### Student Question Answers

<table>
<thead>
<tr>
<th>Student</th>
<th>Question</th>
<th>Answers</th>
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<tr>
<td>shereen</td>
<td>How can I get a job as new formulated chemist? with no experience, only taking practical cosmetic formulation course, and I have BS in chemistry &amp;biochemistry from Egypt.</td>
<td>Well, it’s a difficult question to answer because I don’t know what you mean by thicker or more stable because I don’t know what you already have. How could I make thicker and more stable a Hydrogen Peroxide solution? How can I get a job as new formulated chemist? with no experience, only taking practical cosmetic formulation course? It comes down to three things…</td>
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<td>Ernesto Leon</td>
<td>I need your help for verification in Prospect my interest in registration was create web, verification by three president of some industry of cosmetics, who know my job during five years. degree in Chemical and was added the course.</td>
<td>Well, it’s a difficult question to answer because I don’t know what you mean by thicker or more stable because I don’t know what you already have. How could I make thicker and more stable a Hydrogen Peroxide solution? How can I get a job as new formulated chemist? with no experience, only taking practical cosmetic formulation course? It comes down to three things…</td>
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### Education

Perhaps the most important thing you can do to improve your chances of getting a job in the cosmetic industry is to improve your knowledge of the industry. Getting a bachelor’s degree in Chemistry is most helpful but a Biology or Chemical Engineering degree can work too. You need the degree. Without it, most formulations jobs will be off limits to you. Initially, getting a masters degree only helps a little. But a bachelor’s degree isn’t enough. You also should learn about the cosmetic industry. Find out what the industry is about as well as the companies, the brands, and the products. If you really want to get a leg up on people competing for those jobs go through our Practical Cosmetic Formulation course. After you complete this course you will know more than almost any other candidate for the formulation job you might apply.

### Networking

Being well educated is helpful but it’s not enough to get you that job. The number one thing you can do to improve your chances of getting a job in the cosmetic industry is to meet and connect with people in the industry. Now is the time to start building your network of people you know. In fact, 80% of jobs are gotten through networking!

So if you are looking to become a cosmetic chemist the best thing you can do is to go meet other cosmetic chemists. This can be done through the Society of Cosmetic Chemists. Attend meetings. Begin relationships with other formulators. Learn from them what the job is all about. Ask questions and have a conversation. Cosmetic chemists are a friendly bunch. However, don’t just take, take, take. Remember that people aren’t necessarily interested in helping you. First, figure out some benefit the person will get by helping you and figure out some way you can help them.

### Personality

The final thing you can do is to work on yourself. Critically evaluate yourself and determine if you have the interpersonal skills needed to get what you want. One of my favorite books on the subject is the classic How to Win Friends and Influence People. The basic theme of that book is to think about what other people want before you ask for what you want. Also, read up on how to be the best interviewer that you can. There are lots of blogs with excellent advice.

Finally, if you are willing to relocate you improve your chances of getting a job in the cosmetic industry. Most of the jobs are located in the New York / New Jersey area or in California. If living in one of those areas is ok with you then your chances go up. There are jobs around the country but there are just fewer of them.

### Getting Lucky

There is one other very important thing about getting a job in the cosmetic industry (or any other industry). It helps to be lucky. Most people are where they are because they had some bit of good luck. I know I landed in the cosmetic industry because of luck. My first job offer for an agriculture chemical company fell through so I ended up taking the job at the shampoo factory. And I’m glad I did because I wouldn’t be doing what I’m doing now.

Getting lucky

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### Ashley Green

I formulate hair products, and I love formulating for damaged and dry hair. The ingredients I rely on are Cationic Guar, Behentrimonium Chloride, and Amphoteric. I have seen the use of Guar Hydroxypropyltrimonium Chloride in shampoos that also contain anionic surfactants. I always see an amphoteric surfactant in these formulas, usually Cococethane. Is there a specific ratio of an amphoteric surfactant that allows cationic and anionic ingredients to mix? I see it on ingredient panels all the time, and I’ve successfully done it, but I don’t know how it worked. Usually the formula separates over time.

1) Shampoo: I have seen the use of Guar Hydroxypropyltrimonium Chloride in shampoos that also contain anionic surfactants. I always see an amphoteric surfactant in these formulas, usually Cococethane. Is there a specific ratio of an amphoteric surfactant that allows cationic and anionic ingredients to mix? I see it on ingredient panels all the time, and I’ve successfully done it, but I don’t know how it worked. Usually the formula separates over time.

