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**TROY CORPORATION**

**MICROBIOLOGY LABORATORY REPORT**

**DENBER PAINTS LTD.  
P.O.B 735 OFAKIM 80300 ISRAEL**

**FILM PRESERVATION OF TUTGUM BAKTERINOL WITH  
POLYPHASE AND TROYSAN PROPOSALS  
ACCORDING TO TROY AGAR DIFFUSION TEST METHOD**

**PROJECT INITIATOR:**

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Troy MEA**

**Report No.: T110303r TROY AD TR  
Date: June 2, 2012**

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**PROJECT BACKGROUND AND OBJECTIVE:**

This paint is also sold as exterior paint equipped with the film preservative Parmetol DF19 at 2%.

This project is to evaluate the relative efficacy of the following alternative Troy products:

Polyphase 689,

Polyphase 710S,

Polyphase PW40 + Troysan V662 and

Polyphase PW40 + Troysan 2171

The first two options are full spectrum fungicide-algaecides especially developed for exterior paints.

The last two options are separate fungicide and algaecide as building block concept for interior coatings (only fungicide necessary) and exterior coatings (with the same fungicide – additional algaecide very important).

**SAMPLE IDENTIFICATION:**

**TABLE 1: SAMPLE LABELS**

SPNO	SPECIMEN	NOTES
01	Tutgum Bakterinol	BLANK - Acrylic water based paint; about 900g.
01.01	Tutgum + 2% PARMETOL DF19	reference A7034
01.02	Tutgum + 1.5% Polyphase 689	
01.03	Tutgum + 1.3% Polyphase 710S	
01.04	Tutgum + 0.3% Polyphase PW40 + 0.3% Troysan V662	
01.05	Tutgum + 0.6% Polyphase PW40 + 0.3% Troysan 2171	

- Samples were received on November 15 2011.
- SPNO is the laboratory-assigned identifier.
- Sub-samples were prepared with the addition of the test microbicides as on Table 1.
- Additional sample description is on Table 2.

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**SUMMARY AND CONCLUSION:**

The blank (SPNO 01- Tutgum Bakterinol) was heavily grown with both algae and fungi, particularly after 24-hour leaching.

All test microbicides proved excellent anti-algal preservation.

Parmetol DF19 failed the test against fungal growth.

The Polyphase alternatives 689, 710S and PW40 provided high level of anti-fungal protection even at the lower dose levels applied.

Test results are presented on Results Tables and attached photos.

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Microbiologist

Corazon F. Esguerra  
Manager, Microbiology Laboratory

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All information and recommendations furnished are for guidance and are without guarantee.  
All preservatives should be field tested prior to use in actual manufacturing

**RESULTS TABLES**

**TABLE 2: SAMPLE DESCRIPTION**

<b>SPNO</b>	<b>SPECIMEN</b>	<b>pH</b>	<b>COLOR</b>	<b>STATE</b>
01	Tutgum Bakterinol	7.23	white	paste

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**TABLE 3: ANTI-ALGAL TESTS (Troy Agar Diffusion Method) AD TR**

SPNO	SPECIMEN	Cv +Sb L 24h
01	Tutgum Bakterinol	2
01.01	Tutgum + 2% Parmetol DF19	0Z
01.02	Tutgum + 1.5% Polyphase 689	0Z
01.03	Tutgum + 1.3% Polyphase 710S	0Z
01.04	Tutgum + 0.3% Polyphase PW40 + 0.3% Troysan V662	0Z
01.05	Tutgum + 0.6% Polyphase PW40 + 0.3% Troysan 2171	0Z

After short leaching time the blank still had some algae growth inhibitory properties, the efficiency of the added algaecides can only be deducted from the growth pictures after 24h leaching

