habits (DH)
 ✓ Dietary habits can change over 30 years.

<u>Results</u>

0 /day SSBs versus 2 or more/day SSBs

NO DIFFERENCE overall cancer mortality

2 or more SSBs/day

5% higher RR of dying from OBESITY-RELATED CANCERS (HR= 1.05)
<u>No increa</u>sed risk after <u>adjusting</u> for BMI

Associations of SSB consumption and all-cancer and site-specific cancer mortality in CPSII, 1982–2016

			SSB consumption ^a				
Cancer site/type	Deaths	Person years	Never (ref)	<1 drink/day	1 drink/day	2+ drinks/day	P _{trend}
All cancers							
Men	70,834	1,226,073	1.00	0.98 (0.96-1.00)	0.96 (0.94-0.99)	0.99 (0.96-1.02)	0.073
Women	64,259	1,188,795	1.00	0.98 (0.96-1.00)	1.01 (0.98-1.04)	1.01 (0.98-1.05)	0.807
Combined	135,093	2,414,868	1.00	0.98 (0.96-0.99)	0.98 (0.95-1.00)	0.99 (0.97-1.01)	0.061
Obesity-related cancers ^c							
Men	20,595	351,011	1.00	0.98 (0.95-1.02)	0.98 (0.94-1.03)	1.06 (1.01-1.12)	0.082
Women	30.018	542.434	1.00	1.00 (0.97-1.03)	1.02 (0.97-1.07)	1.03 (0.97-1.09)	0.268
Combined	50,613	893,445	1.00	0.99 (0.97-1.02)	1.00 (0.97-1.04)	1.05 (1.01-1.08)	0.057

McCullough et al. (2022)



In summary

- There is no zero risk. Every activity carries risk. The key is to reduce the risk to an acceptable level.
- The most conservative limit values is used to ensure maximum protection for human health.
- Accurate data selection and understanding and interpreting scientific studies are critical in risk assessment. Because data of risk assessment provide information to Risk Managers to make legislations.

Thank you