

A Rapid Investigation into Effects of Co-biocides and Used Treating Solutions

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Background

- **1950-60's Catherine Duncan**
Initial Soil Block Test Development
Weight Loss
- **1960-2000 Continued Development**
- **2000-2005 Dr. Darrel Nicholas**
Compression strength loss (9x more
sensitive) than weight loss.
4 weeks rather than 12-26 weeks.
Standardized as AWPA method E22-06

Objective

- **Compare Efficacy of Used Treating Solutions to Virgin Solutions**
 - **Does Handling Change Preservative Properties?**
- **Impact of Co-biocides**

Methodology

- Snap Shot of Threshold Values
- Three Preservatives
- Copper Tolerant BR, *Postia placenta*

Influence of used treating solutions vs. virgin treating solutions

Influence of co-biocide on the effectiveness of a primary copper system

Effects of different co-biocides on amine vs. copper systems

Preservatives

- **Micronized Copper Quat (MCQ-A)**
- **Amine Copper Quat (ACQ-D)**

Different Types but Similar Retentions

- **Micronized Copper Azole (MCA)**
- **Amine Copper Azole (CA-B)**
- **Micronized Copper Only (MCu)**
- **Amine Copper Only (CuMEA)**

E-22



- 18 mm x 18 mm x 5 mm

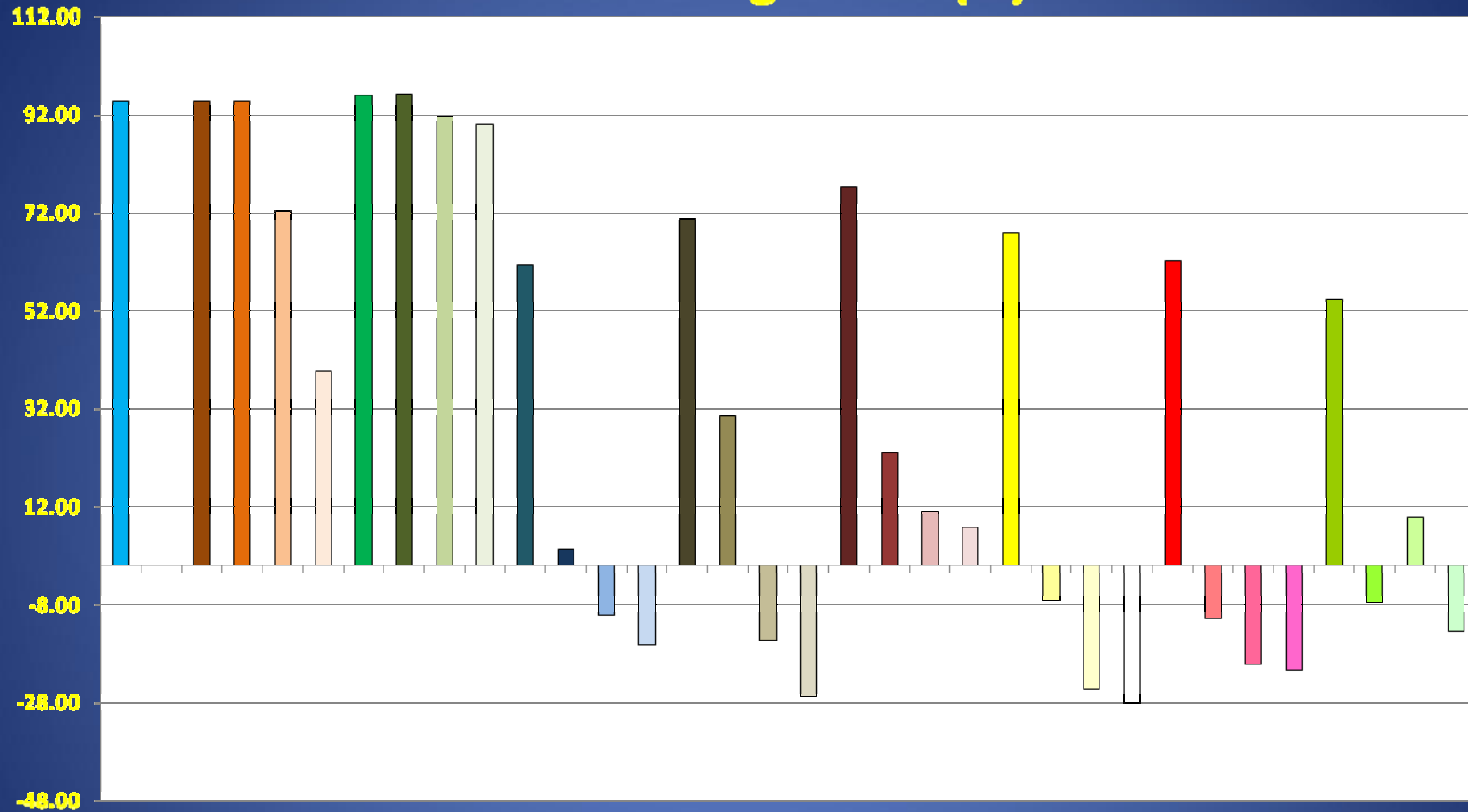
- Gamma irradiation

- Postia placenta*

- Four samples per container



Mean Strength Loss (%)



Water (Exp)

2.43 CuMEA

2.45 Mcu

2.61 ACQ-D

2.61 ACQ-D (TS)

2.62 MCA

2.62 MCA (TS)

.15 ACQ-D (TS)

Water (UnExp)

3.25 CuMEA

3.28 Mcu

3.54 ACQ-D

3.54 ACQ-D (TS)

3.31 MCQ

3.31 MCQ (TS)

.21 ACQ-D (TS)

.82 CuMEA

.82 CuMEA (TS)

.88 Mcu

.88 ACQ-D

.88 ACQ-D (TS)

.85 MCA

.85 MCA (TS)

.05 ACQ-D (TS)

1.63 CuMEA

1.63 CuMEA (TS)

1.63 Mcu

1.63 Mcu (TS)

1.78 ACQ-D

1.78 ACQ-D (TS)