Test organisms: Cv +Sb = *Chlorella vulgaris* + *Stichococcus bacillaris*

Leaching: L 1h = 1hour in water  
L 24h= 24hours in water

**GROWTH RATING SYSTEM:**

- 0Z: No growth on the specimen, zone of inhibition may be present
- 0: No growth on the specimen surface
- 1: less than 10% of the specimen surface covered
- 2: less than 30% of the specimen surface covered
- 3: less than 60% of the specimen surface covered
- 4: more than 60% of the specimen surface covered or specimen surface totally overgrown

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**TABLE 3: ANTI-FUNGAL TESTS (Troy Agar Diffusion Method) AD TR**

SPNO	SPECIMEN	<i>Aa</i> L 1h	<i>An+ Pf</i> L 1h	<i>Aa</i> L 24h	<i>An+ Pf</i> L 24h
01	Tutgum Bakterinol	4	3	4	4
01.01	Tutgum + 2% Parmetol DF19	3	1	4	1
01.02	Tutgum + 1.5% Polyphase 689	0Z	0Z	1	0Z
01.03	Tutgum + 1.3% Polyphase 710S	0Z	0Z	0Z	0Z
01.04	Tutgum + 0.3% Polyphase PW40 + 0.3% Troysan V662	0Z	0Z	0Z	0Z
01.05	Tutgum + 0.6% Polyphase PW40 + 0.3% Troysan 2171	0Z	0Z	0Z	0Z

Test organisms: *A a* = *Alternaria alternata*  
*A n+ Pf* = *Aspergillus niger* + *Penicillium funiculosum*

Leaching: L 1h = 1hour in water  
L 24h = 24hours in water

**GROWTH RATING SYSTEM:**

- 0Z: No growth on the specimen, zone of inhibition may be present
- 0: No growth on the specimen surface
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## **MATERIALS AND TEST PROCEDURES:**

The samples were tested for **Anti-algal and Anti-fungal Preservative Properties** in accordance with the TROY test methods.

### **Anti-algal Properties:**

A layer of sample (300µm) was applied onto filter paper, and air-dried for 2 days.

Leaching treatments were done as specified on Result Tables.

The prepared samples were then placed on Blue-Green 11 Agar then seeded and incubated for 2 weeks at 24°C. The algal inocula used were *Chlorella vulgaris* + *Stichococcus bacillaris*

### **Anti-fungal Properties:**

The sample preparation was done as in Anti-algal Test.

The prepared samples were then placed on the seeded Malt Extract Agar and incubated for 2 weeks at 28°C. The fungal inocula used were *Alternaria alternata*; and *Aspergillus niger* + *Penicillium funiculosum*.

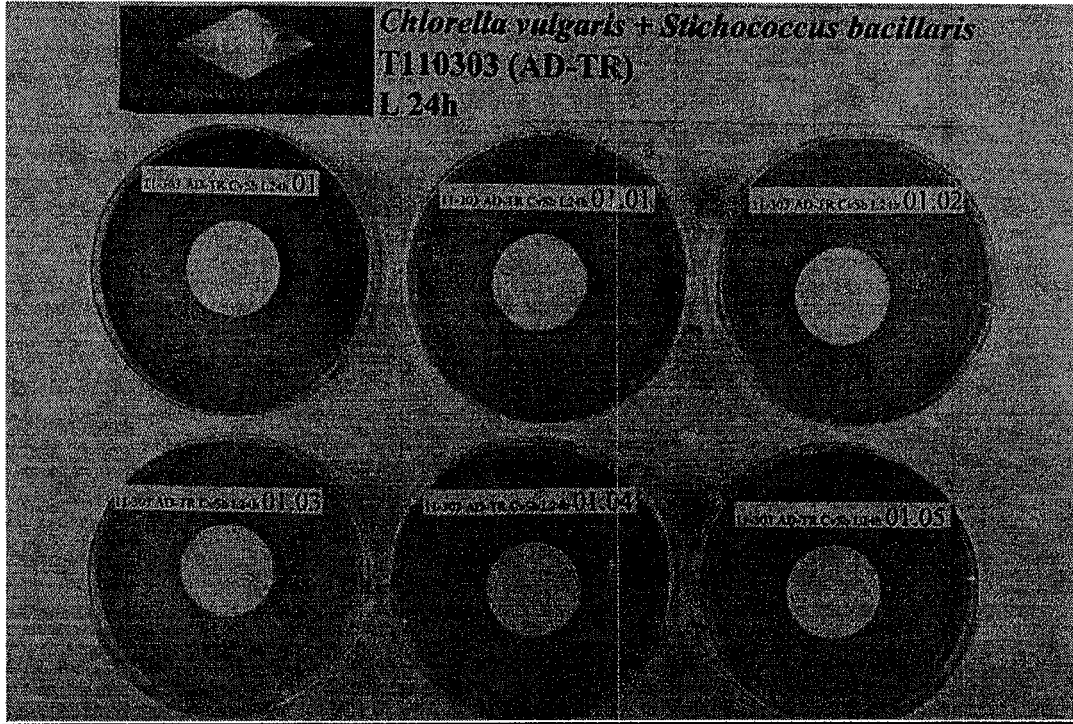
**All prepared samples were sterilized by  $\gamma$ -radiation at a level of  $\pm 35$  kGy prior to the test with microorganisms.**

