

Example 1 – Undergraduate Microbiology Assignment – Year 1

The Effect of Detergent Toxicity on Soil Bacteria

Introduction:

Bacteria are one of the most commonly found micro organisms in soil. Different species of bacteria present in various layers of soil are responsible for various diseases in humans, plants and animals. In addition to these harmful bacteria; soil is inhabited by beneficial bacteria which carry out activities such as decomposition, nitrogen fixation and oxidisation.^[1] Bacteria are mainly of two types: (a) gram positive and (b) gram negative; depending on the charge carried on their surface.

Soil bacteria are further classified into aerobic and anaerobic bacteria. Aerobic bacteria require oxygen for respiration whereas anaerobic bacteria do not require oxygen for respiration. Some examples of commonly found soil bacteria are; E.coli, Azotobacter, Pseudomonas, Achromobacter and many other spore producing bacteria.

Baker, Z *et al* (1941) have proved that synthetic detergents have bactericidal or germicidal properties.^[2] These highly surface active and water soluble agents when released into the soil; inhibit the bacterial growth due to their bacteriostatic activities. Detergents are further classified into anionic, cationic and non-ionic depending on their surface charge.

Mode of Action of Detergents:

It has been proven from multiple studies that different classes of detergents possess varying degrees of bacteriostatic properties. The bactericidal activity of detergents is caused by the disintegration of the proteins in the cytoplasmic membrane of bacterial cells.^[3] This disintegration results in the inhibition of cell metabolism and cell viability.^[4]

Effect of Anionic Detergents:

Anionic detergents carry a negative charge on their surface; typically belonging to the class of alkylbenzenesulfonates. In a typical toxicity study considering anionic detergents; Shafa *et al* (1960) found that anionic detergents have strong bactericidal effect on gram positive bacteria as compared to the gram negative ones.^[5] The effect of anionic detergents on metabolic activities namely respiration and glycolysis of certain gram negative soil bacteria such as E.coli and Ps.aeruginosa is observed to be less as compared to the gram positive bacteria found in soil such as Clostridia and other classes of Bacilli.^[4]

Scientists further suggest that this selective action is caused due to the presence of a lipopolysaccharide (LPS) layer around the cell membrane of the gram negative bacteria.^[6]

Effect of Cationic Detergents:

Cationic detergents have positively charged surfaces with quaternary ammonium groups. Cationic detergents have a more general germicidal effect on bacteria.

In their experiment of cationic detergents; Baker *et al* (1941); concluded that the inhibition of respiration and glycolysis of gram negative and gram positive bacteria by these detergents had similar result values.^[2] This is attributed to the lipophilic quaternary ammonium group contained on the cationic detergents.

Effect of Non-Ionic Detergents:

These detergents carry no charge on their surfaces and have a glycoside group attached to them. Comparative studies on certain soil bacteria such as *Bacillus megaterium*, *E.coli*, *Azotobacter* and many more, suggest that non-ionic detergents have very less bactericidal properties as compared to their ionic counterparts.^[7]

This mild detergency of non-ionic detergents is regarded to their weaker protein denaturation capability.^[8]

Other Factors Affecting the Detergency of Detergents:

Any changes in factors such as pH, time of exposure, concentration, presence of inhibiting phospholipids in the solutions etc are responsible for varying degrees of detergency of detergents.^[2] Certain detergents have also been observed to stimulate bacterial metabolism when present in soil in minute quantities.^[9]

Disturbance of the Soil Ecology by Releasing Detergents:

As mentioned earlier; not all bacteria in the soil are harmful. Many aerobic and anaerobic bacteria inhabiting the soil are responsible for maintaining the beneficial properties of the soil such as oxygen content, nitrogen content, moisture and pH.^[10]

However; release of detergents into the soil in the form of domestic or industrial waste disturbs the ecological balance in the soil. As observed in the above scientific findings, these detergents inhibit bacterial metabolism and hence their growth.^[11] This not only affects the quality of the soil but also affects its cultivable properties. Some of the detergents are also known to cause harmful mutations in certain bacterial species. These bacterial mutations may be responsible for causing diseases in plants and animals as they may inhibit useful processes in vegetation such as nodulation brought about by interactions between classes of bacteria and plants.^[12]

Conclusion:

Ionic and non-ionic detergents have varying degrees of bacteriostatic or bactericidal effects on gram negative and gram positive bacteria. Most of this activity is due to the denaturation of membrane proteins carried out by the detergents; which affect the bacterial cell metabolism by inhibiting respiration and glycolysis. Although it is essential to control the growth of disease causing soil bacteria by the use of detergents; it is also important to maintain the ecological balance of the soil by preserving the beneficial ones. Hence; the use of detergents can be regulated by controlling factors such as detergent concentration and pH in the solutions being released in the soil.