2) Conditioner: Lactylates! Are these a better option for skin care emulsions since they are incompatible with cationics? Is there any way to make them mix and stay together (such as in the question above)?

I think all of my questions will have this theme, so I’ll stop at two.

Thanks!

### César Ley

How could I make thicker and more stable a Hydrogen Peroxide solution? Well, it’s a difficult question to answer because I don’t know what you mean by thicker or more stable because I don’t know what you already have. But for a stable formula. You could use something like this. This is an oil in water emulsion with 17% hydrogen peroxide (35% solution).

<table>
<thead>
<tr>
<th>Part A</th>
<th>CRODAFOS CS20A (Cetearyl Alcohol (and) Cetyl-20 Phosphate (and) Dinonyl Phosphate) 3.50</th>
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<tbody>
<tr>
<td></td>
<td>Glyperm 1.50</td>
</tr>
<tr>
<td></td>
<td>CRODALAN™ LA (Cetyl Acetate (and) Acetylated Lanolin Alcohol) 0.50</td>
</tr>
<tr>
<td>Part B</td>
<td>Deionized Water 70.00</td>
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<tr>
<td></td>
<td>BRU™ S20 (Steareth-20) 0.50</td>
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<tr>
<td>Part C</td>
<td>EDTA 0.50</td>
</tr>
<tr>
<td></td>
<td>EDTACNA (Cetearyl-5 Phosphate (and) Dinonyl Phosphate) 2.00</td>
</tr>
<tr>
<td></td>
<td>Deionized Water 4.00</td>
</tr>
<tr>
<td>Part D</td>
<td>Hydrogen Peroxide 35% 17.00</td>
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<tr>
<td>Suppliers:</td>
<td>1. Croda</td>
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<tr>
<td>pH: 3.0 ± 0.5</td>
<td>Viscosity: 2,500cps (RVT Spindle TC, 10 rpm)</td>
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To get it thicker you would have to add more Cetearyl Alcohol.
Haydah Bolouri

Hi Perry,

I have a question about how to replace an ingredient for another. For example, if I have a lotion formula which I am satisfied with however, I would like to add some additional oil. Is that any problem for the whole formula? - Which points are important to remember? - If I would like to change emulsifier for another which points are most important to check? - What is the critical point of an emulsifier? Why should I have only one emulsifier in one formula and 2 or 3 in another? - I am interested in vegetarian and organic emulsifiers. I replaced emulsifier in my favourite lotion for 2 others. I noticed that the body lotion leaves a white trace during application that disappears eventually. However, I would like to avoid this effect. Thank you so much in advance!

Haydah

Replacing an ingredient with another ingredient can be done rather easily (or more difficulty) depending on the chemical nature of the ingredients. If it's an ingredient in the same class for example they are both anionic surfactants, you can try a 1:1 replacement. So Sodiuum Lauryl Sulfate would be replaced with exactly the same amount of Ammonium Lauryl Sulfate. Similarly, cationic polymers would be substituted, surfactants, emollients, etc. But emulsifiers will depend on their HLB value. You can't just substitute one for another. And oils will also be affected by the HLB requirements of the surfactant and oil. It can be a little complicated.

Remember it's easier to replace solution ingredients than ingredients in emulsions. For stability reasons having multiple emulsions in your formulas is a good idea. Usually one is not enough. You have to find an emulsifier with the proper HLB values. See our post on how to formulate using the HLB system.

Haydah Bolouri

I see sometimes they mention the pH balanced in a formula (specially in a creme formulation) and sometimes not. When should I need to adjust the pH in my formulation?

There are a variety of times you'll want to adjust your pH but this depends on the pH range of your specifications. For most formulas (especially natural) you'll want a pH range below 5.5 so your organic acid preservatives will work. Also, some thickeners work better at a specific pH range as do some styling polymers. You need to adjust your pH value any time your finished formula is outside the range of your pH.

GEORGIOS GEORGADIS

1. Which kind of cosmetics are more sensitive to microbes? Shampoo or creams?

Q1. What is the best way of adding high amount of powder additives in cream formulas? In one formula we have 8% Niacinamide and 3% Vitamin C. What is the best way of adding these powders to the formula so that they disperse completely?

Some of the water soluble ingredients so the way you are doing is correct. Niacinamide is not heat sensitive so if you wanted to you could add it prior to heating your formulas.

Q2. If we are using Decyl Glucoside and Lauryl Glucoside in a shampoo formula, what is the maximum amount that you recommend to use? On their technical data sheet, 15% is recommended amount. However, I have seen some formulas go up to 30%. Please advise.

