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Gel-Pac

Gel-Pac™ novel hatchery delivery system

Overview

Gel Pac is a 'Gel' delivery system for use in day old poultry that may be used as a vehicle for delivering a range of products such as vaccines, competitive exclusion and nutritional supplements. The nature of Gel Pac is such that the level and uniformity of product uptake by birds is greatly improved over standard methods of product delivery in the hatchery which utilises water as the vehicle.

Although referred to as a 'gel', Gel Pac behaves in a very similar manner to water in terms of viscosity, however it cannot be administered via a standard spray nozzle and the product forms distinct 'beads' on birds that facilitate intake by day old birds.

Key points:

- Quick and easy preparation of Gel-Pac®.
- Water stabilising ingredients contained in the gel allow reconstitution with tap water.
- 25ml of Gel-Pac® applied to each box of chicks.
- All Gel-Pac® deliver on to birds is ingested in under 2 minutes.
- Minimal wastage of Gel-Pac® compared to spray administration with water resulting in improved uptake of product.
- No wetting of chicks therefore reduced risk of chilling chicks particularly in winter.
- Gel-Pac® contains dye that enhances uptake by birds and causes tongue staining allowing visual validation of the administration efficiency
- 100% of birds in boxes demonstrate tongue staining after administration of Gel-Pac®
- Dye is apparent in faeces passed by chicks 24 hours after administration providing a further visual validation of product delivery.

Stable gel ensures uniform suspension

Perfect for insoluble ingredients

Individual gel drops are easily consumed

Will not soak feathers

Readily visible to the birds

Ideal for use in gel delivery systems

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- Multiple administration of Gel-Pac® possible if required with no reduction in level of take up by birds or risk of chilling
- Potential support of chicks to be held over.
- Standard spray equipment cannot be used to administer Gel-Pac®, however some types of spray administration equipment may be adapted and dedicated Gel-Pac® equipment is available
- Gel-Pac® consist of ingredients that are all approved under the European Feed additives Directive (EC) No 1831/2003

Practical use of Gel-Pac®

Mixing of Gel-Pac®

Preparation of Gel-Pac® is quick and easy and requires a suitable vessel for the amount of Gel-Pac® to be prepared and a hand held food blender. It is advisable to use a food blender of at least 500 Watts in power in order to avoid over heating as the Gel-Pac® thickens. (Tesco's Hand blender Model HB14, is suitable and has a detachable blade unit that facilitates cleaning) A video illustrating the preparation of Gel-Pac® is available at the following link: **http://m.youtube.com/watch?v=gB_kisE8Ac4**

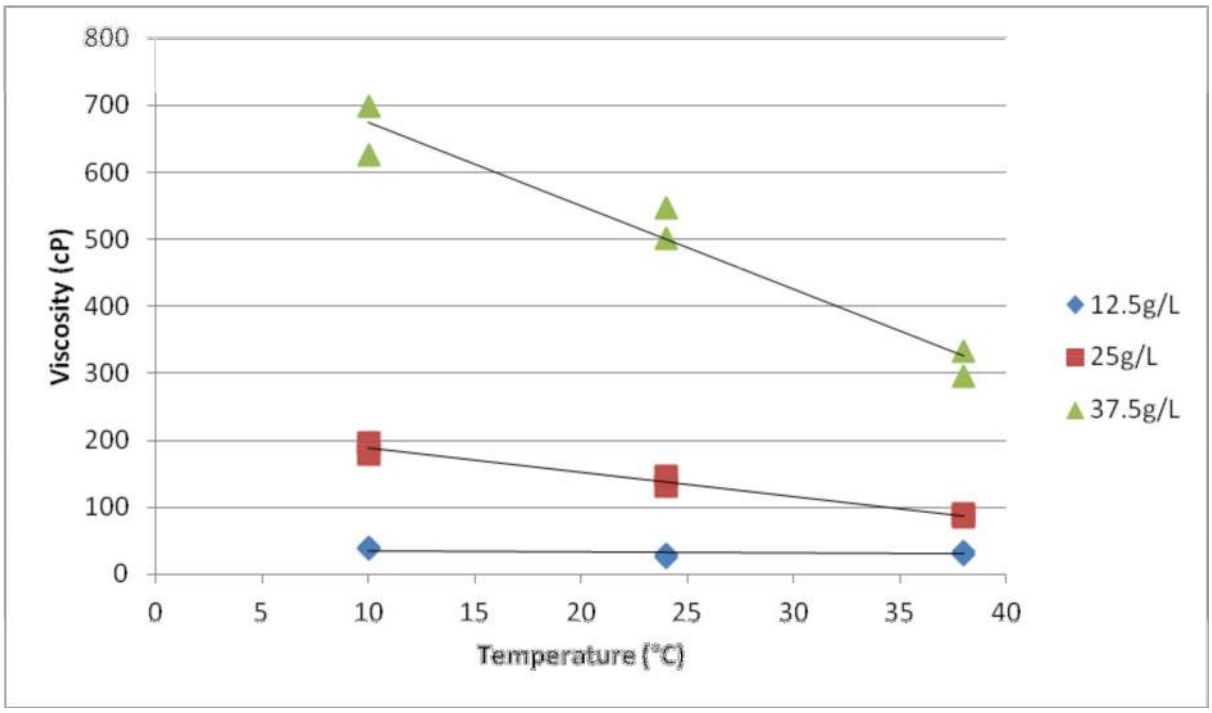
The following are outline instructions on how to mix Gel-Pac®