1.58 MCQ

1.58 MCQ (TS)

1.78 CA

1.78 CA (TS)

1.68 MCA

1.68 MCA (TS)

Virgin vs Used MCQ

System	Copper Retention [kg/m ³]	Co-Bio [kg/m ³]	Strength Loss [%]	Significance	Equal to Unexposed
MCQ	0.83	0.53	70.8	CBD	No
	1.58	0.99	30.6	GF	No
	2.40	1.50	-15.1	KNML	Yes
	3.31	2.06	-26.6	O	Yes
MCQ (TS) ^a	0.05	0.06	54.5	E	No
	0.11	0.11	-7.6	KJ	Yes
	0.16	0.17	10.1	IH	Yes
	0.17	0.17	-13.2	KML	Yes
Water Exposed	--		95.1	A	
Water Unexposed	--		--	IJ	

Virgin vs Used ACQ

System	Copper Retention [kg/m ³]	Co-Bio [kg/m ³]	Strength Loss [%]	Significance	Equal to Unexposed
ACQ-D	0.88	0.58	61.5	ED	No
	1.78	1.12	3.7	IH	Yes
	2.61	1.63	-10.1	KJL	Yes
	3.54	2.21	-16.0	CED	Yes
ACQ-D (TS)	0.05	0.04	62.4	ED	No
	0.10	0.08	-10.6	IH	Yes
	0.15	0.12	-19.9	KJL	Yes
	0.21	0.16	-21.1	KNML	Yes
Water Exposed	--		95.1		A
Water Unexposed	--		--		IJ

Micro Copper Only vs Amine Copper Only

System	Copper Retention [kg/m ³]	Co-Bio [kg/m ³]	Strength Loss [%]	Significance	Equal to Unexposed
MCu	0.80	N/A	96.0	A	No
	1.63	N/A	96.4	A	No
	2.45	N/A	91.7	A	No
	3.28	N/A	90.0	A	No
CuMEA	0.82	N/A	94.9	A	No
	1.63	N/A	95.0	A	No
	2.43	N/A	72.4	CBA	No
	3.25	N/A	39.9	F	No
Water Exposed	--		95.1		A
Water Unexposed	--		--		IJ

MCA vs CA

System	Copper Retention [kg/m ³]	Co-Bio [kg/m ³]	Strength Loss [%]	Significance	Equal to Unexposed
CA	0.88	0.04	77.5	B	No
	1.78	0.07	23.3	G	No
	2.67	0.11	11.2	H	No
	3.58	0.14	7.9	IH	Yes
MCA	0.85	0.03	68.0	BCD	No
	1.68	0.07	-7.1	KJ	Yes
	2.62	0.11	-25.0	ON	Yes
	3.49	0.14	-28.0	O	Yes
Water Exposed	--		95.1	A	
Water Unexposed	--		--	IJ	

Efficacy Conclusions

- **Micronized \geq Amine Soluble Counterparts**
- **Used Solutions = Virgin Solutions**
- **Co-biocide Needed for *P. placenta***

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