Chinese Journal of Cancer Research 3(3): 23—27, 1991.

A PRELIMINARY STUDY ON THE ANTIMUTAGENIC EFFECT OF SELENO-MALT

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Seleno-malt is an organic Selenium product recently developed in China . Seleno-malt itself is not genotixic. It antagonized the mutagenic effect of aflatoxin B_1. The antagonistic activity was, 10—15 times higher than Seleno-yeast may be used as a food additive in areas with low selenium level for the prevention of Ke-Shan disease and Cancer.

Key words: Seleno-malt, Seleno-yeast, mutagenicity, antimutagenicity, inhibitory rate.

Selenium is a powerful oxidant and it is distributed in air, water, soil and vegetables.

Based on the epidemiological and Experimental sbudies for scores years, it was considered to have the preventive and inhibitory effects on the occurence, development, dissemination and relapse of tumours in animal. [1]

MATERIALS AND METHODS

Materials

Aflatoxi B_1 (AFB_1) (Sigma); 4-Nitroquinoline-N-Oxide (4-NQO) (Sigma); Bezo (a) pyrone (PaP) (Fluku); Fluorenimin-(2) (2-AF) (Sigma); *Mitomycin* C (MC) (Tokyo Japan).

Samples

Seleno-malt and seleno-yeast were kindly gift from the Food Industrial Institute of Beijing, and the contents of selenium were 36.6 μg/g and 650 μg/g, respectively. The methanol extracts (methanol: water: sample; 2: 0.2: 1) were used to test their mutagenicity. Antimutagenicity was tested by acetone extracts. In brief, one gram of sample was immersed in 5 ml of acetone for 24 hours at room temperature, then put the filtrate into a closed swirling vaporizer to dry the solvent at 45—60℃. Calculate the weight of extract from original sample.

Methods

Mutagenicity Assay in Bacteria

Mutagenicity assays using Salmonella strain TA_{100}, TA_{98}, TA_{97}, TA_{102} were carried out

according to method reported by Marron and Ames.[2] Liver homogenate supernatant (S-9, protein concentration 34 mg/ml).

Wistar rats were pretreated with Aroclor-1254 (500 mg/kg) 0.5 ml S-9 mix contained S-9 (0.02 ml), MgCl2 (4 μmol), KCl (16.5 μmol), Glucose-6-phosphate (G-6-P) (2.5 μmol) NADP (2 μmol) and sodium phosphate (50 μmol, pH 7.4). 4NQO, AFB_1, BaP, MC and 2AF were dissolved in dimethylsulfoxide (DMSO) before use.

Antimutagenicity Assay in Bacteria

Using incorporating Ames test, observe the recurrence colonies after adding the tested sample extracts with various concentrations to the known positive mutagen, AFB_1. Calculate the inhibitory rate (%) compared with that treated with positive alone.

$$\% \quad \text{Inhibition} = \frac{\text{number 1}}{\text{number 2}} \times 100$$

number 1: number of positive substance's reverse mutation colonies-Sample plus the number of positive substance's reverse mutation colony.

number 2: number of positive substance's reverse mutation colonies.

RESULTS

Ames test

Extract of Seleno-malt

Point Test: There were all negative response in four Ames strains with or without S-9 at dosage of 0.75 to 3 g of per-saturated seleno-malt suspension.

Plate Incorporating Test: There was similar number of recurrence colonies in plates treated with solvent control and the tested sample with or without adding metabolic active system in the dose of 0.15 to 1.50 g and 3 g of per-saturated sample suspension (Table 1). No dose response was observed. These confirmed the result of point test.

Table 1. *Mutagenicity of different Seleno-malt extracts in salmenella typhimurium*

Preparation		Revertants $\bar{x}$/plate							
		TA_{100}		TA_{98}		TA_{102}		TA_{97}	
		-s-9 mix	+s-9 mix	-s-9 mix	+s-9 mix	-s-9 mix	+s-9 mix	-s-9 mix	+s-9 mix
Spontaneous revertant		114	120	21	39	244	275	115	158
Negative control *		113	121	19	34	203	267	114	139
Positive control * *		1333	2254	247	982	2247	418	678	1582
Sample (weight) of g/plate	0.15	108	106	21	22	261	214	130	15
	0.75	95	98	27	29	215	260	150	157
	1.50	135	129	26	26	264	255	158	148
	3.00	136	144	42	71	285	353	151	168

* Methyl Alcohol: H_2O: Sample = 2: 0.1: 1

* * TA_{100}, TA_{98}, TA_{102}+s9 AFB_1 0.5r/plate, TA_{97}+s9 2AF 10r/plate

TA_{100}, TA_{98}, TA_{97}-s9 4NQO 0.5r/plate, TA_{102}-s9 Mc 0.5r/plate