**All organisms are held on culture in the Microbiology Laboratory.**

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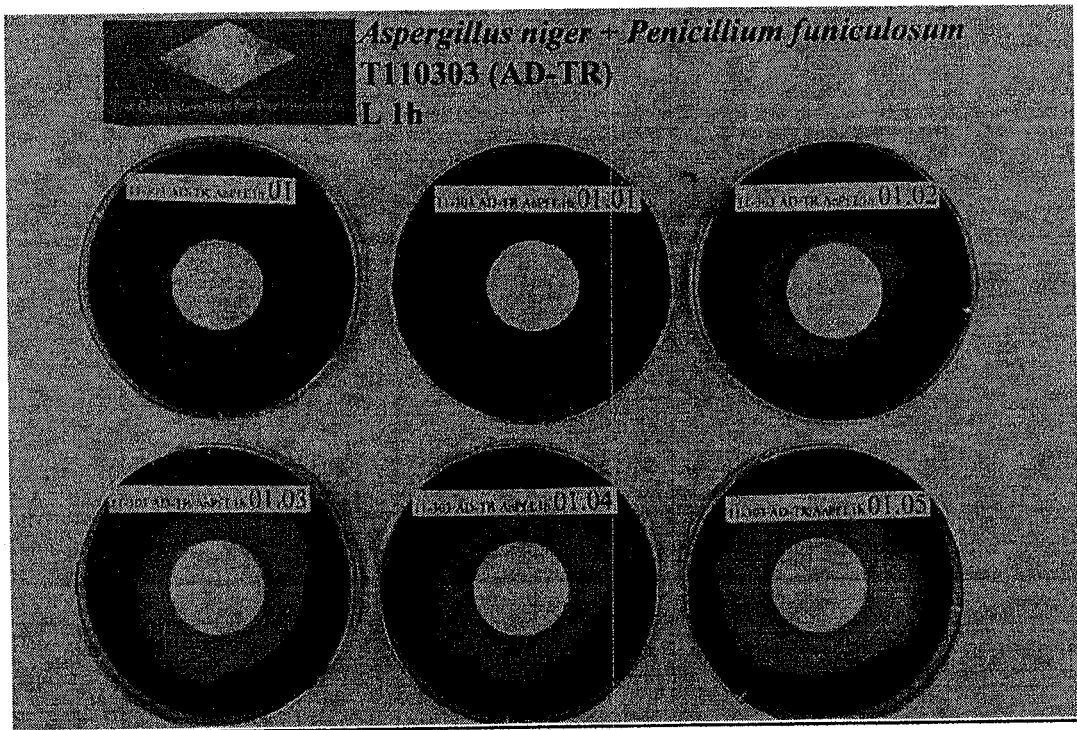
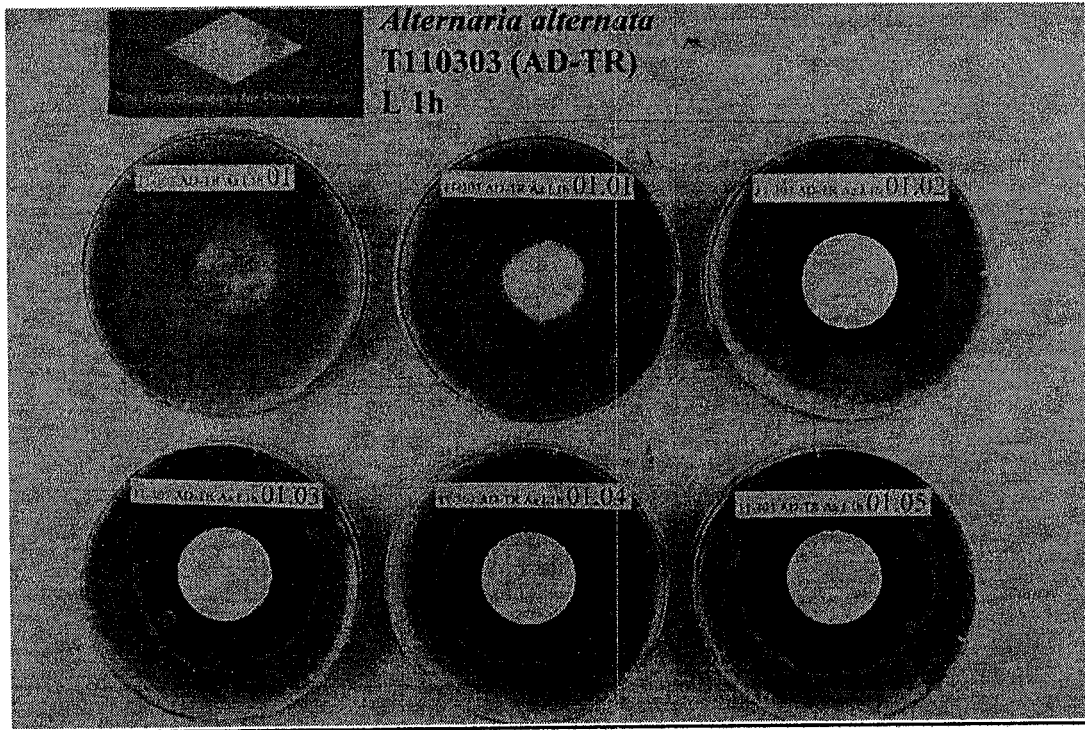
**Annex 1: Photos of Anti-algal Tests**



