Recent Research on Oil Spill Dispersants

Dr. Merv Fingas

Spill Science

Edmonton Alberta Canada

Summary

- What is dispersant research
- Research since 2010
- Effect of the Deepwater Horizon
- Some findings
- Better directions?

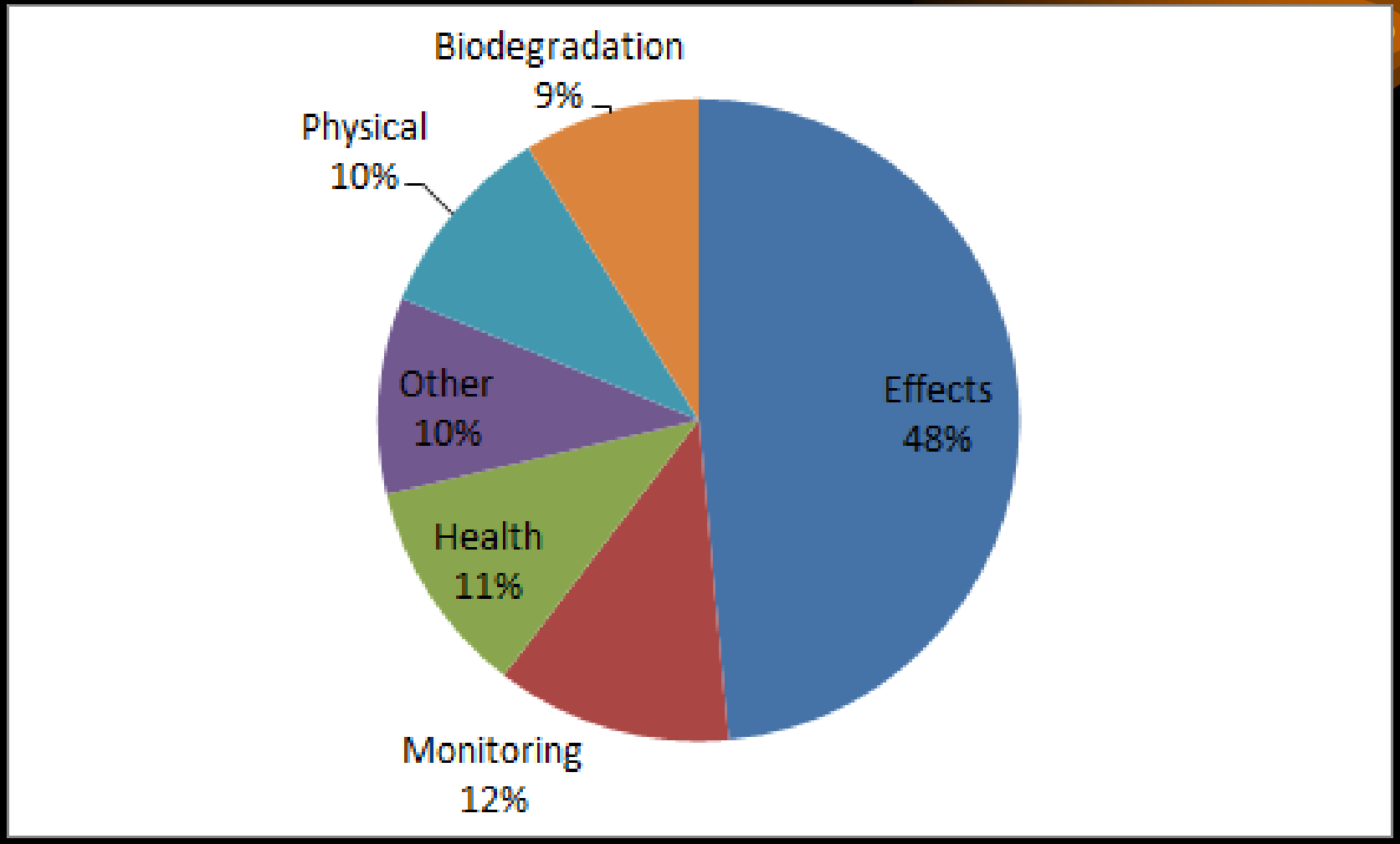
Possible Dispersant Research Areas

- Toxicity and effects
- Basic physical behavior
- Effects on oil behavior
- Longevity of dispersion
- Biodegradation
- Monitoring
- New dispersants
- Effectiveness
- Human health
- Interaction with sediment
- Application
- Fate of dispersed oil
- Molecular interactions
- Benefits vs. effects

Research Survey

- Since 2010 – e.g. since Deepwater Horizon
- Found 92 research projects carried out and published in scholarly journals
- The only topics covered were toxicity and effects, physical, monitoring, others, biodegradation, and human health
- 40% were related to the Deepwater Horizon

Division of Research



What this says ……

- Half of the research carried out studying toxicity and effects of dispersants
- Less than half of research carried out as a result or in response to the Deepwater Horizon
- Half of research divided equally between other areas studied
- Most research areas not studied

Some results of selected areas

- Results are about the same as previous findings

Effects studies

- Effects studies largely finding out that dispersed oil is more toxic than undispersed, because of the large increase in PAHs in the water column
- This depends on life stage of the target organism, eggs, smolts etc. are much more susceptible
- (Of course one cannot really get a high concentration of naturally dispersed oil in a test solution)