References:

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Example 2 – SWOT Analysis – MBA Internship project

SWOT Analysis iMedia Summit 2012

Venue: The Grand, Eastbourne, East Sussex, UK

Dates: 20-21st March 2012

Strengths:

1. Inheriting The Image: Since iMedia communications became a subsidiary of dmgt::events in 2005; it has gained the backing of Daily Mail and General Trust Plc. This makes it easier for iMedia's target audiences to develop faith and see the usefulness of its events.

2. iMedia Summit 2012 – Integrated Approach: The 2012 summit observes a collation of the previously held iMedia Brand Summits and iMedia Agency Summits. This allows the presence of brand marketers and agency leaders under one roof for two days. The main benefits of this are as follows:
 - Easy flow of information between brands and agencies
 - Opportunity to share industry experiences
 - Agencies can better understand the needs of their corporate clients
 - Brands/Businesses can better understand customer preferences, brand experience beyond the physical product or service.
 - Facilitating direct networking between agencies, brands and digital technology providers.

3. Closed Door Discussions: Agencies and Brands can take part in honest discussions on controversial issues and share personal experiences (strictly under the Chatham house rule). This provides an opportunity for delegates to relate with similar issues and gain better understanding of problem solving using digital marketing interface or by improved strategized marketing.

4. Round Table Discussions: This activity gives delegates a chance to participate in discussions on more upcoming topics such as innovative concepts in digital marketing and so on.
5. Array of High Calibre Speakers: iMedia Summit 2012 benefits from the collection of high calibre speakers such as CEO's, Director's, VP's or Strategists of big brands such as Johnson & Johnson, Nokia, LEGO, OMD and so on. This has helped build confidence in its attendees and target audience.
6. Testimonials: Testimonials of previous speakers and attendees have been displayed on the iMedia website and published in its magazines. This can be efficiently used to influence potential attendees in making an affirmative decision.
7. Current Attendees: iMedia Summit 2012 has already acquired a great list of audience which includes high officials from brands and agencies such as American Express, Ann Summers, Dell, Forbes, Groupon and so on.

Weaknesses:

1. Loss of Specialised Focus: Since iMedia summit 2012 has integrated the Brand and Agency summits; the discussion topics would be generalised in a way to suit both the audiences. The content of discussions or seminars would be broader as opposed to the concentric focus of the topics designed to suit either one of the audiences. As a result of which previous/potential attendees wanting to confront specific issues may loose interest.
2. Lack of Relevant Speakers: iMedia summit 2012 has a clear lack of speakers from providers of digital marketing tools such as social media providers (facebook, twitter), mobile service providers (O2, orange), television media/display providers (BskyB, BT) and so on. Attendees may be interested to hear from these companies to analyse the options available to them.

3. Absence of Workshop Culture: iMedia summit 2012 does not include any pre or post conference workshops or hands on experience sessions for attendees who would like to be introduced to and try out new developments in digital marketing.
4. Location of the Event: Eastbourne is located on a 1 1/2 hour drive from London airports. This may be seen as an inconvenience by delegates travelling from all over Europe who may have to undertake additional travel.

Opportunities:

1. Promoting As A Networking Event: In addition to promoting the summit as an event for discussing issues in digital marketing; it can also be promoted as an extensive networking event as this may get more and more brands and agencies to attend.
2. Inclusion of Hot Topics: Since 2010, Europe and the rest of the world has seen the emergence of many new markets places and disappearance of existing ones; as a result of which business have been impacted. Hence, in addition to technical topics, iMedia Summit 2012 can include presentations on topics such as evaluation of new emerging markets and application of digital marketing in them; increasing ROI on digital marketing etc.
3. B2B Meetings: iMedia2012 could also include B2B meeting activities so that they could drive in more audiences. Staff at dmgt::events could provide this additional facility of arranging B2B meetings for delegates at an additional cost.
4. Workshops: There is a scope to include pre/post conference workshops that would aim at providing hands on experience on new digital marketing tools.
5. Flexible Tickets: iMedia Summit could also increase the attendee foot print by introducing 1 day tickets wherein the delegates would have an opportunity to choose their day of attendance depending on the relevance of the topics.

Threats:

iMedia faces threats of direct competition from similar digital media summits. Some of them have been mentioned below:

1. Future Digital Strategies Summit . Venue: London. Price: £1378.80/2 days, £778.00/day, £298.80-workshops

Competitive advantage: Post Conference Workshops

Speakers from digital marketing tools providers such as Facebook, LinkedIn, BT, Qype etc

Central Location leading to transportation convenience

2. DCM-(Digital Content Monetisation). Venue : London. Price: £1499.00

Competitive advantage: Speakers from digital marketing experts such as Orange, Youtube, BSkyB, Yahoo, Vodafone, Virgin Media etc

3. Internet Global. Venue: London. Price: Free (if registered in advance)

Competitive advantage: Presentations from industry gurus

Highly specialised topics (web analytics, ecommerce)

Business start up and innovation village: unique activity to introduce digital marketing to up coming businesses.

Many other international events such as UBM, All for One(USA) etc pose an indirect competition to iMedia summit 2012.