AMERICAN COUNCIL
ON SCIENCE AND HEALTH

ACSH

Holiday Dinner Menu



Welcome to ACSH's Holiday Dinner Menu, where every course comes with a generous helping of chemicals, including some that cause cancer in laboratory animals. **But don't worry**—this is a Thanksgiving feast of knowledge, **not risk**.

Before you cancel dinner, keep in mind: finding a carcinogen in food is different from demonstrating that eating the food is dangerous; **It would be difficult to find a food without any.**

Tonight's Menu



APPETIZERS

Cream of Mushroom Soup

hydrazines

Fresh Relish Tray:
carrots, cherry tomatoes, celery

aniline, caffeic acid, benzaldehyde, hydrogen peroxide, quercetin glycosides, furan derivatives, psoralens

ENTREES

Herb-Roasted Turkey with Cranberry Sauce

heterocyclic amines, furan derivatives

or

Prime Rib of Beef with Parsley Sauce

benzene, heterocyclic amines, psoralens

Traditional Bread Stuffing

acrylamide, ethyl alcohol, benzo(a)pyrene, ethyl carbamate, furan derivatives, furfural, hydrazines, d-limonene, psoralens, quercetin glycosides, safrole

VEGETABLES

Tossed Garden Salad

ethyl alcohol, caffeic acid

Baked Potato

ethyl alcohol, caffeic acid

Sweet Potato

ethyl alcohol, furfural

Broccoli spears

allyl isothiocyanate

DESSERTS

Pumpkin Pie

benzo[a]pyrene, coumarin, methyl eugenol, safrole

Apple Pie

acetaldehyde, caffeic acid, coumarin, estragole, ethyl alcohol, methyl eugenol, quercetin glycoside, safrole

Fresh Fruit Tray

acetaldehyde, benzaldehyde, caffeic acid, d-limonene, estragole, ethyl acrylate, quercetin glycosides

BEVERAGES

Red & White Wine

ethyl alcohol, ethyl carbamate, resveratrol

Coffee

benzo[a]pyrene, benzaldehyde, benzene, benzofuran, caffeic acid, catechol, 1,2,5,6-dibenz[a]anthracene, ethylbenzene, furan, furfural, hydrogen peroxide, hydroquinone, d-limonene, 4-methylcatechol



Chemicals Found in Foods

Mutagenicity and carcinogenicity evidence

ACETALDEHYDE
(apples, bread, coffee, meat, tomatoes)—Mutagen and rodent carcinogen; associated with alcohol-related cancer in humans

ACRYLAMIDE
(bread, rolls)—Rodent carcinogen; no established human cancer risk

AFLATOXINS
(nuts)—Established human carcinogens, particularly linked to liver cancer

ALLYL ISOTHIOCYANATE
(arugula, broccoli, mustard)—Has produced positive results in some laboratory and animal tests

BENZENE
(butter, coffee, roast beef)—Established human carcinogen

ETHYL ALCOHOL
(bread, red wine, white wine, rolls, tomatoes)—Established human carcinogen when consumed in alcoholic beverages

ETHYL ACRYLATE
(pineapple)—Rodent carcinogen under certain experimental conditions



Chemicals Found in Foods

Mutagenicity and carcinogenicity evidence

FURAN AND FURAN DERIVATIVES

(bread, onions, celery, mushrooms, sweet potatoes, rolls, cranberry sauce, coffee)–Furan causes tumors in rodents; related compounds differ in toxicity

FURFURAL

(bread, coffee, nuts, rolls, sweet potatoes)–Produces tumors in some high-dose rodent experiments

HETEROCYCLIC AMINES

(roast beef, turkey)–Some are mutagens and rodent carcinogens form during cooking

HYDRAZINES

(mushrooms)–Some mushroom hydrazines are mutagenic and carcinogenic in animals

HYDROGEN PEROXIDE

(coffee, tomatoes)–Mutagenic in some laboratory tests; not classified as a human carcinogen

HYDROQUINONE

(coffee)–Rodent carcinogen

D-LIMONENE

(black pepper, mangos)–Causes male-rat kidney tumors by a mechanism not relevant to humans



Chemicals Found in Foods

Mutagenicity and carcinogenicity evidence

4-METHYLCATECHOL

(coffee)—Known rodent carcinogen

PSORALENS

(celery, parsley)—Some are carcinogenic with UV exposure

QUERCETIN GLYCOSIDES

(apples, onions, tea, tomatoes)—Can release quercetin, which is mutagenic in some laboratory tests

SAFROLE

(nutmeg in apple and pumpkin pies, black pepper)—Rodent carcinogen

CAFFEIC ACID

(apples, carrots, celery, cherry tomatoes, coffee, pears, grapes, lettuce, mangos, potatoes)—Produces tumors in some rodent studies

COUMARIN

(cinnamon in pies)—Rodent carcinogen; high doses can also damage the liver

ESTRAGOLE

(apples, basil)—Genotoxic and carcinogenic in experimental animals

What's the point?

This menu is not a warning to skip dinner.

It is a reminder that food is made of chemicals, including some that have caused tumors in laboratory animals or mutations in laboratory tests. That sounds alarming until you ask the questions that matter:

1. ***How much is present?***
2. ***What does the experiment actually show?***
3. ***And does it apply to people?***

The natural-versus-synthetic distinction is especially misleading. Plants make their own pesticides to fend off insects and other pests. Toxicologist Bruce Ames and his colleagues estimated that, by weight, the natural pesticides we eat vastly outweigh residues of synthetic pesticides. That historical estimate says nothing about which is more dangerous. It does show why "natural" is not a synonym for "safe." **Nature does not get a free pass.**

Consider furfural, found in bread and other foods. In a National Toxicology Program study, mice received doses as high as 175 mg per kilogram of body weight on dosing days. Using an older estimate of 167 micrograms of furfural per slice of bread, a 70-kilogram person would need to eat roughly 73,000 slices to receive an equivalent dose relative to body weight. This is an illustration of dose, not a prediction of human cancer risk, and the bread estimate is historical.



73,000

SLICES OF BREAD EVERY DAY

=



Anyone who manages 73,000 slices of bread in one day has problems considerably more pressing than furfural.

Dose is not the whole story, either. D-limonene, a natural oil found in citrus fruits and causes kidney tumors in male rats through a mechanism that does not operate in humans.

A tumor in a rat is not automatically a cancer risk in a person.

None of this means carcinogens should be ignored. Aflatoxins and alcohol, for example, are genuine human cancer hazards. **But the mere presence of a chemical on a list tells you remarkably little about the risk from an ordinary holiday meal.**

ENJOY DINNER.

WHEN IT COMES TO CANCER RISK, CHEMISTRY MATTERS. LABELS DON'T.

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