UTiterFast Rapid Aqueous Adjuvant

Product Manual

1. Introduction

UTiterFast is a commercially available adjuvant designed for animal immunization. This pH-neutral aqueous adjuvant appears as a transparent liquid with a faint blue hue. Its primary ingredient is a high-molecular-weight polymer, which provides excellent sustained-release properties and immune stimulation.

UTiterFast is safe, effective, and easy to use—simply mix with the antigen before injection. All excipients meet human-grade preparation standards, ensuring biocompatibility, safety, and non-toxicity.

2. Key Advantages

2.1 Ideal for Large Animal Immunization

UTiterFast is specifically optimized for **cattle, horses, pigs, alpacas, goats, and sheep**. Large animal immunization involves longer cycles and higher costs. Traditional Freund's adjuvant often causes severe inflammatory reactions, granuloma formation, and tissue necrosis at injection sites, compromising animal health and antibody yield. UTiterFast's aqueous formulation is gentle and non-irritating, with excellent absorption at injection sites—no swelling or ulceration. This ensures large animals remain in optimal condition throughout the immunization cycle, **significantly improving polyclonal antibody yield and quality**.

2.2 Superior Safety Profile

The adjuvant is non-toxic and non-immunogenic. Immunized animals remain healthy (unless the antigen itself is toxic), no granulomas are induced, and animals do not produce antibodies against the adjuvant itself. Compared to Freund's adjuvant, UTiterFast delivers stronger immune enhancement with significantly lower toxicity. Validated in piglet safety studies: UTiterFast group animals showed normal mental status, appetite, and stable body temperature with no adverse reactions at injection sites.

2.3 Simplified Preparation

No complex emulsification process required. Simple mixing and stirring saves over 90% of preparation time. Particularly suitable for large-scale vaccine production and batch immunization of large animals, significantly reducing process complexity and contamination risk.

2.4 Broad Antigen Compatibility

UTiterFast is compatible with diverse antigen types without compromising antigen stability. In contrast, the high-shear stress generated during oil-emulsion adjuvant formulation may disrupt the native conformation of protein antigens, leading to epitope loss.

2.5 Dual Immune Enhancement & Durability

This adjuvant simultaneously enhances both humoral and cellular immunity. Antibodies have extended duration of action, and induced memory cells mount stronger responses upon re-exposure to antigen—particularly important for large animals requiring long-term blood collection.

2.6 Rapid Immune Induction

UTiterFast enables rapid initiation of immune responses, inducing high-titer antibodies within just **two weeks**, whereas traditional Freund's adjuvant requires **eight weeks**. Additionally, UTiterFast effectively shortens experimental animal usage cycles, allowing the entire cohort to undergo more rounds of immunization-antibody harvesting procedures. This significantly enhances antibody production efficiency.

3. Usage Guidelines

3.1 Preparation Method

- Based on actual antigen usage, dilute the antigen to 2× the target concentration using sterile physiological saline or PBS in advance.
- Under sterile conditions, dispense the required volume of adjuvant (1:1 volume ratio) and promptly mix thoroughly with the antigen dilution.

3.2 Administration Routes

- Common injection routes including subcutaneous multi-point injection, intraperitoneal injection, and intramuscular injection are all suitable.

- **Recommended: Intramuscular injection into the calf muscle of the hind leg.**

3.3 Immunization Schedule

- Primary immunization on Day 0, followed by a booster on Day 14.
- If antibody titers remain suboptimal by Day 21, administer an additional booster.

3.4 Antigen Compatibility & Dosage Recommendations

Antigen Type	Recommended Dosage
Most protein antigens	25–50 μg per dose
Immunogenic inactivated whole-virus/whole-bacterial antigens and virus-like particles (VLPs)	15–25 μg per dose
Small-molecule antigens conjugated to carrier proteins	50–80 μg per dose

3.5 Storage Conditions

Store at 2–8°C; Do not freeze. Shelf life: 2 years.

4. Precautions

It is normal for the UTiterFast adjuvant to precipitate after mixing with the antigen. The mixture should be thoroughly mixed before being drawn into the syringe. Additionally, the mixture should be injected as soon as possible after being drawn into the syringe.

5. Case Studies

5.1 Mouse Immunization Experiment

Case data from four items of random testing (e.g., virus-like particles prepared by the company, small molecule protein hapten) were mixed with UTiterFast rapid adjuvant to immunize mice three times during a four-week pilot study. The serum titer of mice met the requirements. Specific data are as follows:

Antigen No.	Conc. of Antigen	Quantity	Immune cycle	Antibody titer	
				3 weeks	4 weeks
1	$10^{6.0}TCID_{50}$/ml	10	Once per week	16 K	32 K
2	$10^{6.0}TCID_{50}$/ml			16 K	64 K
3	1.06 mg/ml			16 K	64 K
4	1.09 mg/ml			8 K	32 K

Figure 1: Mouse Immunization Experiment - Serum Titer Results

5.2 Mouse Model Testing of Mycoplasma hyopneumoniae Antigen

5.2.1 Serum Antibody Titer

Our results demonstrate that the proprietary rapid adjuvant UTiterFast group rapidly induced antibody production and generated significantly higher antibody titers compared to the Freund's adjuvant group. This advantage can effectively shorten the experimental animal usage cycle. Consequently, within the same timeframe (e.g., one year), the entire animal cohort can complete more rounds of the immunization-antibody collection process, substantially improving antibody acquisition efficiency.

