material of the capsule, as it is disintegrating, from coming into contact with the device's components.

[005] Additionally, capsules contain pharmaceutical materials that can interact with or damage the device. For example, as the capsule disintegrated, the pharmaceutical material will dissolve into the surrounding fluid and change the chemical composition of the fluid immediately surrounding the pharmaceutical material and the change may prevent the device from operating optimally. The content of the capsule may include material, such as a drug or excipient or compound, that when dissolved at high concentrations, will interfere with the operation of the ingested device placed within the same capsule. As the material enters the solution at the site where the capsule is dissolving, there is a high concentration localized around the device. The stomach motion and diffusion disperses the capsule content throughout the stomach and reduces the concentration. During this time, the device will not operate properly optimally if activated in the localized high concentration areas.

[006] Also, during long term storage the pharmaceutical material may begin to interact with the device and prevent optimal performance when the device is activated. For example, the product inside the capsule may be acidic and harmful to the electronic components. Alternatively, the content may be too basic, which can also harm the electronics. Furthermore, the material or product within the capsule will start to interact with the surrounding fluids, once the capsule is ingested and the capsule starts to disintegrate.

[007] Therefore, what is needed is a device that is manufactured and assembled, such that the capsule walls or other materials present in the fluid environment immediately surrounding the device do not interfere with optimal performance of the device.

Summary

[008] The present disclosure~~invention~~ discloses multiple approaches to preventing the capsule walls and other material from interfering with the performance of a device once the device is activated by surrounding fluid.

[008a] In a first aspect of the present disclosure, there is provided an apparatus comprising:

a partial power source having a first portion and a second portion and configured to generate power upon contact of the first portion and the second portion with a fluid;

a control unit electrically coupled between the first portion and the second portion of the partial power source and configured to be activated by receiving power from the partial power source and to encode information in a current flow between the first portion and the second portion through the fluid; and

a material disposed on and isolating the first portion and the second portion of the partial power source from a surrounding environment and formulated to disintegrate upon contact with the fluid to expose the first portion and the second portion of the partial power source to the fluid,

wherein the material surrounds the partial power source and is secured to itself to define a cavity between the material and the partial power source.

[008b] In a second aspect of the present disclosure, there is provided an apparatus comprising:

a capsule comprising a wall, wherein the capsule defines a cavity for holding a pharmaceutical product, and wherein the wall is configured to disintegrate upon contact with a fluid;

an ingestible unit configured to be disposed in the capsule suitable for ingestion, wherein the ingestible unit is activated upon contact with the fluid and is configured to encode information in a current flow upon activation;

and

a material disposed on at least part of the ingestible unit, wherein the material facilitates physical separation of the ingestible unit from at least a portion of the capsule during disintegration of the capsule in the fluid, and wherein the material is configured to disintegrate after the capsule disintegrates to allow the ingestible unit to contact the fluid.

[008c] In a third aspect of the present disclosure, there is provided an apparatus comprising:

an ingestible tablet configured for association with a pharmaceutical agent including:

an ingestible device configured to be activated upon contact with a fluid; and

a tablet material in contact with at least part of the ingestible device; and

a material surrounding at least a portion of the ingestible tablet, and formulated and configured to inhibit interaction of the ingestible device and the pharmaceutical agent during disintegration of the pharmaceutical agent;

wherein the material is a non-soluble film material that defines an opening at either end of the ingestible tablet such that when the tablet material comes in contact with the fluid and expands the film material controls the direction of expansion.

[008d] In a fourth aspect of the present disclosure, there is provided a method comprising:

disposing between a first layer of material and a second layer of the material a device configured to be contained within a pharmaceutical product and to be activated by a liquid following dissolution of the pharmaceutical product in the liquid, the device configured to encode information in a current flow upon activation, the device having a first portion and a second portion, the disposing including disposing the device with the first portion in contact with the first layer and the second portion in contact with the second layer; and

securing the first layer of the material to one of the device and the second layer of the material, and securing the second layer of material to one of the device and the first layer of material.