These are both water soluble ingredients so the way you are doing it is correct. Niacinamide is not heat sensitive so if you wanted to you could add it prior to heating your formulas.

Q3. Would it be okay to use 2-3% alcohol (as extracts solvent) in a shampoo formula? At the low percent amount would alcohol interfere with the latter formation of Glucose surfactants?

I would advise to keep the water to about 70 gr C, and like keep it for 20 min. This is supposed to kill most of the bacteria.

Suzanne

Dear Perry,

How do you actually add salt to thicken a facial or body wash gel? I thicken with gums and then when I pH balance to 5.3-5.5, the gel thins out substantially. I understand in your video that I can add salt to thicken but how exactly do I do this? Do I dissolve salt into water and add it to the formula? If so, at what %?

For stability reasons having multiple emulsions in your formulas is a good idea. Usually one is not enough. You have to find an emulsifier with the proper HLB values. See our post on how to formulate using the HLB system.

Vida

Dear Perry,

I hope all is well with you. Thank you for scheduling this conference call and your teaching and guidance.

Here are my questions for the call:

Q1. What is the best way of adding high amount of powder additives in cream formulas? In one formula we have 8% Niacinamide and 3% Vitamin C. What is the best way of adding these powders to the formula so that they disperse completely?

- Here is how I do it: I leave 6% water out and dissolve both Niacinamide and Vitamin C into it. Then I add it at the cool-down phase into the formula. Please advise.

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Yes, you can boil the water if you like. The downside to boiling is that you lose more water due to evaporation. It is best to use deionized water.

Suzanne

Dear Perry,

Follow the instructions on this page to do a salt curve analysis. http://chemislotcom.com/salt-curve-analysis/how-to-control-cleansing-cosmetics/

Becky

I took the preservative webinar. I asked Dene Godfrey for his recommendation for his top choice for an EcoCert preservative. He said he thought [name 70] Plus was the best one in his opinion...I want to the website to inquire about purchasing this and they only sell it in drum sizes.

I would love to know how a small scale formulator can have access to these products that seem to be only accessible to large companies?

Thank you for giving us this chance to answer our questions. Mine are:

1. said cationics surfactants work on -ely charged damaged parts of hair or skin. I understand for hair the damage is the torn or split ends, but for skin, can you explain what kind of damage causes a -ve charge? And if cationics surfactants are good for damage skin then why are they irritants?

For stability reasons having multiple emulsions in your formulas is a good idea. Usually one is not enough. You have to find an emulsifier with the proper HLB values. See our post on how to formulate using the HLB system.

Sara Mural

Hi Perry,

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Yes, you can boil the water if you like. The downside to boiling is that you lose more water due to evaporation. It is best to use deionized water.

One of the best ways is to ask the company for a sample. Or you can find a distributor of the compound rather than buying it directly from the manufacturer. One other way is to go to trade shows and talk with the sales people directly.

Sara Mural

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2. If cyclomethicone evaporates when applied to hair or skin, does that mean we lose the property it was used for? (Ship/shine)?

Yes, you lose the property over time. If you want longer lasting shine and slip you would use Dimethicone. If you want temporary shine and slip (such as when a person is styling their hair) you would use cyclomethicone.
I am working on a ringing gel and what I think I know is I know about ringing gel is consist of a high and low HLB emulsifier. One question is can you use basic emulsifying wax with a low emulsifier a stearate, if not why?

How does heat effect emulsifiers?

To make a ringing gel you need to create very small emulsion particles and standard emulsifying waxes will not get you there. They are just not balanced properly hydrophiliclipophilic to create small particle emulsions. To make a ringing gel you get an emulsifier like Oleth-3, Oleth-5 and DEA Oleth-3 Phosphate. For an oil phase you can use an oil like Squalane & PPG-3 Benzyl Ether Myristate.

How does heat effect emulsifiers?

You need to use heat to create an emulsion so heat can effect the functionality of an emulsifier. Basically, you need to make sure to heat your system to a temperature higher than the highest melting point of any of your ingredients.

1. Can we develop an effective Face Wash for skin types Dry, Normal and oily using the same base above? Can we have same pH range for all three types? (pH range 5.5 - 6.5)

Yes. Typically, you would just lower the surfactant level (SLES) for the dry formula, and increase it slightly for the oily formula. Yes, the pH can be the same.

2. In few occasions we have experienced inconsistent performance of the thickener. (pH range of final products - 5.5 to 6.8) What are the steps we should adapt to get a more consistent performance. (Or any suggestions for a better alternative thickener?)

