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Research

Why river islands are formed after every big city

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Abstract

The perennial rivers have high and wide catchment areas that supply water continuously to the rivers. So, all through the year, they get water for their activities. Large cities emerge around such rivers and congregate as huge urban clusters like Delhi, Varanasi, and Patna. It was quite interesting to note that in all the big rivers like the Ganges, after crossing all big cities are invariably present, big river islands. The perceived cause of this is the heavy deposits by the people, or the slowing down of the river as it flattens up. The cause of the river islands is only partly the dirt thrown into the river by the people but largely because of the soap detergents and acids that produce large amounts of salts leading to precipitate and coagulation through a process called Cataphoresis of the colloidal impurities while crossing the cities. Since the river is slender in the cities due to concertized/solid embankment the flow is fairly fast. So, the whole material is pushed beyond the precincts of the cities. But as the river meanders beyond the city's ambit it spreads wider and slows down. So it gives enough opportunity to the colloids to settle down over some time the same enlarges to form River Island.

Keywords: Cataphoresis, Coagulation, Colloids, Detergent, Soaps.

Introduction

The catchment areas of perennial rivers are very wide but as they come near any big city, they start contracting from both sides due to concretization. As the catchment area decreases, the depth of the water increases. This also increases the flow of water. The suspension of detergents and soaps in water bodies creates huge damage to the soil and water itself (Senapati, 2021). Regular laundry detergents are bad for the environment, as most of us are aware. Detergents do not biodegrade completely, contaminating our water supplies, rivers, and oceans with toxic heavy metals such as cadmium and arsenic (Netsol Water Solutions, 2022). Detergent waste is also (Saraswati, 2022) a serious threat to water. The hazardous chemical content contained damages air quality and causes the death of water biota. This leads to the formation of colloids and precipitates. Which gets stuck at a certain point and forms a wetland. These wetlands add colloids and precipitate, which form river islands that sometimes change the direction of the flow of water. Many chemicals and insoluble solutions pollute water and are the cause of the formation of river islands.

Formation of river islands

Coming across the maps and tours, it's quite visible that the water has either changed its direction or many small masses of wetlands have emerged between them. Despite pollutants and dirt, people largely discharge detergents and soaps in large amounts. Detergents and soaps that are drained in water without treating them contain 40 - 90% of salt by weight. Due to the presence of salt, a chemical reaction takes place. This is done through the process called Cataphoresis treatment (Rossi et al., 2017). The colloidal particles settle down and are covered with a coating that forms a wetland. Various types of colloids are recognized: inorganic colloids (silicates, iron oxy-hydroxide). After

crossing the big cities the catchment area increases and several wetlands are observed with dirt, oil, and precipitates. As this colloidal particle joins with another due to Cataphoresis, they collectively form a mass of wetlands. The composition of water in the wetland is highly variable and no generalization can be made. Wetlands mainly receive water from the atmosphere and generally have low mineral ionic composition while those acquiring water from precipitation as well as groundwater are rich in minerals, particularly calcium and magnesium.

Figure 1. Self experimented explanation:- Soaked in water

Figure 2. Self experimented explanation:- Soaked in salt sol

Requirements

Milk, water, 2 pieces of cotton fabric, salt solution.

Procedure

1. 2 pieces of cotton fabric were taken and hung. One was soaked in water and the other one was soaked in salt solution.
2. Slowly milk was poured into each of them respectively.
3. Both the fabrics were left still for 15 – 20 min, and the extra water was allowed to drain out.

Observation

1. It was observed that milk spilled out of the water-soaked fabric without any residue left in it.
2. It was observed that milk got curdled on the salt solution-soaked fabric and residues were left in it.
3. Salt separates the milk particles from water. Thus this shows how colloids are formed in the presence of salt.

Discussion

While passing Pragyaraj via flight a fine whitish line was visible which shows how the colloids are getting collected at the banks and river islands. Also, the formation of river islands somehow diverts the flow of water, which eventually leads to flooding.

Conclusion

Colloidal particles are formed when the water is salty in nature.

Figure 3. Yamuna Biodiversity Park situated near Yamun River

Figure 4. Suaeda Plants (confined tk be saline) found in Yamuna Biodiversity Park

These pictures depict the plants of suaeda that are found on river banks in large masses, which contain a very high amount of salt and taste very salty.

More numbers of river islands are found near Varanasi, Pragyaraj, Gorakhpur, Bihar. As the numbers of industries found here are more. Brocade work is mostly done in Varanasi which involves colours and chemicals too, which are directly drained in rivers.

Thus it's very important to decrease the amount of usage of chemicals and colors to protect the remaining resources.

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