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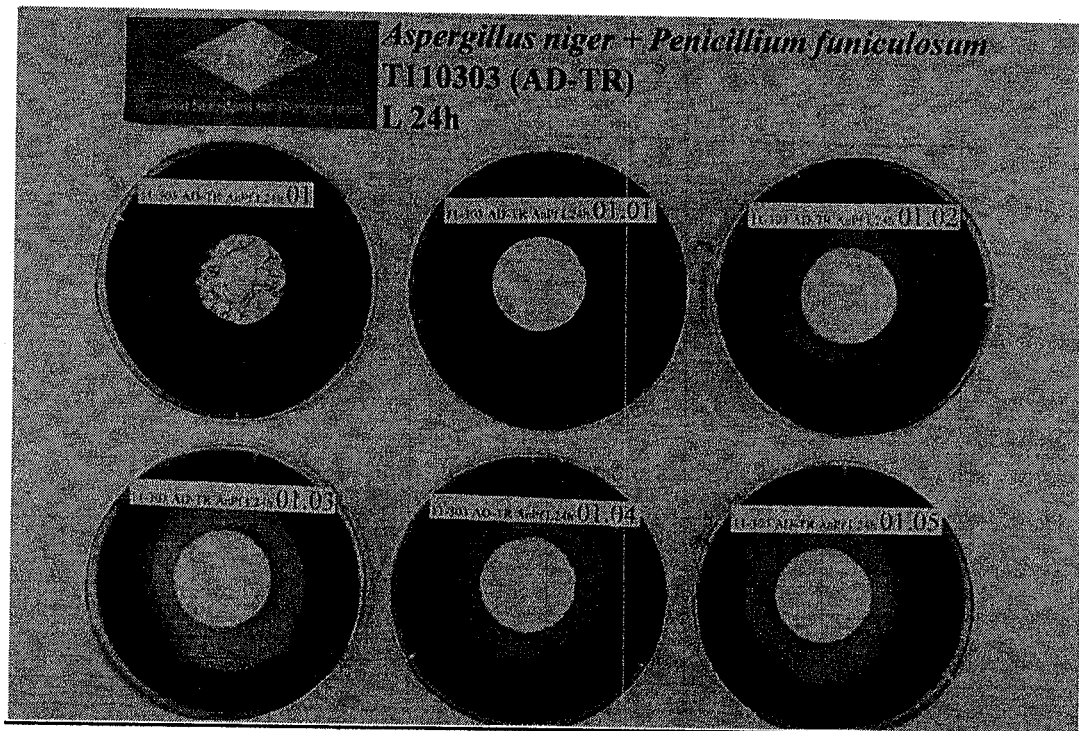
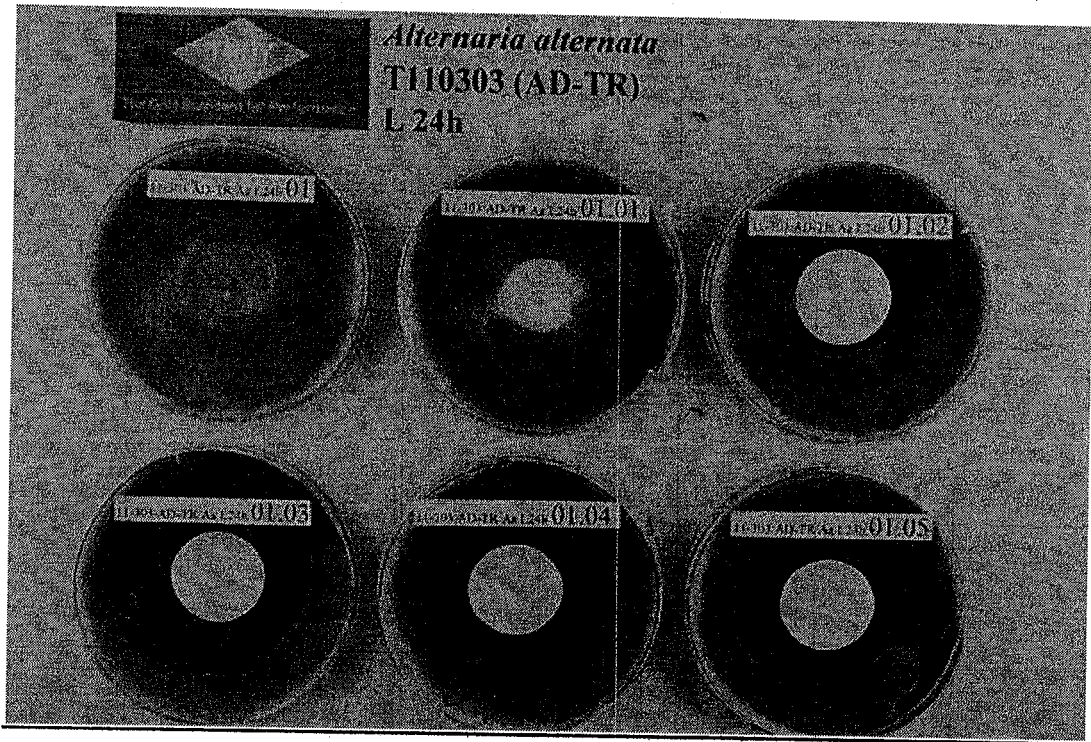
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Annex 2: Photos of Anti-fungal Tests



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