

Coated Pellets with Controlled Glucose Release for Interdiction of Hypoglycemia in Children with Diabetes

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Introduction ● A diet plan, meals with a suitable glycaemic index and sophisticated insulin delivery are used for balanced sacharides-insulin intake. Nevertheless, patients must break their activities in specific real day-to-day life situations. Urgency to eat in socially inappropriate time harm their lives, especially in young children with diabetes. Night hypoglycemia, a parental fear of insufficient snack in nursery, sports with prolonged race periods etc. are among these situations.

● Controlled glucose release formulation with 2, 4 and 6 hours lag time offers chance to substitute snacks or other meals in advance, allowing to decrease a life inconvenience and improve therapy adherence of children with diabetes and their parents.

Design A dosage form with controlled glucose release was prepared, a release period of 2-4 hours was achieved. Optimal diameter, resistance of the coat, volume, taste and acceptable form to swallow were refined in pharmaceutical treat. There is core and cover of the pellets, of the maximal diameter 0,6 mm. Cover layer does not exceed of 30 percent of pellet s volume (fig. 1 and 2).

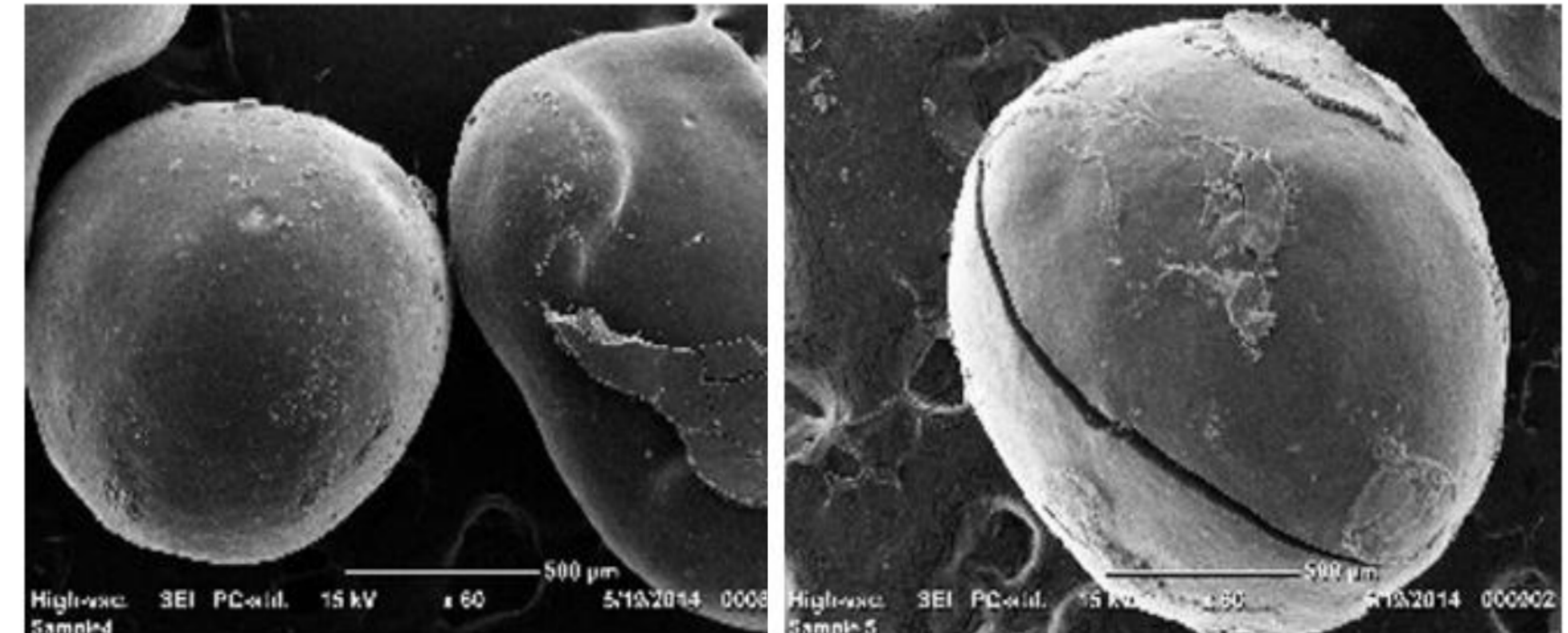


Figure 1: Elektronmicroscopic picture of the pellets before and after dissolution

Figure 2: Composition (100 g) – glucose anhydrous 52,00 g; microcrystalline cellulose (Avicel® PH 101) 9,75 g; carboxymethyl starch (Vivastar P® 5000) 3,25 g; 25% ethylcellulose dispersion (Sulerale® typ B NF) 35,00 g

Pilot laboratory results

● **Dissolution** after desired lag-time, steep glucose release was achieved, with appropriate reproducibility (fig. 3).