1. Ensure the location that you will mix the Gel-Pac® is free from drafts and air flows from ventilation as the powder is very fine and will be disseminated in the area by strong air flows.
2. Fill a suitable plastic jug with the 3.75 litres of cold tap water.
3. While operating the hand blender in the water, gradually add about 1/4 of a pack Gel-Pac® to the water.
4. Blend thoroughly. When the blender is turned off, you should see very few gel powder particles adhering to jug wall above the liquid line.
5. Gradually add the remaining Gel-Pac® while continuously blending over a period of around 30 seconds.
6. Allow to stand a one minute, then pour slowly through a suitable sieve into a clean jug to remove any particles that may remain. If the blending has been adequate, you will see very few particles retained by the sieve.
7. You can note the increased viscosity of the solution by tipping the jug slightly and back to vertical and observing how the solution 'clings' to the side of the jug compared to water.
8. Finally, rehydrate the product to be delivered by the Gel-Pac® into 250ml of distilled or deionised water, pour into the gel and mix with a suitable utensil, such as a stainless steel whisk, until the solution is uniform viscosity.
9. The solution is now ready to add to the administration equipment to be employed. In order to save set up time on the day of use, it is acceptable to mix the gel the day before it is needed and store in a closed container in a fridge, but do not add any medicinal product or vaccine to the mixture until just prior to use.

Temperature

The temperature of Gel-Pac® influences the behaviour of the product. The colder the water temperature used for re constitution, the more readily the Gel-Pac® beads on birds. At the optimal usage rate of Gel-Pac® of 25g/litre, the optimal water temperature is between 10°C and 20°C. If water available is above this temperature, the viscosity may be adjusted by altering the inclusion rate of the product.

Figure 1. Viscosity vs. Temperature for Concentrations of Gel-Pac®



Use with Coccidiosis Vaccines

The properties and behaviour of Gel-Pac® are such that the product will enhance the uptake of coccidiosis vaccines. In order to ascertain the potential need to agitate Gel-Pac® containing coccidiosis vaccines, a study was performed to evaluate the potential sedimentation of the coccidial oocysts in coccidiosis vaccine. The study showed that there is no sedimentation of coccidiosis vaccines in either water or Gel-Pac® and is summarised in the accompanying document.

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Use with Probiotic and Competitive Exclusion(CE) Products

The properties and behaviour of Gel-Pac® are such that the product will also enhance the uptake of CE products. When using Gel-Pac® with CE products the CE product should be mixed with the water before adding the Gel-Pac®. Avigard (Lallemand Nutrition) has been evaluated when mixed with Gel-Pac® and compatibility demonstrated. Please refer to the relevant manufacturer regarding compatibility with other CE products and probiotic products.

Use with Infectious Bronchitis Vaccines

In vivo and in vitro compatibility tests have been performed with Gel-Pac® and infectious bronchitis vaccine, and shown that there is no detrimental effect of the Gel upon the Vaccine titre.