Physical Research

- Has largely focused on effects of sediment interaction with oil
- Sediment interaction is increased with dispersant and results in increased sedimentation

What is not studied

- The fact that dispersions are de-stabilized with time, is not being studied
- This fact is also largely ignored in other studies – usually because it is difficult to incorporate into studies
- Many other aspects not studied as well, e.g. application, effectiveness, etc. etc

Monitoring

- Many studies on monitoring the dispersant application on Deepwater Horizon
- No real conclusions, effectiveness not really determined on both surface and sub-surface applications


RACHEL CARSON

Biodegradation

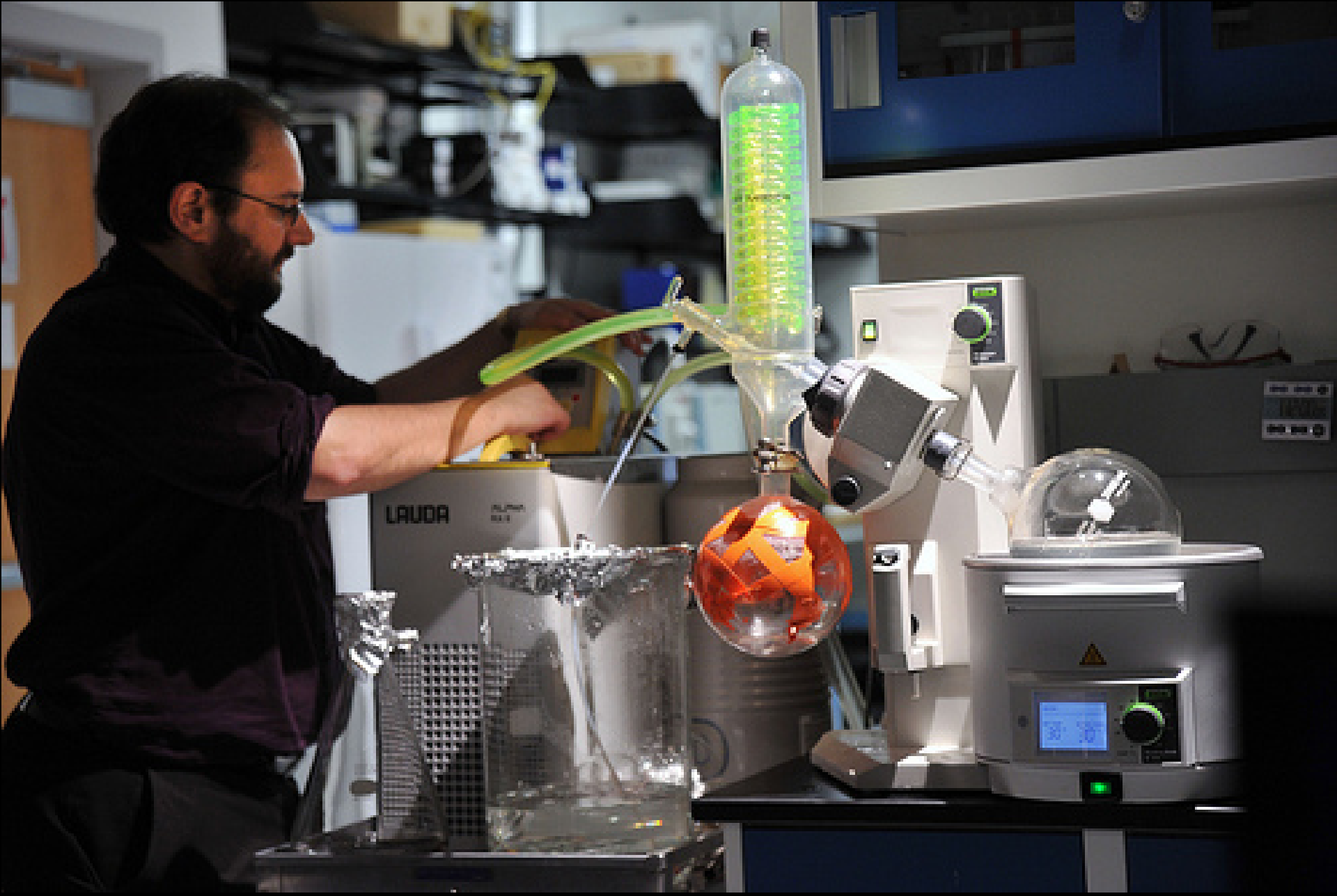
- Scientific studies are again showing that oil biodegradation is about the same or slower with the application of dispersants

Human Health Studies

- Extensive studies conducted on effects of dispersant application on human health
- Results mixed – high doses may have an effect – most research showed that low doses do not have an effect
- Yes, more research needed

Retrospect

- Much of the research in past 3 years was in response to the Deepwater Horizon and addressed immediate situations
- No doubt that the research in this area will decline in coming years
- Hopefully it will be balanced and focus on some of the areas missed


LAUDA

Summary

- A burst of dispersant research occurred after the Deepwater Horizon spill – much of this research directed at finding the effects or toxicity on certain species

New Directions

- For the first time there was research on the effects of dispersants on human health – no real results yet