You can try to do a salt curve analysis on the formula to see how it responds to salt. See this post for a description. http://chemistrycrafter.com/salt-curve-analysis-how-to-control-cleansing-cosmetics/

3. In addition to thickening are there any other effects given by PE950 Disolrate at 0.25% to 0.12%.

It may impact the foam making it more creamy feeling but towering foam. You have to do experiment to see what happens in your system.

4. We have done trial with base without Deycil Glicosate 1% Disodium Sulphosuccinate 0.5% (and we had to reduce PE950 Disolrate to 0.12% to 0.25%.)

This is a very complicated question which doesn't have a good answer. Hair binds together in a non-greasy way when coated with a film former like PVP. Also, when coated with conditioning ingredients like cationic polymers or cationic surfactants the oily nature of these ingredients will bind hair together but the coating level is low enough that it doesn't look greasy.

5. How, exactly, are hydrolyzed proteins created?

Proteins are made up of lots of amino acids joined together by peptide bonds. Hydrolysis of the protein is what happens when the peptide bonds are broken. We say the protein has been hydrolyzed (ysis = splitting, hydro = water). This process really depends on what protein you are going to hydrolyze but typically you will disuade the protein in water, add an enzyme that breaks down the amino acid linkages and creates a smaller chain of amino acid peptides. The resulting solution containing the protein piece (small peptide chains and free amino acids) is called a hydrolysate solution. To fully understand this process you have to have a good background in basic biochemistry.

6. How do you formulate with vanilla resin (CO2 extracted) vs. vanilla essential oil? Are they the same concentration? Does the resin need to be first dissolved in some sort of solvent, before incorporation into the formula?

A vanilla resin has to be dissolved in Alcohol before being incorporated into your formulas. It is not water soluble. Vanilla essential oil doesn't really exist since the resin has to be dissolved in alcohol before being incorporated into the formula. It is water soluble. Vanilla essential oil isn't really exist since you can't get the aromatic compounds out of the plant through distillation. Typically what is sold as vanilla essential oil is a vanilla resin diluted with a solvent like alcohol or jojoba oil.

1. Topic: sunscreen test

5. How, exactly, are hydrolyzed proteins created?

Here is a summary of a challenge test. http://cosmetictestlabs.com/preservative_challenge_testing_overview.html You need a few different strains of bacteria, agar plates, storage ovens, and a method for counting the bacteria on the plates. This is specialized testing that should be handled by companies who have all the proper equipment to do this work.

2. Topic: hair care products

What mechanism, chemistry or product makes clean hair bind together in a “good” way without appearing greasy or sticky. Curly hair appears well defined and straight hair doesn’t appear “stringy.”

4. Topic: microbial challenge test

How does heat effect emulsifiers?

What, exactly, is included in a testing of sunscreen (procedures, equipment, tests performed)?

See the SPF testing section on the FDA monograph http://www.amablas.com/assets/117/FDA_FINAL_RULE_Labeling_and_Effectiveness_Testing_Sunscreen_Drug_Products_for_Over-the-Counter_Human_Use.pdf

Basisly you need a spectrophotometer, a UV light source that can produce 200 to 400 nanometer rays, and some volunteers. It is suggested that you hire someone to do this work as it can't be done objectively without special equipment. This lab could help. http://www.amablas.com/services/spf-testing/

3. Topic: suncreen test

What, exactly, is included in a testing of sunscreen (procedures, equipment, tests performed)?

You can try to do a salt curve analysis on the formula to see how it responds to salt. See this post for a description. http://chemistrycrafter.com/salt-curve-analysis-how-to-control-cleansing-cosmetics/
Hi Perry, 

1. If I use phenoxyethanol with sodium benzoate as a preservative (and the same question for sodium benzoate with potassium sorbate) is this will make products last for one year (approximately) even when using herbal infusions? And are these kinds of preservatives suitable to be used with all kinds of products? 
2. Are we going to make sunscreen creams at home there will be a big chance to be burned because titanium dioxide & zinc oxide need a special blending technique but at home blending will make them set at the bottom therefore there is an uneven coverage and also there is no chance to know the exact SPF specifically, is this true? 
3. How could we use Hydroxyethylcellulose gum (to make gel or serum)? What is the technique and the exact ratio to use especially when making a facial serum? 
4. What is the perfect ratio for natural gums (especially xanthan gum & Hydroxyethylcellulose gum) when making both gel & serum? 
5. Could we use the modified guar gum only in hair products or could we use it also in facial products? 

Thank you very much

Grace Tang

Hi Perry, I am making a sea salt spray and I was wondering what kind of preservative I should add. Can you give some advice? Thank you!

(From Hong Kong)