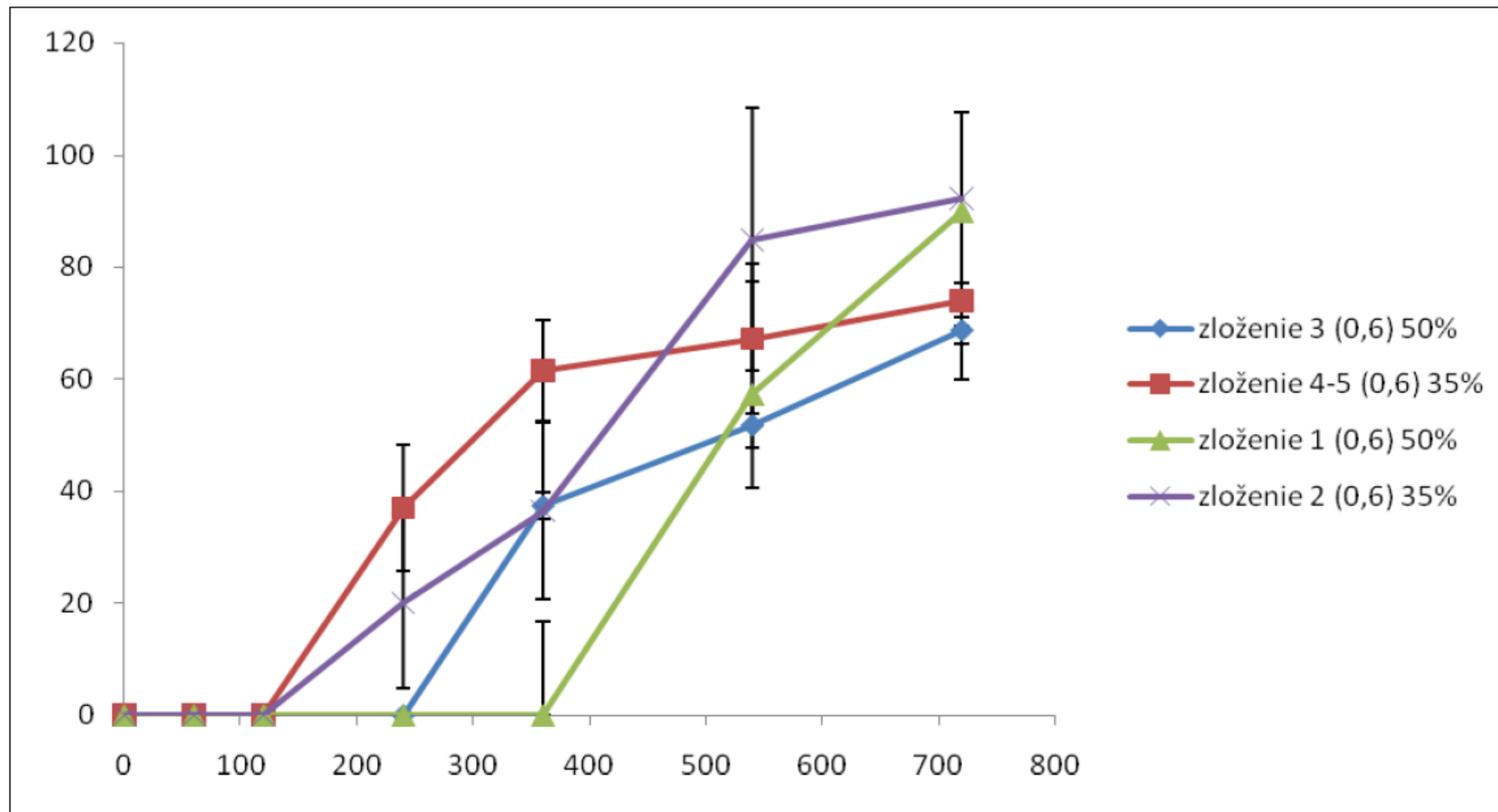


Figure 3: Dissolution study for pellets of 120, 240 and 360 minutes lag time .

