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DEVELOPMENT OF AN INNOVATIVE CHOLECALCIFEROL RODENTICIDE BAIT

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Abstract BASF have developed a non-anticoagulant rodenticide soft bock bait, Selontra® (0.075 % cholecalciferol). In mammals, cholecalciferol toxicity causes death by hypercalcemia - the calcification of soft tissues such as heart, kidney, liver, stomach (inducing a stop-feeding effect). The resulting "stop-feeding" effect means that cholecalciferol rodenticide baits must be both potent and palatable to ensure a lethal dose of bait is eaten before this effect occurs. The mode of action of cholecalciferol means that once a lethal amount has been eaten, time to death is between 2-5 days, compared to 4-10 days for anticoagulants. All reported choice feeding (palatability) studies and field trial studies undertaken either complied with or were a modification of that prescribed in the Biocidal Products Directive Technical Notes for Guidance on Product Evaluation, Product Type 14.
Choice feeding studies (4 days) were undertaken using male anticoagulant susceptible *R. norvegicus* against either Selontra® (n=50) or Storm® (0.005 % flocoumafen) wax block bait (n=50). The mean times to death were 2.8 days for Selontra® and 5.7 days for Storm®. This quicker time to death means that, providing the bait formulation is palatable, control of an infestation can be quicker with a cholecalciferol bait than an anticoagulant bait. Field trial studies undertaken have shown that against *R. norvegicus*, *R. rattus* and *M. musculus* control can be achieved within as few as 7 days of baiting. Choice feeding studies with Selontra® undertaken against anticoagulant resistant strains of *R. norvegicus*, Y139S and L120Q resulted in 100 % mortality within 4 days. This effectiveness, against resistant rats was confirmed with two field trials. The first trial was in France, where the Brown rats were identified, by DNA sequencing, as Y139F - resistant to first generation anticoagulants (FGARs) rodenticides and bromadiolone. Total control, 100 %, was affected after 12 days of baiting with Selontra®. The second site was in undertaken in South England where the rats were identified, by DNA sequencing, as L120Q - resistant to FGARs plus bromadiolone and difenacoum. The population of approximately 2,000 rats was also considered to be extremely neophobic. After 18 days of baiting with Selontra® at this highly challenging site, 83 % control was achieved. Unfortunately, after 18 days the baiting was terminated due to harvesting and subsequent significant re-invasion affecting population assessment. The laboratory and field data presented, demonstrates the efficacy against *Rattus norvegicus, Rattus rattus, Rattus exulans and Mus musculus* including anticoagulant resistant strains. Selontra® is palatable and efficacious against both anticoagulant susceptible and resistant strains of rats and mice. Field trials have shown that pre-baiting is not required. This bait will be an invaluable resistant management tool for the effective control of rodent infestations.

Key words Non-anticoagulant, anticoagulant resistance, *Rattus norvegicus*, *Rattus rattus*, *Mus musculus*