IB Titration in eggs, Triplicate log 10 results:

In water:	T0: 3.8, 3.7, 4.0	GMT=3.8
	T120: 3.4, 3.6, 3.7	GMT=3.6
In Gel-Pac®:	T60: 3.3, 3.8, 3.5	GMT=3.5
	T120: 3.4, 3.7, 3.5	GMT=3.5

Use with Aftex

Aftex is an extract of Prickly Pear plant that has the effect of increasing Heat Shock protein (HSPs) in birds. As this product is not a 'living' product such as vaccines or CE products, it has no ability to spread between birds within a flock. Data comparing levels of HSPs in birds after administration of Aftex with Gel-Pac® and with water demonstrated that there was improved uptake of Aftex when administered with Gel-Pac®. This illustrates the potential benefit of when using Gel-Pac® to deliver vaccines also as the dose received by each bird will be greater than if administered with water.

Use with Newcastle Disease Vaccines

Compatibility with Newcastle Disease vaccines has been demonstrated in Vitro.

A commercial live frozen ND vaccine from the VG-GA strain (VG-Vac®) was thawed in 30 C water, and then diluted to 1 label dose per ml in 3 different solutions:

- Distilled (DI) water, which verified the initial amount of vaccine input
- 4 ppm chlorinated DI water, serving as tap water
- 4 ppm chlorinated DI water plus Gel-Pac® added at label concentration

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Vaccine titres were measured in triplicate upon input and after 30 and 60 minutes in suspension using specific-pathogen-free (SPF) embryonated eggs. The method used was the one USDA requires of vaccine manufacturers in Title 9, Code of Federal Regulations §113.329.

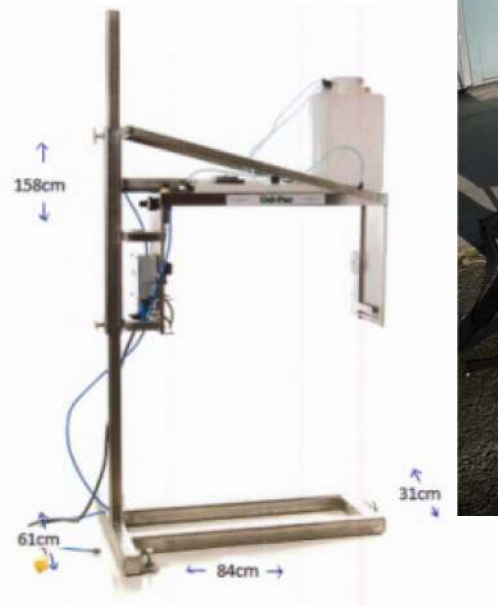
Geometric mean titres were calculated as EID50/ml of vaccine using the method of Reed and Muench. The titre of the ND vaccine input at time 0 was 105.6 EID50/ml.

The titre of ND vaccine exposed to ordinary chlorinated water solution for 30 minutes fell to 103.9 EID50/ml, and after 60 minutes decayed further to 103.0EID50/ml. This aggressive inactivation by the water ultimately left only 2% of the vaccine activity remaining after 30 minutes and less than 1% after 60 minutes.

In comparison, using Gel-Pac to stabilize the same water source in a suspension sustained the original vaccine potency, with titres at 30 and 60 minutes holding at 105.7 and 105.6 EID50/ml, respectively.

Use with Newcastle Disease Vaccines

As mentioned previously, Gel-Pac® cannot be delivered effectively using standard hatchery vaccination equipment, and must be delivered using specialised manifold based equipment. Various options are available for delivery.
A self- contained Gel-Pac® deliver machine is available that may be installed over any hatchery conveyor where a suitable straight length of conveyor is available. The equipment is operated by a photocell, pneumatic syringe mechanism and a manifold that delivers Gel-Pac® across the width of a chick box.



For smaller bird numbers an adapter is available to fit to the Autodos (Micron Sprayers Ltd) that will facilitate delivery of Gel-Pac® either in the hatchery or on farm environment. The manifold attachment may also be used to adapt some types of existing hatchery spray equipment where the spray operates over a moving chick box.

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