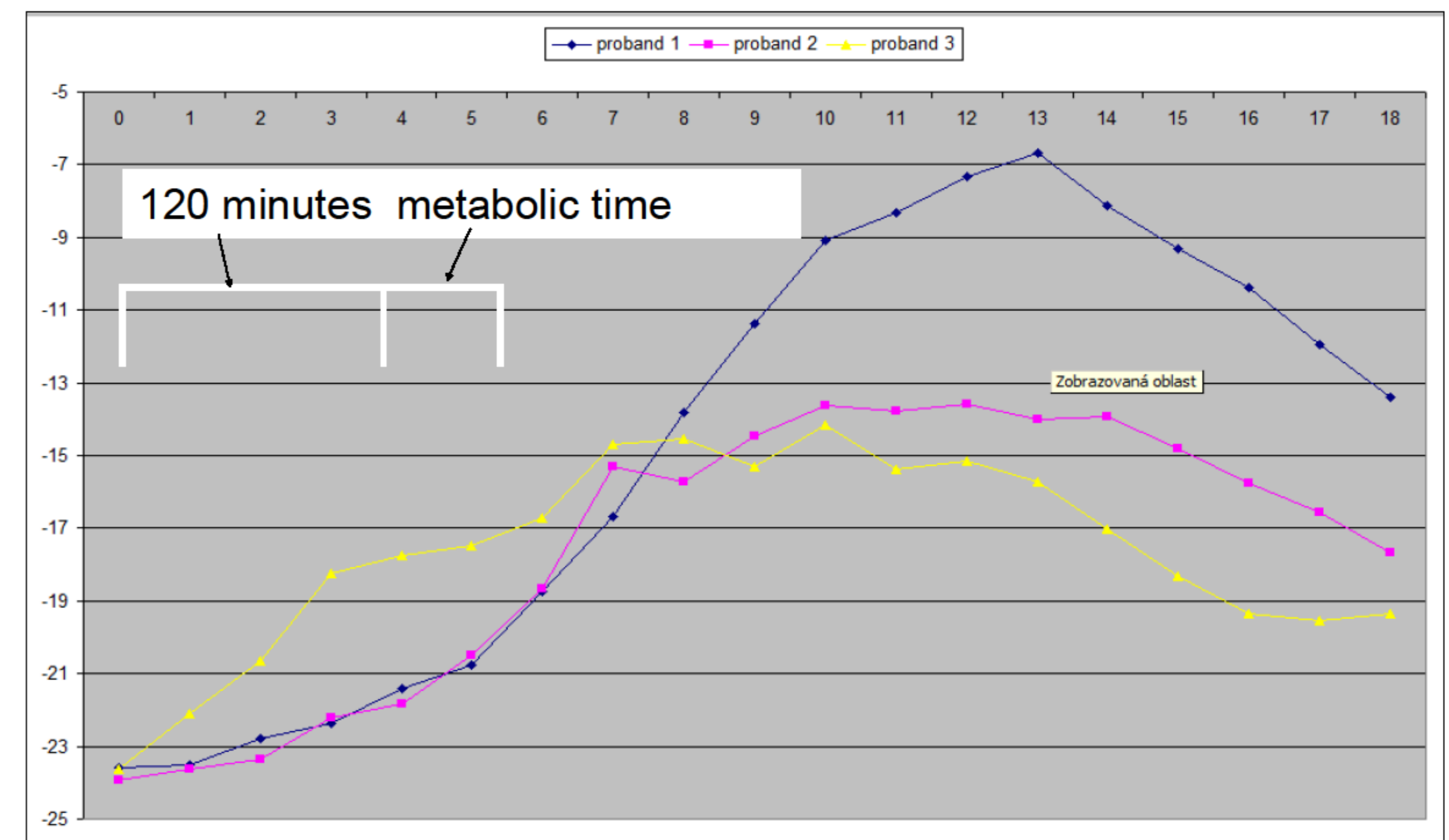


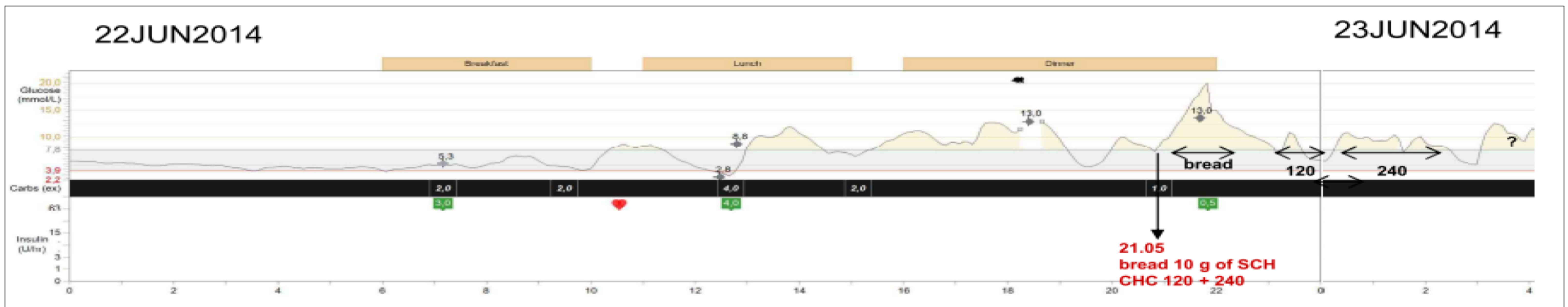
Figure 4: ¹³C-breath test with pellets of 120 minutes lag time.

Pilot clinical results

● Pellets of lag-time 120 minutes were tested using **¹³C-breath test** with addition of the pellets by 50 mg ¹³C-glukózy. Proband 1 swallowed double dose, proband 3 chewed a proportion of the pellets. If a metabolic time is taken into account, clinical tests follow a dissolution curves (fig. 4).

● **CGM study with pellets of lag-time 120 and 240 min.** Proband with diabetes swallowed along with dinner pellets with 10 g of glucose of lag-time 120 a lag-time 240 minutes without bolus insulin dose (fig. 5).

Figure 5: CGM study



Conclusions The formulation with controlled glucose release with specific easy-to-explain lag time offers additional means for diabetes treatment.

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