The disease related to postprandial blood glucose level such as diabetes and obesity is becoming more and more serious problem throughout the world, it is a thorny challenge to human being health and medication. The purpose of this study is to develop an energy sustained-release function food based on the combination of biodegradable hydrogels and starch, which aims to control the postprandial blood glucose level. In-vitro test, the hydrophilic colloid including xanthan gum and konjac gum, the maize starch and buckwheat were selected as biodegradable hydrogels and energy source, respectively. The energy sustained-release is substantially demonstrated when the combined noodles consist of the following components: hydrophilic colloid of xanthan gum and konjac gum mixed with the mass ratio of 5:5, and at a mixed gum to starch concentration of 2.5 wt %; mixed flour with the mass ratio of 20 % buckwheat flour, 32 % maize starch and 48 % plain flour. Compared with the common noodle, the decreasing rate of glucose release (DRGR) of energy sustained-release noodle could reach 39.2 %. In-vivo study, it showed that slow-release noodles can obviously control the level of postprandial blood sugar (P< 0.01). Through scanning electron microscope, it is observed that the combined noodles making the postprandial blood glucose control available is attributed to the cross-linked starch to the hydrogel and build uniform network microstructure.