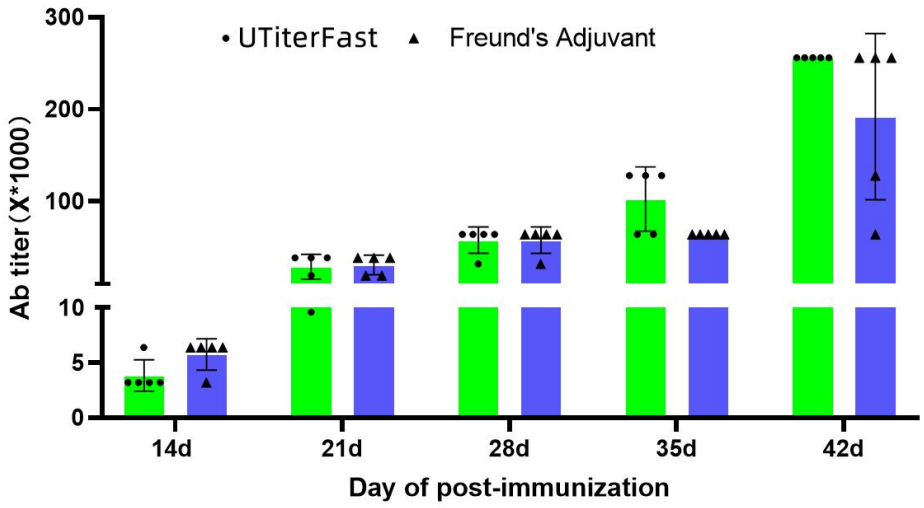

Figure 2: Serum Antibody Titer Comparison - UTiterFast vs. Freund's Adjuvant

5.2.2 Long-term Immunity Indicators

The proportion of memory B cells was higher in the proprietary adjuvant UTiterFast group than in the Freund's adjuvant group. Memory B cells are key mediators of efficient secondary immune responses, capable of rapidly differentiating into plasma cells to produce high-affinity antibodies.

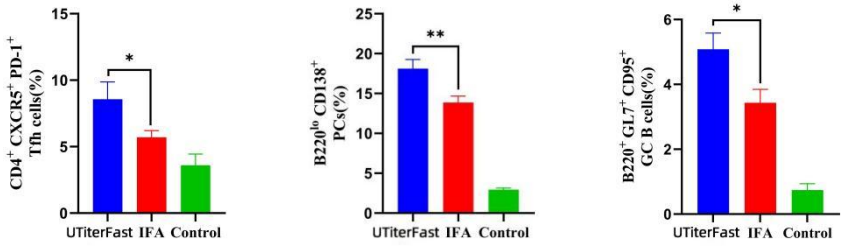

Figure 3: Tfh Cells, Plasma Cells, and Germinal Center B Cell Analysis

The proportions of both $CD4^+$ and $CD8^+$ central memory T cells (Tcm) were significantly higher in the proprietary adjuvant group than in the Freund's adjuvant group. $CD4^+$ Tcm serve as the core reservoir for long-term immunological memory, while $CD8^+$ Tcm can rapidly differentiate into cytotoxic T lymphocytes (CTLs) upon secondary infection to efficiently clear pathogens.

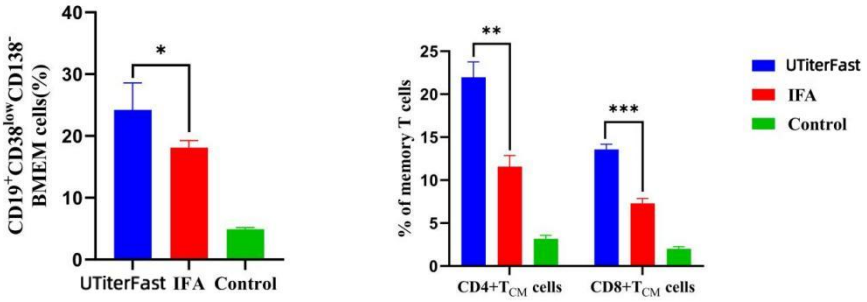

Figure 4: Memory B Cell and Memory T Cell Analysis

5.3 Antigen Adaptability Study in Mouse Model

5.3.1 Cellular Immune Response Results

Compared to Freund's adjuvant, the proprietary adjuvant UTiterFast group (tested with peptide, subunit antigen, and virus-like particle antigens) significantly increased the levels of $CD4^+$ T cells and $CD8^+$ T cells in mouse spleens. This enhancement effectively shortens the antibody generation time and promotes the rapid production of high-titer antibodies.

The rapid adjuvant UTiterFast exhibits broad antigen compatibility and can synergistically enhance immune responses with various types of antigens.

Group	CD4+ T Cell (%)	CD8+ T Cell (%)
Antigen 1 (Peptide) + UTiterFast	45.7±2.7	29.3±1.1
Antigen 2 (Subunit) + UTiterFast	47±1.6	32.9±1.6
Antigen 3 (VLP) + UTiterFast	49.8±2.3	40.4±2
Antigen 1 (Peptide) + Freund's Adjuvant	28±1	18.2±1.2
Antigen 2 (Subunit) + Freund's Adjuvant	30±2.3	21.3±1.3
Antigen 3 (VLP) + Freund's Adjuvant	30.9±2.2	19.1±0.7

5.4 Large Animal Safety Study (Piglets)

5.4.1 Post-immunization Clinical Observations in Piglets

Group	Pig ID	Clinical Observation (Mental Status, Appetite)	Duration of Temp ≥41°C (Days)	Injection Site Observation
UTiterFast	1	**Normal**	0	Good absorption; no swelling or ulceration at injection site
	2		0	
	3		0	
	4		0	
	5		0	
Freund's Adjuvant	1	Lethargy, reduced activity, decreased feed intake	1	Poor absorption; swelling and ulceration at injection site
	2		1	
	3		0	
	4		1	
	5		2	

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